NEW HORIZON COLLEGE OF ENGINEERING
Department of Artificial Intelligence & Machine Learning
22AIM74 - Project Phase-2 Batch list

Sl. No.	USN	Name	Team Lead Mob No	Faculty Supervisor	Project Theme	Project Title	Mapping to Sustainable Development Goals (SDG)
1	1NH22AI002	AR JINEESH	9632144360	Dr. Sowmya HK	AI in Education	HENRY: Adaptive Vocabulary Learning System	SDG 4: Quality Education
	1NH22AI008	ABHIGNA MYLAVARAM					
	1NH22AI056	I DARREN RAJ					
	1NH22AI192	SRISHTI KUMARI					
2	1NH22AI009	ABHISHEK	7899058059	Prof. Apeksha	Natural Language Processing (NLP)	Real-Time Multi-Language Translator with Sign Language Integration	SDG 10: Reduced Inequalities
	1NH22AI007	ABDUL RAHMAN					
	1NH22AI047	GARIKAPATI DEEPCHAND					
	1NH22AI086	M VISHNU VARDHAN REDDY					
3	1NH22AI062	JAYANTH T	86188 75893	Prof. Sindhuja R	Recommendation Systems	CourseDeck-AI Powered Learning Platform	SDG 4: Quality Education
	1NH22AI050	GOKUL E R					
	1NH22AI054	HEMANTH H R					
	1NH22AI011	ADITHYA BHAT					
4	1NH22AI013	ADITYA KAMATH	8861369124	Dr. Sanjeev P Kaulgud	Anomaly Detection	AI-Enhanced Honeypots for Cyber Defence with Real-Time Detection and Response	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI001	LIKHIT A					
	1NH22AI004	AADIL RAHMAN					
	1NH22AI065	JUDIN JOMON					
5	1NH22AI035	CHRIS MATHEW THOMAS	9686862296	Prof. Sandhya Rani V	Speech Recognition and Audio Processing	Deep Fake Audio Detection System	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI016	AMITH IGNATIUS L					
	1NH22AI039	DHARANISH P K					
	1NH22AI094	MOHIMAA HALDER					
6	1NH22AI017	ANAND KUMAR	7889476460	Prof. Apeksha	Computer Vision and Image Processing	AI-Driven Smart Waste Collection and Real-Time Hotspot Detection for Sustainable City Management	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI069	KARAN TYAGI					
	1NH22AI026	BARKHA ANJUM SHAIK					
	1NH22AI030	BHUVAN RATHOD					
7	1NH22AI055	HUZAM SHUKKUR	97469 30034	Prof. Ramyashree P M	Natural Language Processing (NLP)	Nutri bot: An AI-Powered Healkth Assistant for Proactive Dieteary Management	SDG 7 - Affordable and Clean Energy
	1NH22AI019	ANISH S ANAND					
	1NH22AI012	ADHITYEN V K					
	1NH22AI018	ANIRUDH KS					
8	1NH22AI028	BELLARY N LOHITH KUMAR	7993289714	Dr. N V Uma Reddy	Computer Vision and Image Processing	DeepMediScan: AI-Powered Health Insights	SDG 3: Good Health and Well-being
	1NH22AI105	NETTEM MANISH					
	1NH22AI021	ARSHETHA C					
	1NH22AI097	M LOHITH KUMAR RAJU					

Sl. No.	USN	Name	Team Lead Mob No	Faculty Supervisor	Project Theme	Project Title	Mapping to Sustainable Development Goals (SDG)
9	1NH22AI032	CHANDRIKA R	8123279022	Dr. Akshatha P S	Computer Vision and Image Processing	Multimodal Emotion Detection using Speech and Facial Expressions	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI051	HARIHARAN V					
	1NH22AI023	AVINASH A					
	1NH22AI071	KEERTHI VINOD JAGADESHAN					
10	1NH22AI033	CHINMAY K	9686685708	Dr. Umamaheswaran S	Recommendation Systems	Empathy AI: A conversational AI for Psychological profiling and Interest Analysis	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI042	G PRUTHVI RAJ REDDY					
	1NH22AI046	ABHI RAM GAJULA					
	1NH22AI066	JYOTHI SAI SRAVANA R					
11	1NH22AI034	C.SUNITHA	9392621724	Mr. Syam Dev R S	Anomaly Detection	AI powered real time crime detection and Emergency alert system	SDG 7 - Affordable and Clean Energy
	1NH22AI027	B.ADARSH TEJA					
	1NH22AI024	BALAKRISHNA G M					
	1NH22AI025	B.DHEERAJ SAI					
12	1NH22AI038	DHANUSH M	9902660201	Dr. Sanjeev P Kaulgud	Computer Vision and Image Processing	Saral Yatra: A smart public transport monitoring system	SDG 11: Sustainable Cities and Communities
	1NH22AI029	BHARGAVA SIMHA R					
	1NH22AI005	AAKASH NAVIN					
	1NH22AI040	JASWANTH G					
13	1NH22AI063	JIYA MARY JERIN	7483513905	Prof. Sindhuja R	AI in Education	Educational Content Creation through Multi-Video Summarization and Short Video Generation	SDG 4: Quality Education
	1NH22AI043	G S SAI KAMAL					
	1NH22AI064	JOGU SINDHU					
14	1NH22AI058	JAHNAVI S R	6360658203	Prof. Shashikala K S	Recommendation Systems	Emotion Aware Diet Recommendation System using Deep Learning and Natural Language Inputs	SDG 4 - Quality Education
	1NH22AI178	TEJASWINI KONNUR					
	1NH22AI068	KALLU DEVA KEERTHANA					
	1NH22AI067	K BHOOMIKA					
15	1NH22AI072	KEVIN C JOESPH	9739562639	Prof. Thanu Deepu George	Natural Language Processing (NLP)	Fake News Detection in Regional Languages	SDG 10 - Reduced Inequalities
	1NH22AI073	KEVIN JONES W					
	1NH22AI117	PRAJWAL S					
	1NH22AI157	SHREYA MB					
16	1NH22AI080	DASARATH RAMI REDDY	7204081092	Mr. Syam Dev R S	AI in Education	Blood Group using Finger Prints	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI099	N.ARYAN					
	1NH22AI075	KIRAN RAJ.B					
	1NH22AI084	MALLIKARJUN.B					
17	1NH22AI078	K.CHAKRIDHAR REDDY	9391291150	Prof. Sivasankari S S	Speech Recognition and Audio Processing	Voice and Gesture controlled Biometric File Assistant using Deep Learning	SDG 4 - Quality Education
	1NH22AI106	N.VARDHAN REDDY					
	1NH22AI077	K.GANESH KOUSHIK					
	1NH22AI057	INDRA KAARTIKEYA CH					

Sl. No.	USN	Name	Team Lead Mob No	Faculty Supervisor	Project Theme	Project Title	Mapping to Sustainable Development Goals (SDG)
18	1NH22AI083	MAHITHA CHOWDARY J	9553025552	Dr. Sanjeev P Kaulgud	Computer Vision and Image Processing	Pnuemonia Detection from Chest X-Rays and CT Scans using Deep Learning Techniques	SDG 3: Good Health and Well-being
	1NH22AI082	SIRIVENNELA M					
	1NH22AI088	MELLAMPUTI SRINIDHI					
	1NH22AI081	MADHUMITHRA R					
19	1NH22AI085	MANASWI KOUSHIK S	7348890551	Prof. Shravya Shetty	AI in Education	LearnWise: A Smart and Engaging AI-Powered Learning Platform	SDG 4: Quality Education
	1NH22AI128	RAJENDRA NAIK					
	1NH22AI127	RAJATH U SHETTY					
	1NH22AI015	AKASH V H					
20	1NH22AI087	MANOJ R V	8197844697	Prof. Sandhya Rani V	Computer Vision and Image Processing	AI-Powered 3D Drawing in Air	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI070	KAVYAA BALAKARTHIKEYAN					
	1NH22AI114	PAVAN AADITYA B					
	1NH22AI095	MOUNIKA CHOWDARY R					
21	1NH22AI092	MOHAMMED AYAAN KHAN	7795673893	Dr. Rajashree RS	Computer Vision and Image Processing	AI-Driven Crowd Density Estimation for Smart Public Safety Monitoring	SDG 11: Sustainable Cities and Communities
	1NH22AI091	MOHAMMED AMEEN					
	1NH22AI140	SADAAD MOHAMMAD BABA					
	1NH22AI145	SALIM JAVID BABA					
22	1NH22AI096	M MUNI CHINMAI RUCHITHA	90594 09090	Dr. Sreejith S	Interdisciplinary	AI-Based Smart Electricity Price Prediction and Appliance Optimization System	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI098	MUPPIDI NEHA SATYALATHA					
	1NH22EE033	DEEPTHI R					
	1NH22EE034	DEEPU T					
23	1NH22AI100	NANDADEEP YADAV	9606422040	Dr. Sowmya HK	AI in Education	SKYNET Defence System	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI134	RIZU HAQUE					
	1NH22AI074	CM KEVIN					
24	1NH22AI101	NANDHISH K	6366051538	Dr. Sowmya HK	Computer Vision and Image Processing	AGROGUARD: Real-Time Deep Learning System for Crop Disease Detection and Severity Analysis	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI059	JANHAVI KANTHI					
	1NH22AI121	PRIYANKA B M					
	1NH22AI048	GEETHA P S					
25	1NH22AI108	P. BALASUBRAMANIAN	9148944475	Dr. Sonia Dsouza	Autonomous Systems and Robotics	An Intelligent Aqua Bot	SDG 14: Life Below Water
	1NH22AI113	PARIVARTHAN REDDY M					
	1NH22AI112	P NAGENDRA REDDY					
	1NH22AI116	PRAGATHI K A					
26	1NH22AI109	PN BHAVADEEP	9945584142	Dr. Umamaheswaran S	AI in Education	Smart Surgery Training Simulator	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI093	MOHAMMED FAIZAN AJANI					
	1NH22AI090	MOHAMMED AFTAB AHMED					
	1NH22AI118	PRATHAM PATEL					

Sl. No.	USN	Name	Team Lead Mob No	Faculty Supervisor	Project Theme	Project Title	Mapping to Sustainable Development Goals (SDG)
27	1NH22AI135	ROASHAN S	9789256056	Prof. Sindhuja R	Natural Language Processing (NLP)	Conversational AI-Driven Product Recommendation System using Knowledge Graphs and LLM	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI115	PAVITHRAJ K					
	1NH22AI119	PREM KUMAR S					
	1NH22AI137	RUSHIL S					
28	1NH22AI120	PRIYA DARSHINI T	7026029555	Dr. N V Uma Reddy	Computer Vision and Image Processing	AI-Diven Traffic Optimization and Emergency Response System	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI104	NEHA T M					
	1NH22AI133	RITHUN C					
	1NH22AI138	S. MOKSHITHA					
29	1NH22AI123	R B Pavithra	9840226186	Dr. Jimsha K Mathew	Interdisciplinary	Fault Impact Analysis for 5G using AIML	SDG 9 - Industry, Innovation and Infrastructure
30	1NH22AI124	R SNEHA SINGH	8217055156	Dr. Rajashree RS	AI in Education	Smart Learn: An AI-Powered Personalized Multimodal and Multi Ligual Leanrning Platform for Engineering Education	SDG 4: Quality Education
	1NH22AI139	NIDHI SATISH					
	1NH22AI049	GNANADEEP MALISETTY					
31	1NH22AI126	RAJALAKSHMI R	9741757147	Prof. Ramyashree P M	Healthcare and Medical Applications	Multi-Agent System for Paediatric Oncology Patient Support using LLMs	SDG 3: Good Health and Well-being
	1NH22AI165	SONAL S					
	1NH22AI076	KIRUTHIK J					
32	1NH22AI129	R VENKATA ISWARYA	9573396579	Dr. Akshatha P S	Computer Vision and Image Processing	AI-Powered Real-Time Violence Detection and Automated response system using Vision-Based surveillance	SDG 7 - Affordable and Clean Energy
	1NH22AI110	P N KARUN SAI					
	1NH22AI102	N.CHARAN SAI REDDY					
33	1NH22AI131	RICKY	9380025199	Dr. Sonia Dsouza	AI in Education	Design and Development of Aggronite for the Sericulture to the threat and Prediction Analysis through ML Models	SDG 10 - Reduced Inequalities
	1NH22AI156	SHIVANI RAJKUMAR					
	1NH22AI041	G M PRAVEEN KUMAR					
	1NH22AI174	TANISH M SANGHVI					
34	1NH22AI136	RONIT RATURI	8976451295	Prof. Thanu Deepu George	Computer Vision and Image Processing	Real-Time AI-Driven Defect Detection System using Vision and Weight sensing for Plastic Bottle Inspection	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI148	SAMMETA DHARMIKA REDDY					
	1NH22AI122	PRANISREE PUTLUR					
	1NH22AI111	SHAINY PANAKANTI					
35	1NH22AI141	SADIYA MEHNAZ	9844196071	Prof. Shravya Shetty	Computer Vision and Image Processing	PixelCloak: Conceal Sensitive Information in Media Files	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI162	SIREESHA KS					
	1NH22AI175	TASHU L					
	1NH22AI188	VINAYA SM					
36	1NH22AI143	SAHIL SALHAJ	7975897308	Dr. Sonia Dsouza	Computer Vision and Image Processing	Machine Learning-Driven Apiculture system for Optimizing Honebee Foraging Patterns, Hive Health Monitoring and Colony Collapse Disorder Prevention	SDG 4: Quality Education
	1NH22AI185	VAIBHAV VEMANI					
	1NH22AI160	SIDDARTH SRINIVAS					
	1NH22AI151	SATYA PANDIAN					

Sl. No.	USN	Name	Team Lead Mob No	Faculty Supervisor	Project Theme	Project Title	Mapping to Sustainable Development Goals (SDG)
37	1NH22AI146	SALONI JANGID	8105550145	Dr. N V Uma Reddy	AI in Education	CleverLearn: AI-Powered conversational PDF Assistant	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI170	SUYASH GANESH PATIL					
	1NH22AI052	HARSHITHA P SHETTY					
	1NH22AI037	DEEKSHITHA D GANIGA					
38	1NH22AI154	SHARAN S	9110207597	Prof. Shashikala K S	AI in Education	FullStack Tutoring with AI	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI172	TP DARSHAN					
	1NH22AI149	SANJAY S					
39	1NH22AI153	SHANKA S	7594916107	Dr. Akshatha P S	Recommendation Systems	HelpHand Intelligent Volunteer and Task Matching System	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI132	RITHIKA C PATTA					
	1NH22AI180	V SHRIYA					
40	1NH22AI159	SHREYAS G PALIMAR	9880030860	Prof. Bhawna Khokher	Healthcare and Medical Applications	HEALIX: An AI Medical Chatbot and Appointment Booking System	SDG 3: Good Health and Well-being
	1NH22AI150	SARIKA SUMAN					
	1NH22AI169	SURYA R					
	1NH22AI155	SHASHANK NAIK					
41	1NH22AI161	S ARYA VARDHAN	8074847298	Mr. Syam Dev R S	Natural Language Processing (NLP)	A Malware Detection using Autoencoder in Deep Learning	SDG 4: Quality Education
	1NH22AI189	Y KRISHNA SAI					
	1NH23AI409	G H PAWAN KOUSHIK					
	1NH22AI061	R JAYANTH					
42	1NH22AI163	SNEHA SHINDE	8970269028	Prof. Sandhya Rani V	Healthcare and Medical Applications	AI-Driven Mental health chatbot for Personalized Emotional Assistance	SDG 3: Good Health and Well-being
	1NH22AI158	SHREYA YADAV G					
	1NH22AI179	TIRISHAANT KARTIK					
	1NH22AI144	SAHIL YADAV					
43	1NH22AI184	VEERENDRAKUMAR G S	7259091443	Prof. Bhawna Khokher	Speech Recognition and Audio Processing	Adaptive Speech Transcription for Medical Environments using Deep NN	SDG 3 - Good Health and Well-being
	1NH22AI166	SUBHASH K M					
	1NH23AI408	MADHU M					
	1NH22AI164	SOMESH					
44	1NH22AI171	SYED MUQADDAM ABBAS	9980772904	Dr. Sreejith S	Natural Language Processing (NLP)	Sign language Interpretation	SDG 10: Reduced Inequalities
	1NH22AI187	VIJAY D V					
	1NH23AI401	B SANTHOSH					
	1NH22AI168	SUHAS B					
45	1NH22AI173	TALLAM SATYA SAI SUHAS	8686538808	Prof. Sushma	Natural Language Processing (NLP)	NextGen Financial Price Prediction using ML and DL Algorithms	SDG 9 - Industry, Innovation and Infrastructure
	1NH22AI177	TEJA SWAROOP K					
	1NH22AI010	A HARSHAVARDHAN RAJU					
	1NH22AI044	G SAI NANDA V REDDY					

Sl. No.	USN	Name	Team Lead Mob No	Faculty Supervisor	Project Theme	Project Title	Mapping to Sustainable Development Goals (SDG)
46	1NH22AI193	DIVYAM GUPTA	9453028119	Dr. Sreejith S	AI in Education	BLR Riders	SDG 9 - Industry, Innovation and Infrastructure
	1NH22AI194	ANIKET SINGH MARKO					
	1NH22AI142	SAHIL CHANDRARKAR					
	1Nh22Ai181	SURAJ V					
47	1NH22AI183	VAIBHAV SORCAR	9986790210	Prof. Sivasankari S S	Healthcare and Medical Applications	Supercharged Medical Chatbot- A Next-Generation AI Assistant	SDG 3: Good Health and Well-being
	1NH22AI020	ANU PHILOMEN T DSILVA					
	1NH22AI195	GANESH PRASAD MASULE					
	1NH22AI045	GAGANDEEP NAIK					
48	1NH22AI186	VIBHA N R	8867014336	Dr. Jimsha K Mathew	Interdisciplinary	LLM-Powered AIOps: Proactive Fault Prediction and Intelligent Root Cause Analysis	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI152	SEEMA R					
	1NH22CS123	M SAI SUDARSHAN					
	1NH22CS062	DEEPAK S SHETTI					
49	1NH22AI167	SUDHINDRA DEVULAPALLI	9113236142	Dr. Umamaheswaran S	Computer Vision and Image Processing	Autonomous Vehicle Navigation for Real-Time Decision Making	SDG 9: Industry, Innovation, and Infrastructure
	1NH22AI147	SAM REEVES					
	1NH22AI191	YASHAS SHETTY					
	1NH22AI190	YASH H					
50	1NH23AI403	CHARAN GOVIND	8217360160	Dr. Rajashree RS	Recommendation Systems	AI-Powered Startup Recommendation Engine	SDG 8: Decent Work and Economic Growth
	1NH23AI402	BHARATH B					
	1NH23AI412	SHANKAR					
	1NH23AI415	SUMAN G					
51	1NH23AI405	CHINMAY INCHAL	9353763315	Dr. Jimsha K Mathew	Computer Vision and Image Processing	AI-Based approach towards Personalized Investment & Advisory system	SDG 8: Decent Work and Economic Growth
	1NH23AI417	VIKRANT NAYAK					
	1NH23AI410	PRATIK TORUSKAR					
	1NH22AI036	D TEJESH					
52	1NH23AI413	SHASHIDHAR R	8317381397	Prof. Sushma	AI in Education	Real-Time Multi-Speaker Voice Separator with Live Transcription and Translation	SDG 9: Industry, Innovation, and Infrastructure
	1NH23AI404	CHARAN M					
	1NH23AI416	V RANJITH					
	1NH23AI407	KOUSHIK					
53	1NH23AI414	SHISHYANTHA B M	9686156439	Prof. Shashikala K S	Speech Recognition and Audio Processing	Tracking Deforestation using High-Resolution Satellite Images with DL Techniques combining Unet and ResNet	SDG 9: Industry, Innovation, and Infrastructure
	1NH23AI406	GAJANAND L IMMANNAVAR					
	1NH22AI130	REKHA					
54	1NH22AI022	ASHWINI P	8867972322	Prof. Sindhuja R	AI in Education	OORU Alert: Urban Crowdsourced problem reporting WebApp	SDG 11: Sustainable Cities and Communities

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

HENRY: ADAPTIVE VOCABULARY LEARNING SYSTEM

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

AR JINEESH : 1NH22AI002
ABHIGNA SREE MYLAVARAM : 1NH22AI008
I DARREN RAJ : 1NH22AI056
SRISHTI KUMARI : 1NH22AI192

Under the guidance of

Dr. Sowmya HK
Associate Professor

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "HENRY: ADAPTIVE VOCABULARY LEARNING SYSTEM" is a bonafide work carried out by **AR JINEESH (1NH22AI002), ABHIGNA SREE MYLAVARAM (1NH22AI008), I DARREN RAJ (1NH22AI056) and SRISHTI KUMARI (1NH22AI192)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

Signature of Guide
Dr. Sowmya HK

Signature of HOD
(Dr. N V UMA REDDY)

External Viva

Name of Examiner	Signature with date
1. Dr. S. Umamaheswaran	18/12/25
2. Dr. Sweetha Rani. L	Sweetha 18/12/25

DrillBit

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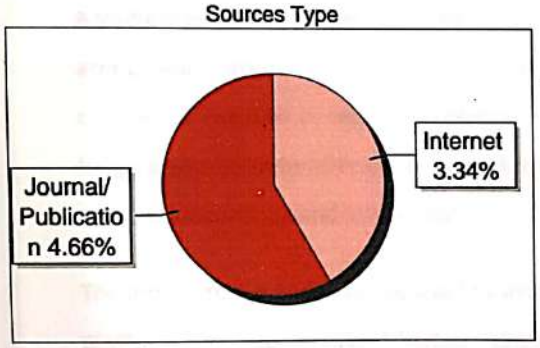

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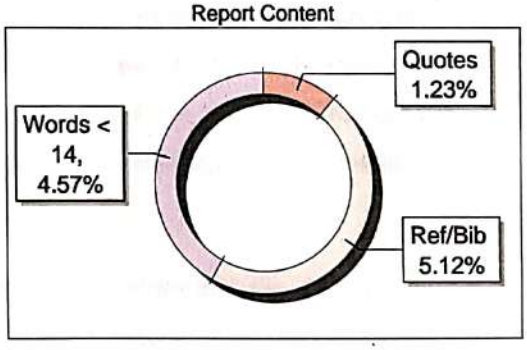

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ABSTRACT

Vocabulary acquisition is a core component of language learning, yet traditional instructional methods and many existing mobile applications lack adaptivity, personalization, and effective long-term retention mechanisms. This project introduces the design and sequential development of an intelligent mobile vocabulary learning system, which is based on Self Attentive Knowledge Tracing (SAKT). In comparison to recurring strategies, SAKT utilizes self-attention mechanisms to simulate interactions between learners, so that learners past learning events are selected selectively by the system when determining the current state of vocabulary knowledge in a learner.

The suggested system will identify mastery of vocabulary dynamically with the use of SAKT, and adjust learning content in real-time, such as increasing difficulty progression, scheduling of reviews, and generation of quizzes. The learning of vocabulary is considered a multidimensional process that takes into consideration word sense, use in context, recall and pronunciation as opposed to memorization. The system overcomes the main shortcomings witnessed in other knowledge tracing models like the inability to capture the long-range dependencies in the interactions of the learner including poor sparse data handling, transparency and sequential bias.

The application is based on mobile first architecture and is coded on Flutter to create cross platform user interfaces and Firebase to create a scalable backend. The core adaptive logic in updating knowledge state and quiz construction is acquired with help of cloud-based services, which assures efficiency and responsiveness. There are other functionalities like gamification, repeated learning through spaced repetition, pronunciation feedback through speech processing, real time learning analytics dashboards and others which are added to improve the use of the vocabulary and help learners retain it in the long-term.

The system shows the feasibility of attention-based knowledge tracing to personalized mobile education and preludes a further extension, empirical testing, and optimization to scalable and adaptive language learning solutions

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi,** Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy,** Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Sowmya HK, Associate Professor,** Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

AR Jineesh (1NH22AI002)
Abhigna Mylavaram (1NH22AI008)
I Darren Raj (1NH22AI056)
Srishti Kumari (1NH22AI192)

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Submitted in partial fulfillment for the award of the degree of

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Under the guidance of

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2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled **"REAL-TIME MULTILANGUAGE TRANSLATOR WITH SIGN LANGUAGE INTEGRATION"** is a bonafide work carried out by **ABDUL REHMAN (1NH22AI007), ABHISHEK (1NH22AI009), GARIKAPATI DEEPCHAND (1NH22AI047) and MANCHALA VISHNU VARDHAN REDDY (1NH22AI086)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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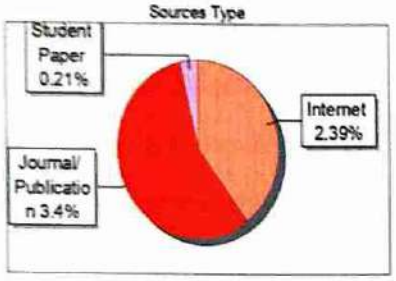

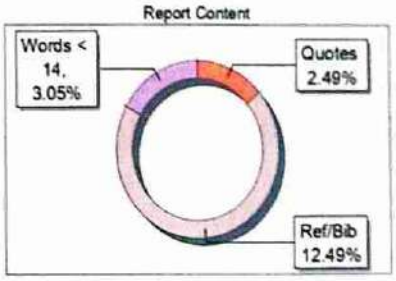

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Student Papers	Yes
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ABSTRACT

This project report presents the design and development of a Realtime Multilanguage Translator with Sign Language Integration, an innovative system that bridges communication barriers between spoken/written languages and sign language users. Imagine a world where spoken words, written text, and sign language flow seamlessly together. That's exactly what we've created with our Multilanguage Translator - a bridge connecting people across different languages and communication styles.

At its heart, this innovative system combines two powerful technologies: advanced language processing and smart vision recognition. Whether you're speaking, typing, or using sign language, our translator understands you. It works with common languages like English, Spanish, and Hindi, but what makes it special is how it handles sign language too.

The magic happens in real-time - you make a gesture, and instantly see or hear the translation. For sign language users, we've trained the system to recognize a wide range of signs, from everyday conversations to more complex expressions. It doesn't just translate words; it understands meaning and context.

We built this with real people in mind. In hospitals, it helps doctors communicate with deaf patients. In schools, it breaks down language barriers for students. At airports or government offices, it makes services accessible to everyone. The technology adapts to different lighting conditions and backgrounds, making it practical for daily use.

What excites us most is how this is just the beginning. We're already working on adding more languages and improving the system's ability to understand regional signing variations. Our goal is simple: to create technology that doesn't just translate words, but connects people.

The translator has significant potential applications in educational settings for language learning, healthcare environments for patient-provider communication, public service areas like airports and government offices, and as assistive technology for daily communication. Future enhancements plan to expand language support, improve gesture recognition

accuracy, and develop offline functionality for broader accessibility. This innovative solution represents a meaningful advancement in accessible communication technology by seamlessly integrating spoken, written, and signed languages in a unified platform.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi,** Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Ms. Apeksha N H** , Assistant Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

On

"COURSEDECK-AI POWERED LEARNING PLATFORM"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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GOKUL E R: 1NH22AI050
HEMANTH H R: 1NH22AI054
JAYANTH T: 1NH22AI062

Under the guidance of

Ms. Sindhuja R
Senior Assistant Professor

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

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CERTIFICATE

It is hereby certified that the Project work entitled "**COURSEDECK - AI POWERED LEARNING PLATFORM**" is a Bonafide work carried out by **ADITHYA BHAT(1NH22AI011), GOKUL E R(1NH22AI050), HEMANTH H R(1NH22AI054) and JAYANTH T(1NH22AI062)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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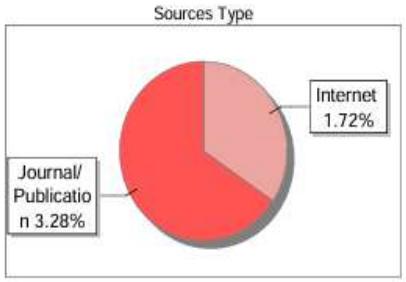

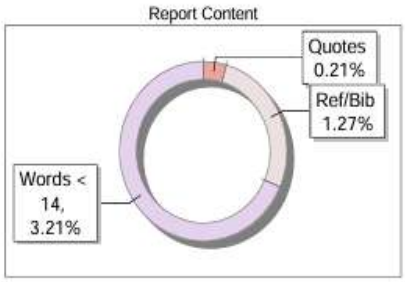

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ABSTRACT

The rapid growth of digital education has created a strong demand for learning platforms that can adapt to individual learner needs and deliver personalized guidance rather than fixed, one-size-fits-all content. CourseDeck is an AI-powered learning platform designed to address this gap by offering dynamically generated learning pathways, intelligent assessments, and real-time performance insights. The system utilizes advanced artificial intelligence models to create personalized roadmaps based on the learner's background knowledge, career goals, and preferred learning pace. By integrating features such as adaptive quizzes, AI-generated flashcards, and spaced-repetition techniques, the platform ensures continuous reinforcement of concepts and long-term retention.

CourseDeck further enhances the learning experience through real-time analytics, which evaluate user performance and provide actionable insights to help learners understand their strengths, weaknesses, and progress trends. A secure and scalable architecture built with modern technologies—including React, TypeScript, Node.js, MongoDB, and Gemini AI—ensures smooth functionality, efficient data management, and reliable multi-device accessibility. The platform's clean user interface, coupled with its intelligent recommendation engine, creates an engaging and supportive environment suitable for students, professionals, and lifelong learners.

Overall, CourseDeck demonstrates how artificial intelligence can transform online education by delivering personalized, adaptive, and interactive learning experiences. The project highlights the potential of AI-driven systems to support continuous improvement, enhance motivation, and empower learners to achieve their academic and professional objectives more effectively.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement. We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

We also express our gratitude to **Ms. Sindhuja R**, Senior Assistant Professor, Dept. of AIML our project guide, for constantly monitoring the development of the project and setting up precise deadlines.

Finally, a note of thanks to all the teaching and non-teaching staff of both the departments, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

ADITHYA BHAT (1NH22AI011)

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-Enhanced Honeypots for Cyber Defense with Real-time Detection and Response

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

LIKHIT AERPULA: 1NH22AI001
AADIL RAHMAN: 1NH22AI004
ADITYA KAMATH: 1NH22AI013
JUDIN JOMON: 1NH22AI065

Under the guidance of

Dr. Sanjeev Kaulgud
Associate Professor

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "AI-Enhanced Honeypots for Cyber Defense with Real-time Detection and Reponse" is a bonafide work carried out by **LIKHIT AERPULA (1NH22AI001), AADIL RAHMAN (1NH22AI004), ADITYA KAMATH (1NH22AI013),** and **JUDIN JOMON (1NH22AI065)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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Signature of HOD
(Dr. N V UMA REDDY)

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ABSTRACT

Static thresholds are a problem. Network intrusion detection systems basically face this issue where they have to choose between too many false positives that overwhelm the security team or they miss actual attacks because the threshold is set too conservatively, and this tradeoff becomes especially difficult when the threat landscape changes throughout the day but the System can't adjust to these changing conditions which means it's essentially operating with the same sensitivity regardless of what's actually happening. This work combines machine learning with honeypot intelligence to create adaptive behavior. Flow features get extracted by CICFlowMeter (82 of them), these features then go through mapping to match what the classifier expects which is 78 features for the XGBoost model. Basically a coordinator looks at predictions from recent traffic;the last 100 flows specifically;and calculates how severe the threat level is from this data. The threat level adjusts the threshold. During normal operation it's 0.1 but under Critical conditions it drops to 0.0001 ,which is four orders of magnitude difference and this creates the adaptive response without any model retraining being necessary. The Cowrie honeypot (SSH) integrates through a pub-sub broker that decouples components. Visualization is real-time. The dashboard uses Streamlit and operators can manually override if they need to. Sub-second latency for detection. Processing handles about 1,000 flows/second on commodity hardware with thread-based parallelism enabling everything to run concurrently, and there's defensive handling for malformed packets and missing data so the system doesn't crash when it encounters problematic input.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Deepfake Audio Detection System

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

Amith Ignatius L : 1NH22AI016
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2025-26

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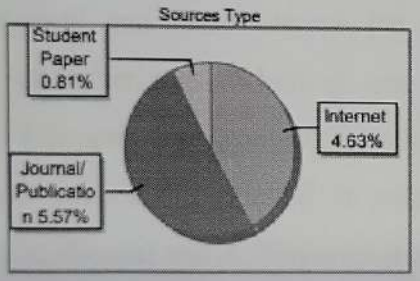

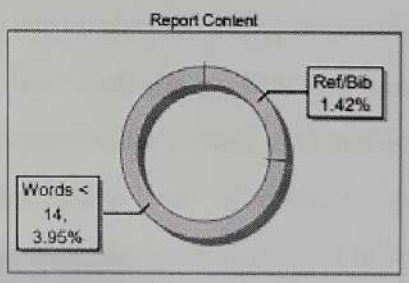

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It is hereby certified that the Project work entitled "DEEPFAKE AUDIO DETECTION SYSTEM" is a bonafide work carried out by Amith Ignatius L(1NH22AI016), Chris Mathew Thomas(1NH22AI035), DharanishPK(1NH22AI039) and Mohimaa Halder(1NH22AI094) in partial fulfilment for the award of Bachelor of Engineering in ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING of New Horizon College of Engineering during the year 2025-2026. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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2. Dr. Soumya HK.	18/12/25

ABSTRACT

Deepfake audio is a low-key copy that comes from the digital evening it gets better with every tool that is made. While the same engines that fuel innovations in art can be used to trick people, thereby making it difficult to distinguish between the real and the fake, to some extent, the border that separates these two is being eroded. The risk of these things happening is the main reason social engineering to be more effective and hence faster, vulnerable to defamation, and difficult to build trust. The issue of finding the sources (of deepfake audios) is not only a matter of technology but also digital caution which acts as a protector for untrue and non-existent voices in this changing environment.

This work is aiming to meet that challenge by developing a Deepfake Audio Detection Framework based on detailed signal analysis and up-to-date deep learning. Besides the spectral, temporal, and phase features, the system is also recording micro-modulations—those small characteristics of human speech that synthetic models still cannot produce consistently. The spatial information from the stereo audio as well as compressed and low-quality mono streams are looked at with the same level of detail to guarantee the performance in the real world. Not only are the classifier stacks adjusted to spot statistical anomalies but also to listen to every acoustic fingerprint with a doubter's ear.

A simplified web interface that helps the entire pipeline is at the core of the operation, making it possible for users to upload clips and get the results quickly, and also, clearly showing the confidence scores. The system can expand, modify, and mature with ease—by employing continual learning loops to meet this challenge, it will be able to face newer, more cunning deepfake generations without becoming outdated. Simply put, this framework is like a restless guardian who is forever challenging every voice that comes through it and, in a world where imitation is getting better and better, it refuses to accept sound as it is without further examination.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement.
We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for his constant support.

We also express our gratitude to **Ms. Sandyarani Vadlamudi**, Professor, Dept. of Artificial Intelligence and Machine Learning, our project guides, for constantly monitoring the development of the project and setting up precise deadlines. Their valuable suggestions were the motivating factors in completing the work.

Finally, a note of thanks to all the teaching and non-teaching staff of both the departments, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-Driven Smart Waste Collection and Real-Time Hotspot Detection for Sustainable City Management

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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BARKHA ANJUM SHAIK: 1NH22AI026
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KARAN TYAGI: 1NH22AI069

Under the guidance of

Ms. Apeksha N H
Professor

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CERTIFICATE

It is hereby certified that the Project work entitled **"AI-Driven Smart Waste Collection and Real-Time Hotspot Detection for Sustainable City Management"** is a bonafide work carried out by ANAD KUMAR (1NH22AI017), BARKHA ANJUM SHAIK (1NH22AI026), BHUVAN RATHORE (1NH22AI030) and KARAN TYAGI (1NH22AI069) in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-26**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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(Ms. Apeksha N H)

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(Dr. N V UMA REDDY)

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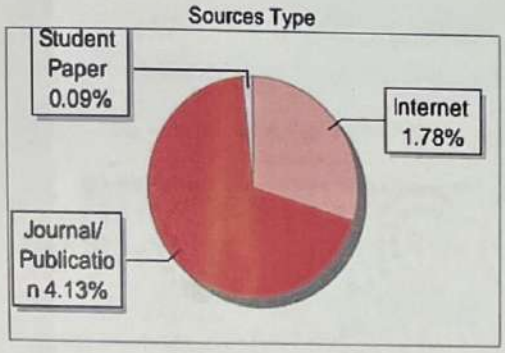

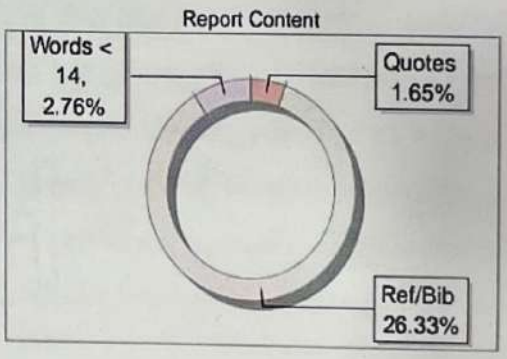

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ABSTRACT

Since we are living in a population of almost in billion, as the count of the citizens are more we can see the usage of many edible, non-edible, bio-degradable, non biodegrable and many more things used, which cause it smelly, overflowing bins, trash scattered everywhere, and clogged drains, especially after any events conducted big or small or during the rain. Those issues make our neighbourhoods dirty, unhealthy, and frustrating to live. The current way of managing this waste is very slow, and sometimes they react very late; they only take action once it's too late to manage those wastes that are overflowing. Our project here has come up with a solution that creates a system that acts like a medium that will contact to the NGO, and the NGO will act as a helping channel and take action accordingly through a smart dashboard, and help in waste management. It does two main things: Predicts the Trash and Instant Reporting.

Predicts the Trash: Using AI, our system looks at data (like holidays, weather, and area events) to predict exactly when and where a bin will get full. This lets the trucks go and empty the bins before they overflow. Our project works like this: when there's an open area present, we see that a large amount of garbage is being dumped, and instead of waiting for it to overflow and come to the roads and cause any havoc, we have trained the model to guess when and where the trash will pile up before it happens to cause any chaos.

Component 1: Predicting Trash: We study the past: The system will look at the old records of how often the trash is being collected in each area, how much is usually thrown away, and when the trucks typically empty the bins.

We spot the trends: so on, feeding the data to the model, and training it, the model will learn all the patterns and can come up with the idea of how much waste goes up on weekends, spikes up during festivals, or increases when the weather is warm.

It sends an early warnings: Based on what the model is trained and tested, it flags with a simple status:

Green- which says it is normal: everything looks okay.

Orange-Needs Attention: which says there can be chances for the trash to overflow soon, please take action, get ready soon!

Red-Critical: an immediate action has to be taken, send a truck now!

This will be alerted to the NGO through a notification from the dashboard, which makes it a smart, planned mission on ensuring the right action, or at least a truck is sent to the place where the concerned area is about to be affected at the right time to prevent the nasty overflow altogether.

Component 2: Citizen Power Instant Reporting: Now for the second part of how our project works is, it is all about giving everyone the power to be a local clean hero by updating us on where the garbage is being overflown with the help of a mobile phone. We call this Instant Reporting, inspired by the civic Project Unmute India.

Fast Reporting: As mentioned earlier if the citizen sees a probelm they take a snap of the picture and sent us an alert to through a comment or any message and our app instantly will capture the location.

Smart Analysis: The moment the text and the photo arrive we can see our AI taking the charge:

a) It makes sure that the picture is fed to the model and instantly figures out if it's overflowing trash, construction debris, or a clogged drain, and how bad the mess is.

b) Through the text the AI will understand what the user is trying to convey and find out weather it is severe or not.

This analysis will give a report to a priority level: Based on both the components, AI prediction and the Citizen Reports this functions together on the Smart Dashboard. This dashboard will show how the NGO team will work at a glance:

Prediction Map: where the trash is in red zone.

Report Map: where the citizens look at the problem by uploading a picture.

Priority Queue: A list of critical issues that need immideate action, sorted automatically.

This unified platform ensures that nothing is missed, and the NGO can react instantly to real-time problems while also proactively preventing future ones.By bringing together our AI-powered prediction system and the instant reporting tool, we have built a powerful, all-in-one platform that truly changes the way a city manages waste. It doesn't just react to problems—it prevents them and fixes them faster when they do occur.

To make sure the system works smoothly and accurately, we developed it in two major parts:

Prediction Model:

We collected past waste-related data from different areas, cleaned and organized it, and used it to train our AI model. Over time, the model learned patterns—like which areas overflow more often, what days see higher waste levels, and how trends change. This helped us build a system that can warn us in advance about potential waste hotspots.

Reporting System (Three-Level Workflow):

We designed the reporting part like a fast-track service system:

You Report: Citizens upload a photo, add a short description, and submit their complaint through the app.

The Server Checks: The system immediately analyzes the image and text using AI, understands how severe the issue is, and detects the exact location.

NGO Takes Action:The report is sent directly to the NGO responsible for that area. They fix the issue and update the status, ensuring full transparency. This flow guarantees quick response, accurate reporting, and zero confusion. The prediction system warns about future issues before they happen, and the reporting system responds instantly to real-

time citizen alerts. Together, they work like a complete solution that handles both future trash problems and present trash problems in a smarter and cleaner way.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Ms. Apeksha N H,** Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Nutri Bot: An AI-Powered Health Assistant for Proactive Dietary Management

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

ADITHYAN V K : 1NH22AI012
ANIRUDH K S : 1NH22AI018
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2025-26

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It is hereby certified that the Project work entitled "Nutri Bot: An AI-Powered Health Assistant for Proactive Dietary Management" is a bonafide work carried out by **ADITHYAN V K (1NH22AI012), ANIRUDH K S (1NH22AI018), ANISH S ANAND (1NH22AI019) and HUZAM SHUKKUR (1NH22AI055)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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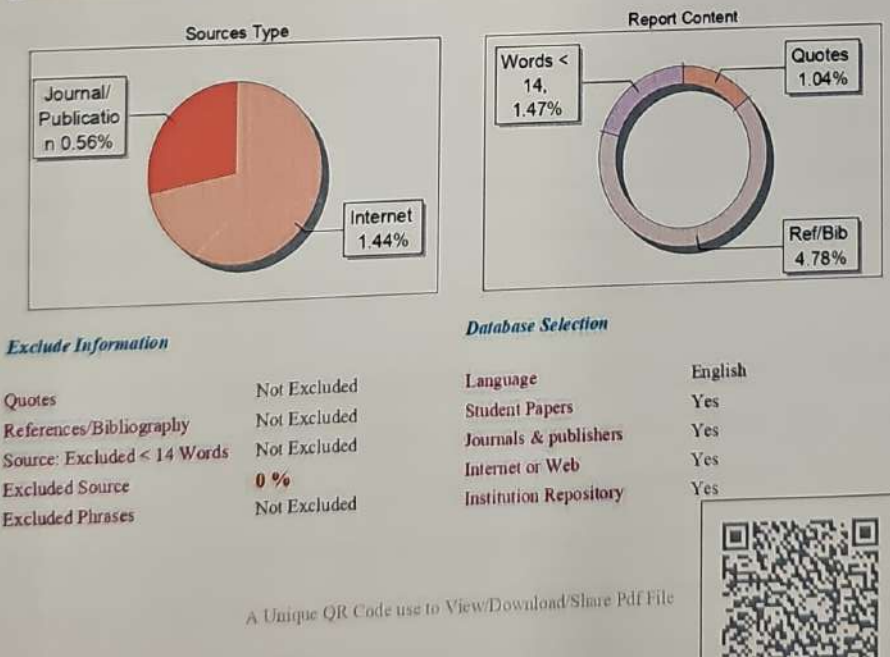

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Database Selection

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ABSTRACT

The rise in food allergies and lifestyle-related health problems has increased the need for intelligent tools that help users make safer food choices. In India, this challenge is greater due to diverse cooking styles and complex recipes that often contain hidden ingredients. Most existing nutrition apps focus only on calorie tracking and do not consider allergens or a user's medical history.This project presents Nutri Bot, an AI-powered health assistant designed to support informed dietary decisions. Nutri Bot combines food image recognition, ingredient and allergen analysis, medical document understanding, and personalized health guidance in one system.

The system uses lightweight deep learning models such as MobileNet-V2 and ResNet-18, trained on a curated dataset of Indian food images. Images are pre-processed using resizing, color normalization, and noise reduction to improve real-world performance. Once a dish is identified, Nutri Bot maps it to its ingredients and checks for allergens. A separate safety module evaluates whether the food is suitable based on the user's health profile.Nutri Bot can also read prescriptions, allergy reports, and handwritten notes using OCR and NLP, allowing automatic extraction of medical information. These details are integrated with a chatbot and medication reminders for daily support.

Experimental results show strong performance with efficient models: MobileNet-V2 achieves nearly 80% accuracy, while ResNet-18 reaches about 78%. Skipping preprocessing reduces accuracy by over 15%, confirming its importance. Errors mainly occur between visually similar dishes. Separating allergen checks from image recognition allows flexible updates without retraining.Overall, Nutri Bot offers a practical, culturally relevant solution for personalized food guidance. Future improvements include multi-dish detection, deeper ingredient analysis, menu understanding, and full on-device processing for better privacy.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Ms. Ramyashree P M,** Assistant Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT WORK REPORT
ON
INTERDISCIPLINARY PROJECT TITLED

"OORU ALERT "

URBAN CROWDSOURCED PROBLEM REPORTING WEBAPP

Submitted in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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It is hereby certified that the interdisciplinary project work entitled **"OORU ALERT"** is a bonafide work carried out by **ASHWINI PRASATHKANNAN (1NH22AI022)** in partial fulfilment for the award of **Bachelor of Engineering** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of the New Horizon College of Engineering during the year **2025-2026.** It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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ABSTRACT

Urbanization has accelerated the demand for efficient civic infrastructure management, especially in rapidly growing metropolitan cities like Bengaluru. Issues such as overflowing garbage bins, potholes, streetlight failures, damaged public assets, and blocked drainage systems significantly affect the urban living experience. Although municipal authorities operate across various wards, the absence of a unified, intelligent communication and reporting mechanism creates gaps between citizens, field workers, and administrative departments. Traditional grievance redressal methods—including phone calls, physical visits, and fragmented mobile applications—lack transparency, scalability, geolocation support, automated routing, and real-time tracking, leading to delays, poor coordination, and reduced public trust in civic systems.

Ooru Alert is proposed as an integrated, technology-driven civic grievance management platform designed to bridge this communication gap and streamline the entire lifecycle of urban issue reporting and resolution. The system enables citizens to effortlessly report complaints by uploading images, specifying locations, categorizing issues, and tracking the status of their submissions in real time. The application leverages cloud technologies for seamless data storage, retrieval, and scalability, while geolocation data ensures accurate mapping of complaints to respective wards for faster and more effective municipal action.

A centralized administrative dashboard provides authorities with a comprehensive view of complaints across different regions, enabling them to identify hotspots, analyze trends, allocate resources more efficiently, and track worker performance. Data visualization tools further enhance decision-making through graphical representations of complaint density, resolution timelines, and category-wise distribution. An AI-assisted module can classify complaints automatically, helping prioritize critical issues and reduce manual workload. Field workers are supported through a dedicated interface where they can receive assigned tasks, update completion status, and upload visual proof of resolution.

The architecture of Ooru Alert incorporates modern web technologies, cloud databases such as Firebase for real-time synchronization, and responsive frameworks that ensure accessibility across devices. The system emphasizes security, authentication, and role-based access to safeguard user data while maintaining operational transparency. By integrating IoT sensors in future expansions—for example, smart bins or streetlight monitoring—the platform can transition toward proactive issue detection, further improving municipal responsiveness.

The proposed solution significantly enhances governance efficiency by reducing delays, ensuring accountability, and fostering participatory civic engagement. Citizens benefit from a transparent, user-friendly interface, while municipal authorities gain actionable insights, automated workflows, and improved coordination among departments. Ooru Alert ultimately aims to contribute to the vision of a smarter, cleaner, and more responsive city by leveraging technology to strengthen the relationship between citizens and civic bodies. The system's modular design makes it scalable and adaptable for use in various urban regions, establishing a foundation for future smart-city innovations.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement. We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance. We would also like to thank **Dr. N V Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support. We would also like to thank **Dr. Vandana CP**, Professor and HOD, Department of Information Science and Engineering, for his constant support. We would also like to thank **B Swathi**, Professor and HOD, Department of Computer Science and Engineering (Data Science), for his constant support. We also express our gratitude to **Ms. Sindhuja R**, Assistant Professor, Dept. of AIML, **Dr. Karthikayini**, Associate Professor, Dept. of ISE and **Ms. Sasikala T**, Assistant Professor, Dept. of Data Science our project guides, for constantly monitoring the development of the project and setting up precise deadlines. Their valuable suggestions were the motivating factors in completing the work.

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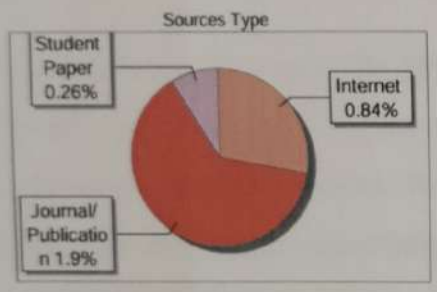

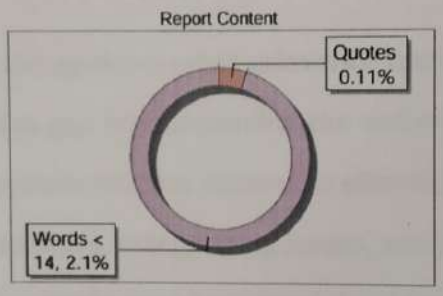

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

DEEPMEDISCAN: AI-POWERED HEALTH INSIGHTS

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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2025-26

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It is hereby certified that the Project work entitled "**DeepMediScan: AI-Powered Health Insights**" is a bonafide work carried out by **ARSHETHA C (1NH22AI021), B N LOHITH KUMAR (1NH22AI028), M LOHITH KUMAR RAJU (1NH22AI097) and N MANISH (1NH22AI105)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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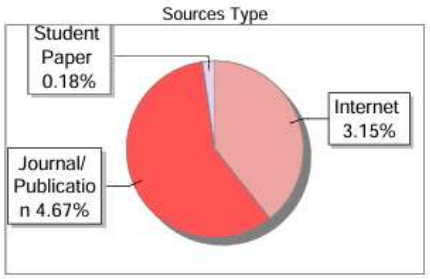

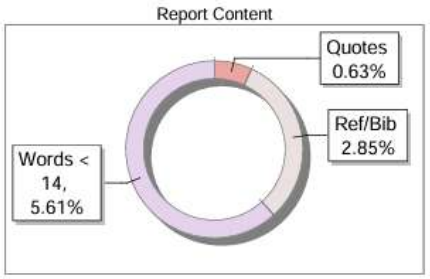

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ABSTRACT

This project explores whether artificial intelligence can help people make sense of medical images in a quick and understandable way. Many individuals receive X-rays or skin photos but don't always have immediate access to a specialist who can explain what's going on. With that in mind, we built DeepMediScan, a system that tries to bridge this gap by analyzing different types of medical images and giving a simple, structured report supported by visual explanations.

The platform accepts multiple modalities such as dental, chest, knee X-rays, and skin images. Instead of a single universal model, we used separate detectors for each category, since each imaging type has its own characteristics. After an image is uploaded, the system identifies possible findings, assigns a basic severity level based on confidence, and produces three output views: the original image, an annotated detection map, and a heatmap overlay. These visuals help users understand *why* the model reached a particular conclusion rather than just seeing a label.

We also included an AI assistant that can answer follow-up questions in a simple conversational style. It uses a Mistral model with a small memory component, allowing it to generate short explanations or patient-friendly interpretations of the report. While it does not provide medical diagnosis, it helps users interpret the results more comfortably and encourages clinical follow-up when needed.

Overall, DeepMediScan brings together computer vision, explainability, and conversational AI to create an accessible support tool for early health insights. The system doesn't aim to replace professionals, but rather to give users clearer guidance and visual understanding of their uploaded scans. The project demonstrates how modern AI techniques can be combined to offer meaningful assistance in everyday healthcare scenarios.

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The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Multimodal Emotion Detection Using Speech and Facial Expressions

Submitted in partial fulfillment for the award of the degree of

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in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

2025-2026

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It is hereby certified that the Project work entitled "Multimodal Emotion Detection Using Speech and Facial Expressions" is a bonafide work carried out by **Avinash A (1NH22AI023), Chandrika R (1NH22AI032), Hariharan V(1NH22AI051) and Keerthi Vinod (1NH22AI071)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026.** The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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Signature of HOD 18/12/25
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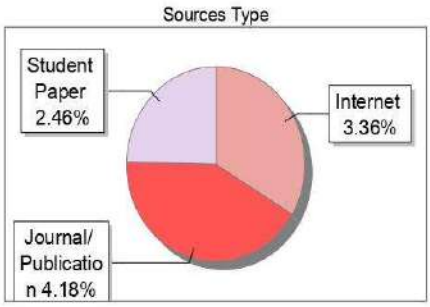

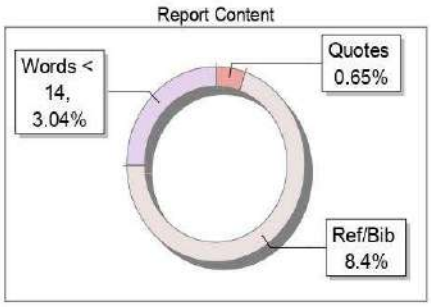

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ABSTRACT

The aim of the project is to detect the emotions which are elicited by the speaker through speech and facial expressions. Emotion Detection has become a essential task these days. The emotion which is in fear, anger, joy have higher and wider range in pitch whereas have low range in pitch. Detection of speech is useful in assisting human machine interactions. Here we are using different classification algorithms to recognize the emotions , Support Vector Machine , Multi-layer perception, and the audio feature MFCC, MEL, chroma, Tonnetz were used. These models have been trained to recognize these emotions such as Calm, neutral, surprise, happy, sad, angry, fearful, disgust. We got an accuracy of 86.5% and testing it with the input audio we get the same.

One of the quickest and most natural ways for humans to communicate is through speech. Speech emotion recognition is the process of accurately anticipating a human's emotion from their speech. It improves the way people and computers communicate. Although it is tricky to annotate audio and difficult to forecast a person's sentiment because emotions are subjective, Speech Emotion Recognition makes this possible. Various researchers have created a variety of systems to extract the emotions from the speech stream. Speech qualities in particular are more helpful in identifying between various emotions, and if they are unclear, this is the cause of how challenging it is to identify an emotion from a speaker's speech.

This project implements a pipeline for recognizing human emotional states from audio as well as facial expressions. The system is designed as a modular web application that combines a trained deep learning model, a Flask based backend server, and a browser frontend for both batch and live audio collection. The dataset used to develop the model contains labeled voice recordings spanning multiple emotions and demographics. From raw audio files the pipeline extracts robust acoustic features such as MFCCs, spectral contrast, and chroma, and uses these features to train a supervised neural network model that outputs discrete emotion labels.

The architecture separates concerns into three layers: data and preprocessing, model training and persistence, and runtime inference with a web interface. Preprocessing

normalizes audio levels, resamples to a fixed sample rate, and computes time frequency representations to supply the model with consistent inputs. The model is trained to be lightweight enough for fast inference while remaining accurate across different speakers and recording conditions.

Backpropagation to train multilayer architectures

From the earliest days of pattern recognition, the aim of researchers has been to replace hand engineered features with trainable multilayer networks, but despite its simplicity, the solution was not widely understood until the mid 1980s. As it turns out, multilayer architectures can be trained by simple stochastic gradient descent.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Akshatha P S,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

"Empathy AI: A Conversational AI for Psychological Profiling and Interest Analysis"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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ABSTRACT

In the evolving landscape of artificial intelligence, creating meaningful human-machine interactions has become increasingly significant. This project aims to develop a conversational AI system that not only responds to user queries but also understands the user's psychological profile, interests, and emotional tone. By leveraging Machine Learning (ML) and Large Language Models (LLMs), the system analyzes user input through structured Q&A modules, categorizes user interests, and detects the tone of conversation in real-time, making interactions more personalized and engaging.

The architecture is designed with a multi-stage pipeline that includes user data collection, text preprocessing, user classification, and tone detection. Advanced ML techniques such as KMeans clustering, Random Forest classification, and contextual embeddings using BERT or RoBERTa enhance the system's ability to understand nuanced user inputs. Adaptive prompt engineering and real-time model fine-tuning through LoRA or QLoRA adapters enable dynamic response customization based on detected user profiles and emotional states.

The interaction layer features a user-friendly frontend (React/Vue) and a robust backend (FastAPI/Django), incorporating WebSocket integration for seamless, real-time communication. Additionally, a vector database maintains user profiles, emotional trajectories, and personalized embeddings, ensuring continuity and depth in conversations. Ultimately, this project aspires to build a psychologically aware conversational AI that fosters deeper connections through emotionally intelligent interactions.

ACKNOWLEDGEMENT

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We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Umamaheswaran S**, Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT PHASE-2 REPORT

on

AI-POWERED REAL-TIME CRIME DETECTION AND EMERGENCY ALERT SYSTEM

Submitted in partial fulfillment for the award of the degree of

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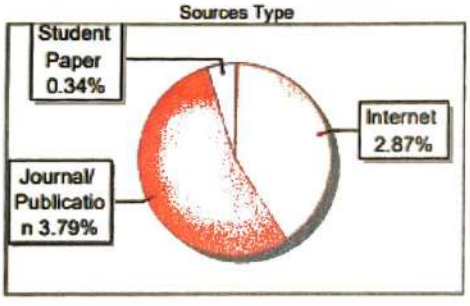

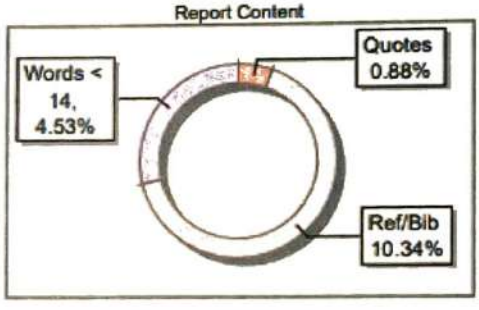

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ABSTRACT

Personal safety has become a growing concern as incidents such as harassment, violence, and unexpected emergencies continue to affect individuals in both public and private spaces. Traditional safety applications often depend on the user manually initiating an alert or having stable internet access, which may not be possible in real emergency situations. Victims may be unable to speak, unlock their phone, or navigate an app due to fear, physical restraint, or poor network conditions. To address these limitations, this project presents an **AI-Powered Real-Time Crime Detection and Emergency Alert System** that focuses on autonomous detection, multilingual accessibility, and dependable communication even in offline environments.

The system uses **on-device artificial intelligence models** to analyze live camera footage and identify abnormal or potentially dangerous actions such as aggressive movement, physical struggle, or the presence of a weapon. Because the AI model runs directly on the smartphone, it ensures quick response times, enhanced privacy, and reduced reliance on cloud-based processing. The system also includes **multilingual voice commands** and silent activation methods like shaking the device or pressing the power button multiple times, allowing users to trigger an SOS alert in situations where direct interaction is not possible. These features make the application practical and accessible for users of different languages and age groups.

A major strength of the system is its **offline alert communication**, built using Bluetooth Mesh, Wi-Fi Direct, and LoRa technologies. This hybrid communication framework allows emergency messages to reach responders even without internet access. Alerts include the user's live location, time, and optional audio or video evidence, which are displayed on a web-based responder dashboard with real-time updates. Through features such as live video streaming, location tracking, and automated severity analysis, responders receive accurate and timely information that supports fast decision-making. Overall, the system provides a reliable and user-friendly solution that enhances personal safety and strengthens emergency response capabilities across diverse environments.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

SARAL YATRA – A Smart Public Transport Monitoring System

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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ABSTRACT

Urban bus transport remains the backbone of daily mobility for a large section of the population, yet it continues to suffer from long-standing operational issues such as overcrowding, uncertain bus arrival times, and the lack of reliable information about seat availability during peak hours. These gaps reduce commuter comfort and make it difficult for transport authorities to manage fleets efficiently. To address these challenges, this work introduces **SARAL YATRA**, an integrated smart public-transport monitoring platform that brings together real-time passenger estimation, continuous GPS-based location tracking, and QR-enabled digital ticketing within a single system.

The platform removes the need for specialized onboard hardware by using the driver's smartphone to capture camera frames and GPS coordinates throughout the trip. These frames are transmitted to a cloud-based backend, where a lightweight YOLOv8 model performs person detection to estimate current occupancy. The model, optimized for fast inference, demonstrated an average accuracy of around 87% under typical bus conditions, including varied lighting and partial occlusions. In parallel, periodic GPS updates provide reliable, up-to-date information about the bus's movement and proximity to stops.

A Flask–MongoDB backend manages data retrieval, authentication, inference processing, ticket generation, and real-time synchronization with the frontend. Commuters access the system through a React-based interface, where they can view live bus locations, occupancy levels, and estimated arrival times. They may also generate QR-based digital tickets, which the driver validates through the same mobile interface. Drivers receive a dedicated dashboard that allows them to activate the camera, view route details, send service updates, and monitor occupancy statuses as detected by the model.

The system follows a modular architecture divided into five layers: the user layer for commuter/driver/admin access, the on-bus processing layer built on mobile-device sensing, the data communication layer responsible for secure transfer of frames and GPS data, the cloud-intelligence layer where YOLO inference and state management occur, and the administrative layer used for route supervision and analytics. This multi-layer structure ensures smooth data flow, scalability, fault-tolerance during network drops, and reliable synchronization across all interfaces.

Testing on real routes revealed fast response times, stable communication, and accurate detection across common bus scenarios. UI updates reached users within one to two seconds of backend processing, and GPS refresh intervals were consistent enough for real-time tracking. Overall, the results show that SARAL YATRA can deliver timely and trustworthy information to commuters while offering operators better visibility into daily bus operations.

By combining computer vision, cloud computing, and mobile-first design, the proposed system demonstrates a practical and low-cost approach to modernizing public transportation. It provides a unified framework that simplifies ticketing, reduces commuter uncertainty, and enhances the transparency of fleet operations. The platform also opens pathways for future extensions, such as multi-camera support, predictive analytics for peak-hour demand, and integration with multi-modal transport networks.

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We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We wouldalsoliketothank**Dr. N VUma Reddy**,ProfessorandHead,Departmentof Artificial Intelligence and Machine Learning, NHCE for her constantsupport.

We also express our gratitude to **Dr. Sanjeev P Kaulgud,** Sr. Associate Professor, Departmentof Artificial Intelligence and Machine Learning, NHCE, our guide, formonitoring and reviewing the project regularly.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Educational Content Creation through Multi-Video Summarization and Short Video Generation

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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ABSTRACT

In the modern digital learning landscape, Artificial Intelligence (AI) plays a transformative role in enhancing accessibility, personalization, and learner-centric education. While platforms such as YouTube, Vimeo, Coursera, and edX provide vast amounts of instructional video content, students often struggle with redundancy, inconsistent explanations, and cognitive overload caused by navigating multiple lengthy videos to understand a single concept. Traditional video-learning systems lack efficient mechanisms for summarizing diverse video sources or adapting explanations to individual learner needs. To address these limitations, this project presents an integrated AI-powered framework for Educational Content Creation, combining advanced Natural Language Processing (NLP) with Generative AI to streamline both information extraction and adaptive multimedia generation.

The system ingests multiple videos from YouTube links or locally uploaded files and employs the Whisper model for accurate speech-to-text transcription. The Longformer Encoder-Decoder (LED) model then performs large-scale abstractive summarization on the combined transcript, supporting inputs up to 16,384 tokens. Additionally, structured topic extraction is achieved through an external Large Language Model (LLM) accessed via the OpenRouter API, generating three concise and pedagogically relevant key discussion points. Beyond summarization, the framework supports personalized content creation by fine-tuning the runwayml/stable-diffusion-v1-5 model using Low-Rank Adaptation (LoRA) on user-defined images. This customized model generates high-fidelity visuals from textual prompts, which are subsequently transformed into short animated video clips using FFmpeg and moviepy.

Deployed through an intuitive Gradio interface, the system offers educators and learners a seamless end-to-end tool that accelerates note-taking, enhances conceptual clarity, and provides real-time, personalized clarification videos. Overall, the proposed framework demonstrates strong potential to revolutionize video-based education, making learning more efficient, accessible, and responsive to individual student needs.

Keywords— AI in Education, Video Summarization, Adaptive Learning, Real-Time Content Generation, Personalized Learning Systems.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

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Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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22AIM74

A PROJECT PHASE-2 REPORT

on

Emotion Aware Diet Recommendation System Using Deep Learning and Natural Language Inputs

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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ABSTRACT

The growing intersection of artificial intelligence, affective computing, and digital health has opened new pathways for designing systems that support both physical wellness and emotional well-being. Dietary behaviour is one of the most emotion-sensitive aspects of human lifestyle, with psychological states such as stress, sadness, anxiety, fatigue, and even excitement influencing food choices, appetite levels, and nutritional balance. Traditional diet recommendation systems, however, continue to focus predominantly on physiological indicators such as age, BMI, calorie intake, or pre-existing medical conditions. While such parameters are undeniably important, they do not reflect the immediate mental or emotional conditions that strongly shape eating patterns. As a result, most existing systems fail to provide relevant or empathetic recommendations during emotionally vulnerable moments, making it difficult for users to adhere to healthy dietary habits.

This project addresses this gap by proposing an **Emotion-Aware Diet Recommendation System** that integrates deep learning–based emotion detection with personalized nutritional guidance. The system is designed to interpret emotions from **free-form text**, enabling users to interact naturally by describing how they feel rather than selecting from predefined menus. A fine-tuned transformer model (BERT/RoBERTa) serves as the core emotion classifier. Its contextual understanding allows it to identify subtle emotional cues in user input, providing more accurate classification than keyword-based or rule-based approaches. The identified emotional state is then mapped to research-supported nutrient groups associated with mood regulation—for example, magnesium-rich foods for anxiety, serotonin-supporting options for sadness, omega-3–rich meals for stress, and iron-dense foods for fatigue.

To transform these nutritional guidelines into practical, user-friendly suggestions, the system employs a **GPT-2–based natural language generation module**. This component generates coherent meal plans based on both the detected emotion and the user's dietary

preferences, such as vegetarianism, allergies, health goals, or lifestyle constraints. Instead of offering generic advice, the system produces personalized meal recommendations for breakfast, lunch, dinner, and snacks, written in natural language that is easy for users to follow. This enhances usability and fosters a sense of emotional support rather than mechanical instruction.

The system is deployed through an intuitive **Streamlit interface**, allowing real-time interaction. Users simply enter their feelings or short journal-style descriptions, and the system responds with an emotion label, confidence score, and an adjusted meal plan tailored to their emotional needs. This conversational design bridges the gap between psychological state and nutritional behaviour, presenting diet planning as a dynamic and adaptive process rather than a static routine.

Comprehensive experiments were conducted to evaluate the system. The BERT-based emotion detection model achieved an accuracy of **89.2%**, significantly outperforming baseline models such as Naïve Bayes, LSTM, and GRU. Generated recommendations were assessed through user surveys and qualitative feedback, with participants noting high relevance between the detected emotion and suggested meals. The system demonstrated consistent performance, low latency, and strong user acceptance, indicating its effectiveness for real-world wellness applications.

This work contributes a holistic framework that integrates emotional intelligence into dietary recommendation. By recognizing the psychological factors behind food choices, the system encourages healthier and more mindful eating habits. It also lays the foundation for future adaptive health platforms that combine emotion sensing, personalized nutrition, and conversational AI. The approach demonstrates how deep learning and NLP can meaningfully enhance lifestyle guidance by offering emotionally supportive, context-aware, and scientifically grounded diet recommendations.

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The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Fake News Detection in Regional Languages

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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ABSTRACT

We are living in a time when information is travelling very fast. This is through the use of social media and messaging apps. With so much of information being shared by people on a day to day basis, it has become quite easy to spread false information without anyone noticing that it is false. Many users forward messages thinking that the information conveyed in the message is true, but it would actually be false and by the time it is noticed that what was conveyed was untrue, it would be too late as many people would have already received the message. This becomes much more worrying in the case of regional languages because there are only few tools to check if the information is real or fake. People tend to trust messages that are written in the local style, and this leads to the spreading of such messages with a lot of ease. This can tend to cause a lot of unrest and confusion within the community.

The work acts like a filter for news in the Hindi Language. The goal of the work is to help users to quickly check if a piece of information can be trusted or not. The work learns from content from the past which includes examples of both real news content in Hindi and also fake news content in Hindi. It applies the learning that it gets from these past examples into the new news content that is given to it. with this, it becomes useful to warn people early and reduce the spread of news and stories that are both harmful as well as misleading.

The first part consists of the fake news detection model. The system studies and tries to learn from thousands of news samples. It understands the style that has been used for writing and also the patterns which often appear in false information. Over time the system can become better in spotting things that can be missed by a person such as multiple usage of the same word or an unusual sentence flow with a way of framing that is misleading. When new text is entered and given to the model, it will give a clear result along with a confidence level, so users can understand how strong the detection is.

The second part focusses on user interaction . The user can enter Hindi text into the system and the system will process it. The model will read the content, study the words along with its context and identifies if the news is likely to be real news or fake news. This method which is simple and fast encourages the users to verify the information before they share it

with others. Even though the system has been made for the Hindi Language right now, it can be expanded to use other regional languages in the future.

These two platforms together that makes communication on online platforms safer. The model that is used for detection can prevent misinformation from spreading in the future. The user friendly interface offers checks that are fast for real time. This approach increase the awareness about fake news and its spreading and also helps in reducing the confusion caused by the spread of misinformation, thereby making digital spaces safer and dependable for the public.

ACKNOWLEDGEMENT

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A PROJECT PHASE-2 REPORT

on

Blood Group Detection using Fingerprint

Submitted in partial fulfillment for the award of the degree of

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in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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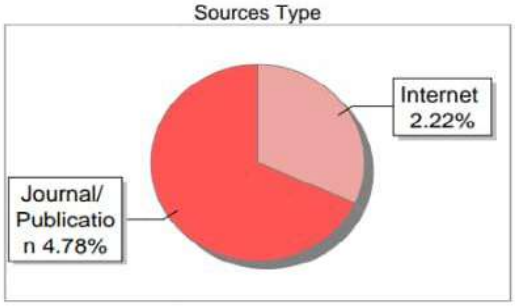

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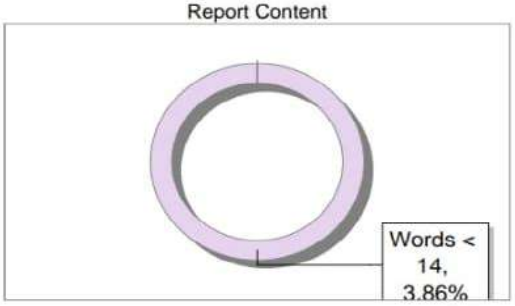

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ABSTRACT

Identifying blood groups is a necessity, in contemporary medical practice critically impacting safe blood transfusion surgical procedures organ transplants, prenatal care, urgent medical treatment and forensic analysis. Conventional serological techniques although reliably accurate need blood collection, specific reagents, skilled staff and lab facilities. These limitations greatly restrict their accessibility in clinics, disaster areas, military settings and urgent care scenarios where quick non-invasive testing is crucial. The growing demand for portable and automated blood group identification systems has propelled research into biometric-based and AI-driven approaches that can address these challenges. Among biometric features fingerprints are prominent because of their widespread presence, consistency, simplicity of collection and possible association with genetic and physiological indicators, like blood group traits.

This work presents a learning–driven approach for non-invasive blood type identification via fingerprint images merging biometrics, AI and clinical diagnostics. The method utilizes a Convolutional Neural Network (CNN) that automatically learns layered fingerprint characteristics—such as ridge directions, bifurcations and minutiae details—without the need, for features. A collection of 10,477 fingerprint images was prepared through contrast enhancement (CLAHE) Gaussian blur, noise filtering, normalization and resizing to maintain high-quality input. Data augmentation methods enlarged the dataset further to boost model resilience and manage real-world differences in fingerprint quality. The CNN model underwent training and testing with an 80–20 division, aided by hyperparameter optimization, regularization and validation techniques to enhance results. While the existing model attains prediction accuracy it provides solid proof of the viability of fingerprint-based blood group classification and points to important areas, for future improvement.

To enhance usability the suggested model is incorporated into an interactive Streamlit web app that allows users to upload or take fingerprint images instantly. The system automatically preprocesses the input applies inference via the trained CNN model. Delivers the predicted

blood group along with a confidence score. The interface also offers visualizations. Allows for instant user feedback fostering transparency, in the decision-making procedure. This

implementation showcases the capability of integrating AI models into user- platforms that eliminate the need for laboratory tools or expert training rendering the solution ideal, for field use, telemedicine services and distant health clinics.

Comprehensive evaluations—including unit, integration, system and usability testing—were performed to evaluate reliability, performance, accuracy and functional stability across a range of scenarios and device categories. Issues like low-light capturing, incomplete fingerprints, varying orientations and imbalanced datasets were. Methodically resolved using adaptive preprocessing, normalization methods and class balancing strategies. These tests validated that the system sustains performance with response times, below two seconds regardless of fluctuating imaging environments.

In summary this study provides a groundbreaking addition to the developing area of -invasive biometric diagnosis. By showing how fingerprint designs can be utilized with learning to determine vital medical details like blood type the project introduces a scalable affordable and mobile substitute, for traditional serological techniques. While ongoing refinements are necessary to achieve clinical-grade precision, the system lays the technological groundwork for future advancements in AI-driven healthcare solutions, potentially transforming diagnostic practices in emergency medicine, rural healthcare delivery, forensic science, and personalized medicine.

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A PROJECT PHASE-2 REPORT

on

"VOICE & GESTURE-CONTROLLED BIOMETRIC FILE ASSISTANT USING DEEP LEARNING"

Submitted in partial fulfillment for the award of the degree of

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in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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It is hereby certified that the Project work entitled "VOICE & GESTURE-CONTROLLED BIOMETRIC FILE ASSISTANT USING DEEP LEARNING" is a bonafide work carried out by **INDRA KAARTIKEYA C H (1NH22AI057), K. GANESH KOUSHIK (1NH22AI077), K. CHAKRIDHAR REDDY (1NH22AI078) and N. VARDHAN REDDY (1NH22AI106)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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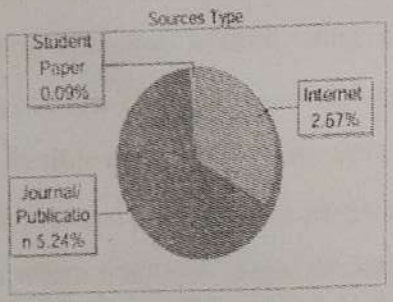

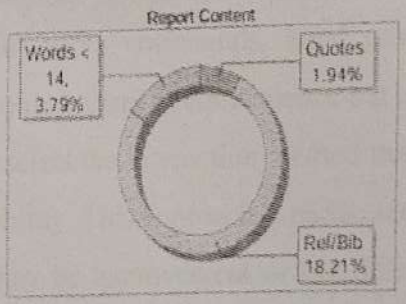

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ABSTRACT

In recent years, human-computer interaction (HCI) has evolved significantly, moving from conventional input methods such as keyboards and mice to more natural and intuitive interaction paradigms, including voice recognition and gesture control. The growing demand for hands-free, efficient, and accessible computing has led to the development of **personal assistants and virtual control systems** that aim to simplify daily tasks and improve productivity. Despite notable progress in the field, existing solutions often suffer from **limited functionality**, **low accuracy**, or **restricted modalities**, typically supporting either voice-based commands or gesture-based interaction, but rarely integrating both in a seamless manner. Addressing these limitations, the present project focuses on the design and implementation of a **hybrid voice and gesture-controlled desktop assistant** capable of performing **comprehensive file management tasks** with high precision and user-friendly interaction.

The primary objective of this project is to provide an intelligent system that allows users to perform various **file operations**, including opening, moving, copying, deleting, searching, and navigating files and folders, using either voice commands, hand gestures, or a combination of both. The hybrid approach not only enhances convenience but also ensures **robust and flexible control**, enabling users to select the interaction method that suits their environment, personal preference, or physical ability. This approach is particularly valuable in scenarios where traditional input devices may be inconvenient or inefficient, such as during presentations, multitasking workflows, or accessibility applications for individuals with physical impairments.

The voice recognition module is implemented using **Python-based libraries** such as speech_recognition for capturing and interpreting user commands and pyttsx3 for providing auditory feedback. The system is designed to recognize a predefined set of commands, ensuring precise and consistent execution of file management operations. Special attention is given to **error handling** and **command confirmation**, so that any misinterpretation of user input is promptly addressed through user-friendly prompts. This ensures that the system remains reliable and reduces the likelihood of unintended actions. Additionally, the voice module supports natural-sounding responses, which not only

confirm the successful execution of commands but also enhance the overall user experience.

Complementing the voice interface, the **gesture control module** utilizes **OpenCV** and **Mediapipe**, enabling real-time tracking and recognition of hand gestures. Through this module, users can perform actions such as navigating through folders, selecting files, scrolling, and executing commands without touching the keyboard or mouse. The system supports intuitive gestures including swipe, pinch, and open palm, which have been carefully chosen to reflect natural human motions. The gesture recognition system has been optimized to perform accurately even under varying lighting conditions and minor background distractions. The combination of **visual feedback** and **gesture interpretation** ensures that users receive continuous confirmation of system actions, reducing errors and increasing confidence in the system's capabilities.

A significant advantage of this system over existing solutions lies in its **hybrid functionality**, which allows simultaneous use of voice and gestures. Unlike prior systems documented in the literature [Refs 1–15], which are generally limited to single-modal control, this system permits users to combine both modalities for **complex, multi-step tasks**. For example, a user can initiate a file search using voice commands and then select the desired file using a hand gesture, streamlining the workflow and significantly reducing the time required to complete tasks. Such integration demonstrates the system's versatility and practical applicability, particularly in professional, educational, and personal computing environments.

The development process involved thorough **analysis and comparison with existing systems**, including voice assistants such as Zeus [Ref 1], gesture-based virtual mice [Refs 2, 8, 9, 13], and other Python-based desktop assistants [Refs 10–12]. While these systems provide foundational insights, they often lack integration of multiple interaction modes, comprehensive error handling, and efficient real-time execution of file management tasks. By addressing these gaps, the current system not only achieves **higher accuracy** and **user satisfaction** but also establishes a robust framework for further improvements and extensions.

In terms of performance, the voice module achieves recognition accuracy of approximately **95%**, while the gesture recognition module maintains around **93% accuracy**, even in real-time operations. The hybrid mode enhances operational efficiency, with complex tasks executed in approximately **4–5 seconds**, demonstrating a notable improvement over traditional input methods and prior research systems. The system's design emphasizes **user-friendliness**, with clear auditory and visual feedback mechanisms that guide users through tasks, minimize errors, and reduce the learning curve.

Furthermore, this project lays the foundation for future research and development in hybrid HCI systems. Potential enhancements include integration with **natural language processing models** for more sophisticated voice commands, **AI-based predictive assistance** for automated task suggestions, and **cloud storage integration** for remote file management. Additional improvements could include **customizable gesture recognition**, **user-specific profiles**, and support for **cross-platform compatibility**, ensuring that the system can serve a broader audience and operate efficiently across diverse computing environments.

In conclusion, the developed hybrid voice and gesture-based desktop assistant represents a **significant advancement in HCI technology**, combining the strengths of multiple input modalities to deliver a **practical, efficient, and intuitive system**. It demonstrates superior functionality compared to existing voice and gesture-based systems, offering enhanced accuracy, speed, and user satisfaction. By providing a seamless and natural interface for file management, this system not only contributes to the field of intelligent personal assistants but also opens avenues for further research and real-world applications in accessibility, productivity, and hands-free computing. The project successfully illustrates how integrating voice and gesture control can create a more **inclusive and efficient computing experience**, setting a precedent for future innovations in human-computer interaction.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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A PROJECT PHASE-2 REPORT

on

Pneumonia detection from chest X-rays and CT scans using Deep Learning Techniques

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in

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "Pneumonia detection from chest X-rays and CT scans using Deep Learning techniques" is a bonafide work carried out by **MADHUMITHRA R(1NH22AI081), MADISHETTY SIRIVENNELA (1NH22AI082), MAHITHA CHOWDARY JAGARLAMUDI (1NH22AI083) and MELLAMPUTI SRINIDHI (1NH22AI088)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026.** The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

LearnWise : A Smart and Engaging AI Powered Learning Platform

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

AKASH V H : 1NH22AI015
MANASWI KOUSHIK S : 1NH22AI085
RAJATH U SHETTY : 1NH22AI127
RAJENDRA NAIK : 1NH22AI128

Under the guidance of

Ms. Shravya Shetty
Assistant Professor

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "LearnWise : A Smart and Engaging AI Powered Learning Platform" is a bonafide work carried out by **AKASH V H (1NH22AI015), MANASWI KOUSHIK S (1NH22AI085) , RAJATH U SHETTY (1NH22AI127) and RAJENDRA NAIK (1NH22AI128)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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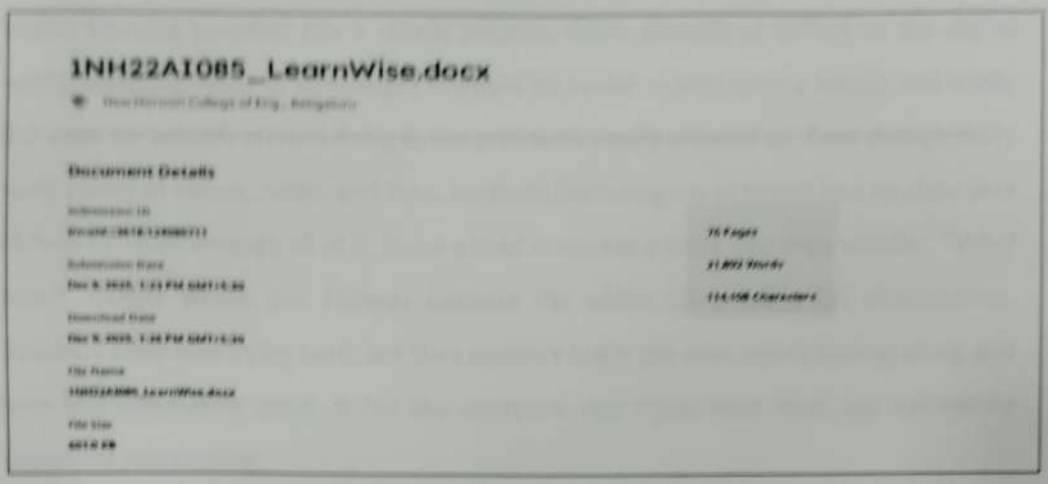

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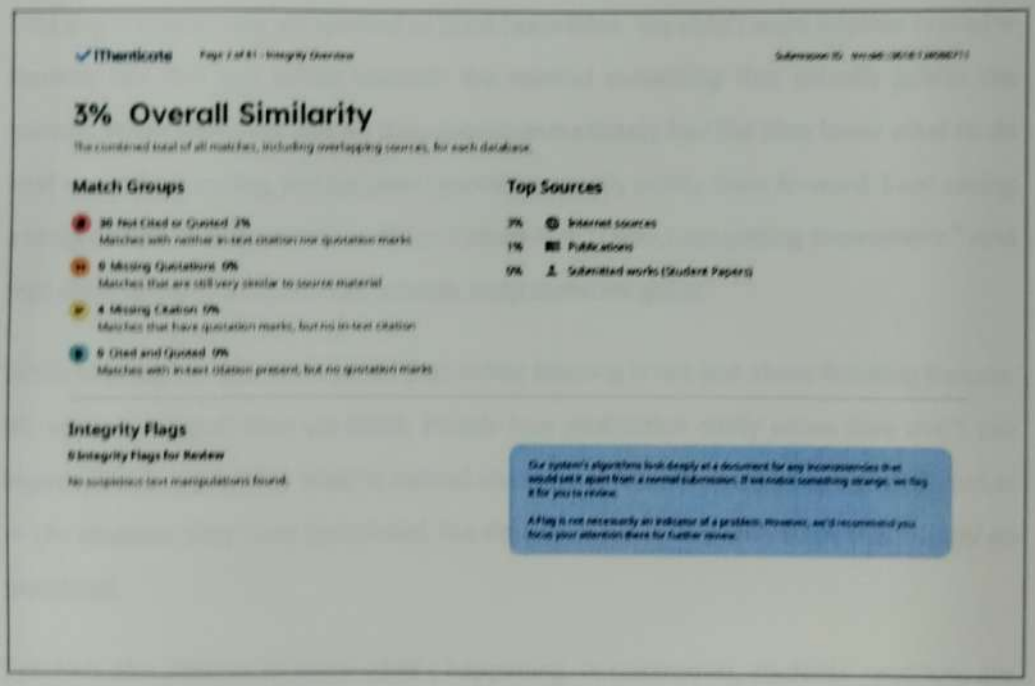

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ABSTRACT

Online learning sounded like a simple solution when everything shifted to the digital world. Honestly, most of us thought it would be easier — just open a laptop and study. But once we actually started doing it, the problems slowly showed up. Even though there were plenty of videos, notes, and links, students (including me at times) had no clear idea of how to move through all of it. Some would complete a topic and then wonder, "What now?" Others would quit halfway because the whole thing felt a bit directionless. Teachers were also trying hard, but they couldn't really see who was following along and who was completely stuck. It felt like everyone was trying their best, but something important was missing.

That gap is exactly why we wanted to build **LearnWise**. We didn't want another typical e-learning site that just stores content. We wanted something that actually guides the learner. When someone logs in, they should immediately feel like they know what to do next — not by guessing, but because LearnWise quietly points them forward. Even seeing a small update in progress can make a student feel, "Okay, I am getting somewhere." And that small sense of progress can actually keep someone going.

While working on this, we realized that online learning is not just about finishing lessons. It's more emotional than we think. People lose motivation easily when they don't see improvement. LearnWise tries to remind students of the effort they have already put in — the chapters they have completed, the time they spent, the little steps that usually go unnoticed.

Teachers also deserve to know what's happening. In classrooms, students' reactions are visible. In online learning, silence can mean anything — confusion, boredom, understanding, or even that the student walked away. LearnWise tries to help teachers notice where students slow down so they can help at the right moment, not after the exam results.

The core idea behind this project is to make online education feel a bit more human again. Not overwhelming, not lonely, not confusing. Just a little more like someone is learning with you, not judging you. LearnWise wants to give direction without killing flexibility, and give confidence without adding pressure.

If this platform can make a student feel less lost while studying — even by a little — we think that would already be a positive change. Because learning should never feel like walking through a maze alone. It should feel like something we can actually do.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Ms. Shravya Shetty,** Assistant Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-POWERED 3D DRAWING IN AIR

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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CERTIFICATE

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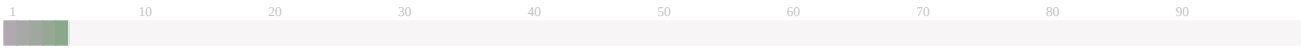

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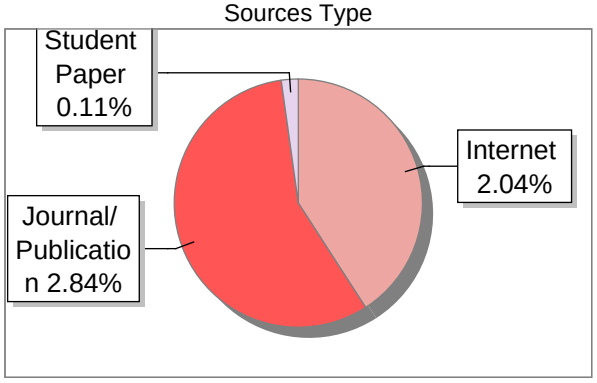

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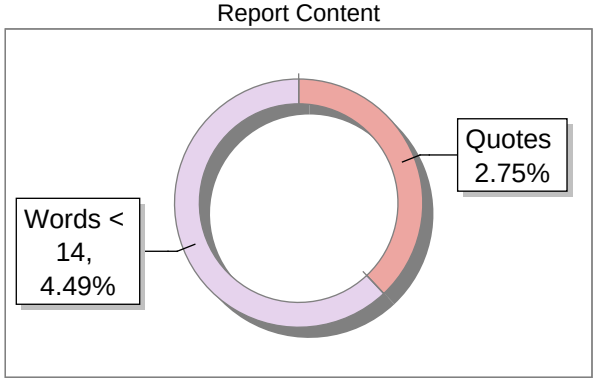

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ABSTRACT

This project is about building a touchless drawing system where a person can draw in the air and see that sketch turned into a digital 2D drawing and a simple 3D shape on the screen. Instead of using a mouse, keyboard, or stylus, the system watches the user's hand through a normal webcam and follows the fingertip to record the drawing movement in real time.

As the finger moves, the system traces smooth strokes by applying basic noise reduction so that the lines look closer to what the user intended. When the sketch is finished, a small AI model tries to recognise what object was drawn, and then a matching basic 3D model is either picked from a set or generated and shown on the screen.

The whole setup is designed to run on regular computers without any depth sensors, gloves, or special cameras, so it can be used in labs, classrooms, or home environments. This shows how hand-gesture tracking, simple sketch recognition, and 3D visualisation can be combined to create a more natural way of drawing for uses like digital art, teaching, quick design ideas, and other hands-free applications

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Magnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Ms. Sandyarani Vadlamudi,** Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-Driven Crowd Density Estimation for Smart Public Safety Monitoring

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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MOHAMMED AYAAN KHAN -1NH22AI092
SADAAD MOHAMMAD BABA -1NH22AI140
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Under the guidance of

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NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

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CERTIFICATE

It is hereby certified that the Project work entitled "**AI-Driven Crowd Density Estimation for Smart Public Safety Monitoring** " is a bonafide work carried out by **MOHAMMED AYAAN KHAN (1NH22AI092), MOHAMMED AMEEN (1NH22AI091), SADAAD MOHAMMAD BABA (1NH22AI140) and SALIM JAVID BABA (1NH22AI145)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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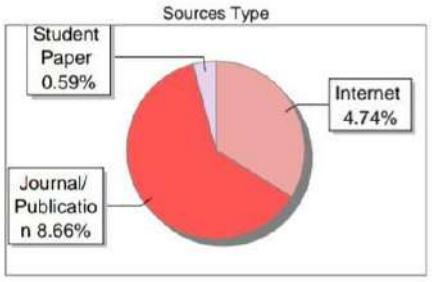

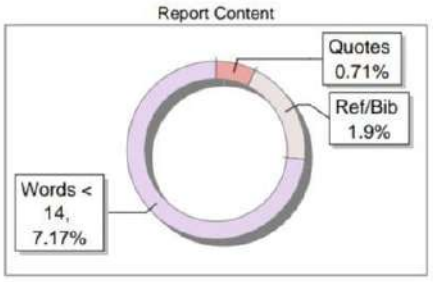

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Student Papers	Yes
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ABSTRACT

The system employs technological approach for automated crowd observation in public areas, utilizing state-of-the-art artificial intelligence and computer vision techniques. The system analyzes visual data from various sources, images, and archived public datasets, to provide accurate real-time crowd assessments. At its essence, the implementation merges the powerful features of CSRNet—a dedicated deep learning framework for understanding crowded scenes—with enhanced OpenCV algorithms for thorough image analysis. This combined strategy allows the system to surpass conventional constraints in crowd analysis, especially when addressing difficult situations related to occlusions, different lighting conditions, and perspective distortions.

The technical framework functions via an advanced multi-stage pipeline that starts with intelligent frame capture and preprocessing. Sophisticated computer vision methods improve input quality by reducing noise, adjusting contrast, and normalizing geometry, setting the stage for precise deep learning evaluation. The CSRNet model subsequently analyzes these improved inputs to produce intricate density maps— pixel-level visuals that measure human presence throughout the observed region. These density maps are subsequently transformed into intuitive heatmap visuals, where color gradients ranging from cool blues to vibrant reds distinctly represent crowd concentration levels. At the same time, the system computes exact headcounts by spatially integrating density values, utilizing perspective correction algorithms to guarantee precision across varying camera angles and distances.

In addition to basic counting, the solution features smart classification systems that sort crowd density into three operational categories: low (safe), medium (caution), and high (critical) levels.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr.Rajasree R S**, Senior Assistant Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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Mohammed Ameen (1NH22AI091)
Sadaad Mohammad Baba (1NH22AI140)
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A PROJECT WORK REPORT
ON
INTERDISCIPLINARY PROJECT TITLED

"AI BASED SMART ELECTRICITY PRICE PREDICTION AND APPLIANCE OPTIMIZATION SYSTEM "

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING
IN
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
BY

MULA MUNI CHINMAI RUCHITHA-1NH22AI096
MUPPIDI NEHA SATYALATHA -1NH22AI098

Under the guidance of
Dr. SREEJITH S
Associate Professor

BACHELOR OF ENGINEERING
IN
ELECTRICAL AND ELECTRONICS ENGINEERING
BY

DEEPTHI R -1NH22EE033
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Under the guidance of
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Academic Year: 2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the interdisciplinary project work entitled **"AI BASED SMART ELECTRICITY PRICE PREDICTION AND APPLIANCE OPTIMIZATION SYSTEM"** is a bonafide work carried out by **MULA MUNI CHINMAI RUCHITHA (1NH22AI096) and MUPPIDI NEHA SATYALATHA (1NH22AI098)** in partial fulfillment for the award of **Bachelor of Engineering** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of the New Horizon College of Engineering during the year **2025-2026.** It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

Signature of Guide	Signature of Guide	Signature of HOD
(Dr. SREEJITH S)	**(Dr. SUJOY DAS)**	**(Dr. N V UMA REDDY)**

10/12/25

SEE VIVA

Name of Examiner	Signature with date
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2. P. Rakesh	

ABSTRACT

Energy prices continue to rise, and families feel it month after month. Modern homes are overflowing with energy data—smart meters, IoT devices, solar setups, and more. But most people aren't sure how to make sense of all those numbers. When that data is actually put to work, though, it becomes something useful. Suddenly, you can catch price spikes before they hit, run appliances like laundry machines when electricity costs less, and steadily reduce your bills. That's the goal of the "AI-Based Electricity Price Prediction and Appliance Optimization System.". The platform is built on six main modules: Data Preprocessing, LSTM Price Forecasting, Appliance Analytics, Cost Computation, an Optimization Engine, and a Streamlit User Interface. Everything kicks off with Data Preprocessing. Once the data is ready, the LSTM Forecasting Module steps in. Long Short-Term Memory networks forecast hourly electricity prices for the upcoming day, revealing not just general trends but specific times when prices rise or fall. Next is Appliance Analytics. The Cost Computation Module handles the math, figuring out what it costs to run each appliance at various times, all while respecting your preferences (for example, "don't use the dishwasher after 9 pm"). The core of the system is the Optimization and Scheduling Engine. It brings everything together, analyzes the data, and selects the schedule that delivers the greatest savings without overlooking your preferences. There's no guesswork—users see exactly how much they save, how those savings happen, and why the system suggests certain schedules. All of this is delivered through a single, interactive Streamlit Dashboard. Households can view price forecasts, compare appliance costs, choose which devices to optimize, and get clear, money-saving schedules. Everything is presented in straightforward charts and summaries, so nobody needs to be an engineer to use it. This isn't just a concept—it's been tested using real UK-DALE data. The predictions are reliable, the insights are genuinely helpful, and people save. In short, this project provides a practical, scalable solution for managing household energy. It puts advanced AI tools in everyday hands, reduces wasted energy, and helps families move toward smarter, more sustainable living.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement. We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support. We would also like to thank **Dr. Aravinda K**, Professor and HOD, Department of Electronics and Communication Engineering, for his constant support.

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Finally, a note of thanks to all the teaching and non-teaching staff of both the departments, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

SKYNET DEFENCE SYSTEM

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

KEVIN JOSEPH C M : 1NH22AI074
NANDADEEP YADAV : 1NH22AI100
RIZUANUL HAQUE RIZU : 1NH22AI134

Under the guidance of

Dr. Sowmya H K
Associate Professor

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It is hereby certified that the Project work entitled "SKYNET DEFENCE SYSTEM" is a bonafide work carried out by **Kevin Joseph C M (1NH22AI074), Nandadeep Yadav (1NH22AI100)** and **Rizuanul Haque Rizu (1NH22AI134)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

18/12/25

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(Dr. Sowmya H K)

18/12/25

Signature of HOD
(Dr. N V UMA REDDY)

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ABSTRACT

With the rapid rise of drones in civilian and commercial use, the risk of unauthorized entry and misuse near sensitive areas has become a serious concern. SkyNet Defence System addresses this by building a fully virtual drone monitoring and defence simulator, where detection, threat evaluation, and response can be tested safely without deploying real drones, sensors, or countermeasure equipment. The main focus of the project is the simulation framework itself: a Unity-based 3D environment that generates repeatable intrusion scenarios and realistic camera views, allowing controlled experiments, clear visual demonstrations, and reliable benchmarking.

The simulator models a protected zone using virtual geo-fencing and continuously observes the airspace through simulated camera feeds. When a drone crosses into restricted space, the system escalates the situation and triggers defence behaviour inside the simulation, such as warnings, tracking escalation, or simulated neutralization actions (e.g., jamming/interception). A distributed hive-mind architecture is used so that multiple virtual nodes—camera units, detection modules, and defence controllers—can cooperate across the terrain, improving coverage and maintaining a shared view of the threat situation.

This makes SkyNet Defence System suitable for academic research, testing of decision logic, and early-stage prototyping of real-world counter-drone workflows in a safe and repeatable virtual environment.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Sowmya H K,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AGROGUARD: REAL-TIME DEEP LEARNING SYSTEM FOR CROP DISEASE DETECTION AND SEVERITY ANALYSIS

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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Janhavi Kanthi : 1NH22AI059
Nandhish K : 1NH22AI101
Priyanka B M : 1NH22AI121

Under the guidance of

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2025-26

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CERTIFICATE

It is hereby certified that the project work entitled **"AgroGuard: Real-Time Deep Learning System for Crop Disease Detection and Severity Analysis"** is a Bonafide work carried out by **Nandhish K (1NH22AI101), Geetha P S (1NH22AI048), Priyanka B M (1NH22AI121) and Janhavi Kanthi (1NH22AI059)** in partial fulfilment for the award of **Bachelor of Engineering** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of the New Horizon College of Engineering during the year **2025-2026**. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved for **22AIM74-Project Phase-2**, as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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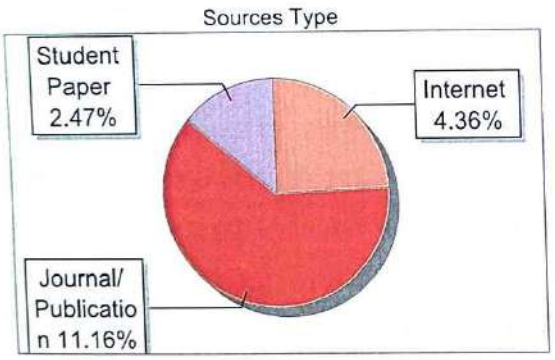

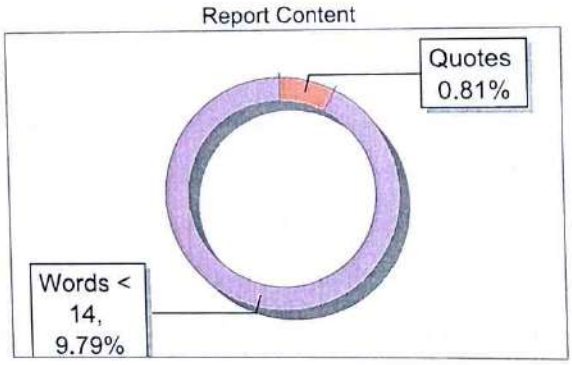

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ABSTRACT

Crop disease is a pertinent issue facing agriculture around the world, since it plays an important role in causing critical reduction of agricultural production, quality, and income of farmers. Detection of plant diseases early and accurately is necessary to avoid huge losses in crops. Traditional disease detection techniques face serious challenges because they require much manual inspection and expertise, which are usually very time-consuming, expensive, and not feasible for poor small-scale farmers. In this work, AgroGuard is proposed as an efficient deep learning–based system for the detection of crop diseases in real time and analysis of their severity using images of leaves.

The proposed system employs convolutional neural network-based architectures, namely VGG-16 and ResNet-based models, for the automatic classification of disease types in multi-crops. Other than disease classification, AgroGuard also performs severity analysis by estimating the extent of infection on the leaf surface and categorizing it as mild, moderate, or severe. Such two-tier analysis creates actionable insights that guide farmers to make proper decisions related to the urgency behind treatment and resource usage.

AgroGuard is designed to be practically deployed, performing real-time inferences on web and mobile platforms while allowing offline support on low-connectivity environments. Focus is laid on the aspects of scalability, accuracy, and ease of use in this system, hence making it apt for rural agricultural setup adoption. Detecting disease along with estimating the severity would enable AgroGuard to enhance the precision farming practices, cut down crop losses, and help with sustainable agricultural management through timely, data-driven decisions.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating a good environment.

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We would also like to thank **Dr. N. V. Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

We also express our gratitude to **Dr. Sowmya H K**, Associate Professor, Department of Artificial Intelligence and Machine Learning, our project guide, for constantly monitoring the development of the project and setting up precise deadlines. The valuable suggestions given by our guide were the motivating factors in completing the work.

Finally, a note of thanks to all the teaching and non-teaching staff of AIML department, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

"AN INTELLIGENT AQUA BOT"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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It is hereby certified that the Project work entitled "An Intelligent Aqua Bot" is a bonafide work carried out by **P BALASUBRAMANIAN (1NH22AI108), PACHIPALA NAGENDRA REDDY (1NH22AI112), PARIVARTHAN REDDY M (1NH22AI113) and PRAGATHI K A (1NH22AI116)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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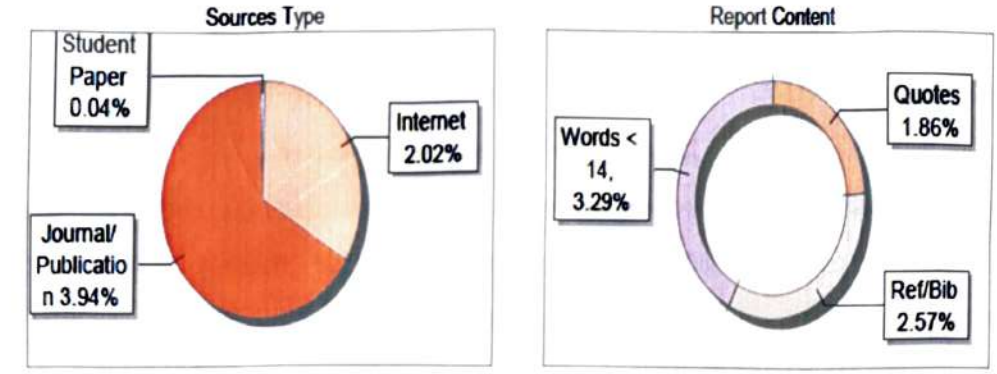

ABSTRACT

An estimated 5 trillion plastic particles, totalling more than 250,000 tonnes, contaminate marine ecosystems, making marine plastic pollution a serious environmental issue of contemporary importance. This widespread problem puts human health and food security at indirect risk in addition to endangering marine biodiversity and aquatic habitats. The resource-intensive, ineffective, and incapable of successfully addressing the intricacies involved in the detection and collection of microplastics are the hallmarks of conventional approaches used for marine debris remediation. The Intelligence Aq-ua Bot project offers a novel, completely autonomous, AI-driven robotic platform designed to identify, categorise, and remove marine debris in real time, including microscopic pollutants like microplastics.

The Intelligence Aqua Bot (IAB) provides a comprehensive and long-term solution to marine plastic pollution by combining state-of-the-art developments in robotics, artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT). The system's core features include intelligent waste classification, real-time debris detection, autonomous navigation, and efficient macro and microplastic collection and segregation.

YOLOv8, a sophisticated deep learning object detection framework that offers remarkable accuracy and speed, powers the system's detection module. The Aqua Bot can now analyse real-time, high-resolution visual data from waterproof cameras attached to the bot thanks to YOLOv8. YOLOv8 ensures precise bounding box regression, object classification, and presence estimation by using a multi-task loss function. This allows the system to identify and distinguish between different types of debris, such as plastics, metals, and organic materials.

Convolutional Neural Networks (CNNs) are used to classify the waste into predetermined categories after it has been detected. A categorical cross-entropy loss function is used by CNNs to ensure accurate classification outcomes. This classification makes it easier to collect and store waste later on. The Aqua Bot's compartments are specifically made for

segregated storage. CNN integration reduces the need for human intervention while increasing operational effectiveness.

Proximal Policy Optimisation (PPO), an algorithm based on reinforcement learning, controls navigation, a crucial aspect of any autonomous aquatic robot. By analysing GPS signals, data from ultrasonic sensors, and other environmental factors, PPO makes dynamic path planning and obstacle avoidance possible. Because of its flexibility, the Aqua Bot can optimise both route efficiency and energy consumption by changing its movement strategy in real-time. In order to ensure stable policy updates and avoid over-fitting, the algorithm uses a clipped surrogate objective function, which facilitates smooth operations under a variety of aquatic conditions.

The Aqua Bot uses microbots equipped with fluo-rescence-based optical sensors and waterproof imaging technologies to address the problem of microplastic detection, an area where conventional systems face constraints. These mi-crobots are skilled at recognising microplastics by their spectral fluorescence signatures, and they work in coordinated swarms. The sensor data is processed by a Support Vector Machine (SVM) classifier, which successfully separates microplastics from organic materials with an 88% detection accuracy. Microplastics are detected, extracted using micro-scale suction mechanisms, and stored in the microbots' onboard compartments.

Energy sustainability is a key part of the system's architecture. Intelligence Aqua Bot is powered by high-efficiency solar panels complemented by onboard lithium-ion batteries for continuous operations in any isolated or off-grid water body. In order to enhance energy utilization across all modules-navigation, detection, collection, and communication-a dynamic power allocation algorithm has been implemented. The energy system's efficacy will be bench-marked using an energy efficiency metric defined as the volume of debris collected per unit of energy expended, in kg/kWh.

Embedding Zigbee modules allows communication and coordination between system components over short-range data transmission, while LoRa modules permit long-range updates to an onshore control center. This kind of comprehensive communication

architecture ensures seamless synchroniza-tion between the main Aqua Bot and the microbots operating with it. The central data processing unit, NVIDIA Jetson Nano, acts as the cognitive core of the system, fusing sensor data, processing imagery, running machine learning algorithms, and controlling robotic movements with minimum latency.

The project also addresses specific limitations and prospective pathways for future enhancement. One identified limitation pertains to the performance of the detection system under low-light or high-turbidity conditions. Augmenting sensor sensitivity or integrating supplementary modalities, such as LiDAR or sonar, could further bolster detection robustness. Additionally, the incorporation of alternative energy sources, such as tidal or wind energy, could complement the solar-based power system and improve sustainability across diverse environmental conditions.

With regard to scalability and real-world implementation, the Intelligence Aqua Bot exhibits substantial potential. The utilization of modular components, resilient communication protocols, and an onboard control system enables its deployment in fleets for extensive marine cleanup operations. Furthermore, the artificial intelligence models utilized can be retrained with novel data, rendering the system adaptable to changing pollution scenarios, including emerging contaminants and new forms of marine debris.

In conclusion, the Intelligence Aqua Bot signifies a notable technological progression in the field of environmental robotics and marine conservation. Through the seamless integration of artificial intelligence, robotics, deep learning, and the Internet of Things (IoT), the Aqua Bot delivers a fully autonomous and sustainable remedy to marine plastic pollution. The system's capability to detect, classify, and extract both macroscopic and microscopic debris—while maintaining elevated energy efficiency and operational autonomy—positions it as a transformative instrument in global marine cleanup initiatives. The innovations presented in this project not only yield immediate environmental benefits but also establish a benchmark for the advancement of future autonomous systems aimed at ecological restoration.

ACKNOWLEDGEMENT

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Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Smart Surgery Training Simulator

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

Mohammed Aftab Ahamed: 1NH22AI090
Mohammed Faizan Ajani: 1NH22AI093
PN Bhavadeep: 1NH22AI109
Pratham Patel: 1NH22AI118

Under the guidance of

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the Project work entitled "**Smart Surgery Training Simulator**" is a bonafide work carried out by **Mohammed Aftab Ahamed (1NH22AI090), Mohammed Faizan Ajani (1NH22AI093), PN Bhavadeep (1NH22AI109)** and **Pratham Patel (1NH22AI118)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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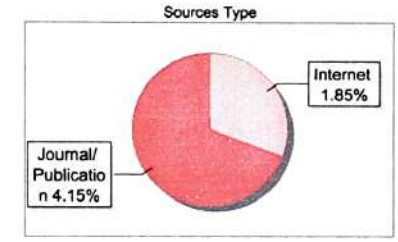

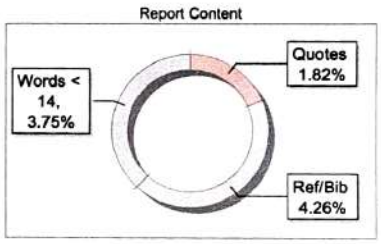

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ABSTRACT

Traditionally, cadaver practice, real patient exposure, and instructor-supervised procedures have been the mainstays of surgical training. These techniques offer crucial practical experience, but they also have a number of drawbacks in terms of cost, availability, and ethical issues. Interactive tools that let students learn complicated procedures in a safe, repeatable, and controlled setting are becoming more and more necessary as medical education develops. By creating an interactive, computer-based surgery simulator with a focus on liver tumor removal, this project fills that need. The simulator, which was created entirely with Unity, Blender, and C#, provides an immersive learning environment intended to improve medical students' procedural comprehension.

The simulation shows a structured workflow that takes the learner through each step of the operation, starting with the incision, then finding the tumor, removing it, giving painkillers, and finally stitching it up. Using Blender, we made detailed 3D models of the liver, tumor, and surgical tools that were clear and had realistic proportions. These models were then integrated into Unity, where physics-based logic was used to enable cutting, object interaction, and soft-tissue response. The system uses raycasting and collider detection to evaluate each user action, allowing it to generate real-time feedback for errors such as cutting too deeply, slicing healthy tissue, or placing medication far from the wound.

To evaluate the educational value of the simulator, a small group of medical students and instructors tested the system. Their feedback highlighted the usefulness of the immediate error alerts, the clarity of the surgical steps, and the opportunity to repeat the procedure multiple times without external constraints. Students reported that the simulation improved their understanding of incision control, tissue boundaries, and the logical order of tasks within a surgery. Instructors observed that the simulator supported cognitive learning and helped learners become more confident before practicing on real patients or cadaveric specimens. Although the system does not replicate tactile sensations, participants found that the visual cues and structured workflow contributed meaningfully to skill development.

The project demonstrates that a lightweight, physics-driven simulator can serve as an effective teaching aid even without advanced artificial intelligence or haptic equipment. By focusing on a single surgical scenario, the system ensures that learners develop precision

and conceptual clarity rather than being overwhelmed by complexity. The simulator's modular design also makes it possible to expand the platform in the future. Planned improvements include haptic feedback integration, the addition of multiple surgical procedures, higher-fidelity anatomical behavior, and cloud-based analytics for tracking user performance. A future VR version could further increase immersion and support collaborative training, enabling multiple users to participate in the same procedure.

All things considered, the Interactive Surgery Simulator provides a useful, reasonably priced, and instructive option for contemporary surgical training. By giving students a safe environment in which to practice, make mistakes, and improve their technique, it closes the gap between theoretical knowledge and practical experience. The project demonstrates how easily accessible technologies like Unity and Blender can be utilized to produce powerful educational resources that help medical students acquire the competencies and self-assurance required for clinical practice.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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We also express our gratitude to **Dr. Umamaheswaran S**,Professor , Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLENGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

CONVERSIONAL AI-DRIVEN PRODUCT RECOMMENDATION SYSTEM USING KNOWLEDGE GRAPHS AND LLM

Submitted in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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DEPARTMENT OF ARTIFICIAL INTELLENGE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "Conversational AI-Driven Product Recommendation System using Knowledge Graphs and LLM's" is a bonafide work carried out by **PAVITHRAJ K (1NH22AI115), PREM KUMAR S (1NH22AI119) , ROASHAN S(1NH22AI135) and RUSHIL S (1NH22AI137)** in partial fulfilment for the award of Bachelor of Engineering **in ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

The rapid growth of e-commerce platforms has led to an overwhelming number of product choices, making it increasingly difficult for users to identify items that best suit their needs. Traditional recommender systems—primarily based on collaborative filtering, static rules, or basic content-based techniques—lack the ability to understand natural language queries, interpret nuanced user intent, or adapt through multi-turn interactions. As a result, these systems often deliver generic or irrelevant recommendations, negatively impacting user satisfaction and decision-making efficiency.

To address these limitations, this work proposes a **Conversational AI-Driven Product Recommendation System** powered by **Large Language Models (LLMs)** and **Knowledge Graphs (KGs)**. The system enables intelligent, real-time interaction by interpreting natural language queries, reasoning over structured product knowledge, and dynamically refining recommendations through conversational context. Unlike traditional approaches, the system supports multi-turn dialogue, allowing users to progressively specify constraints such as budget, brand preferences, technical features, and usage scenarios.

At the core of the architecture, the LLM processes user inputs to extract semantic preferences and convert them into structured intents. These intents are mapped onto a domain-specific Knowledge Graph that captures relationships among products, categories, brands, specifications, and attributes. The KG ensures factual grounding and enables transparent reasoning by providing explainable recommendation pathways. This knowledge-grounded approach reduces ambiguity and improves trust, particularly in complex product domains such as electronics and appliances.

To further enhance accuracy and reliability, the system incorporates **Retrieval-Augmented Generation (RAG)**. Verified product data is retrieved from the Knowledge Graph and external sources before response generation, minimizing hallucinations and ensuring up-to-date information. A relevance scoring mechanism combines user preferences with KG-based semantic relationships to rank products effectively. The system also supports attribute-level comparison and justification, offering clear explanations for each recommendation.

The solution is deployed via a lightweight web interface connected to a modular backend built using Python, Neo4j, and LLM APIs. This design supports scalability, extensibility, and real-world deployment. New product categories, updated specifications, and live e-commerce integrations such as pricing and availability can be seamlessly incorporated without modifying the conversational pipeline.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Prof. Sindhuja R,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-DRIVEN TRAFFIC OPTIMIZATION AND EMERGENCY RESPONSE SYSTEM

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

NEHA T M	**1NH22AI104**
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RITHUN C	**1NH22AI133**
S MOKSHITHA	**1NH22AI138**

Under the guidance of

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Professor and HOD

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103
2025-26

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It is hereby certified that the Project work entitled "AI-DRIVEN TRAFFIC OPTIMIZATION AND EMERGENCY RESPONSE SYSTEM" is a bonafide work carried out by **NEHA T M (1NH22AI104), PRIYA DARSHINI T (1NH22AI120), RITHUN C (1NH22AI130), S MOKSHITHA (1NH22AI138)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

Managing traffic efficiently has become increasingly important as urban regions continue to grow and experience heavier road usage. Traditional signal systems that rely on static timing often fail to respond effectively to fluctuating traffic patterns. In this work, an adaptive signal control framework is introduced that leverages continuous video-based monitoring to assess conditions at an intersection. The system analyzes live feeds from each lane to determine vehicle density, congestion tendencies, and the presence of emergency responders, with each stream handled concurrently to maintain real-time performance.

The extracted information is forwarded to a central decision module, where an optimization mechanism calculates a priority score for every approach. Emergency vehicles are automatically assigned the highest precedence, allowing ambulances, fire services, and law-enforcement units to move through the junction with minimal delay. When no such vehicles are detected, the controller regulates green-light durations according to prevailing traffic levels, preventing excessive queue formation and reducing idle times.

To support operators, the framework also includes an interactive dashboard that visualizes traffic states and signal actions as they occur. Its modular architecture enables deployment at a single intersection or integration into a broader urban traffic network.

Overall, the system illustrates how computer vision techniques combined with lightweight optimization can enhance traffic responsiveness. By dynamically adjusting signal phases and ensuring swift passage for emergency vehicles, the proposed approach aims to reduce congestion, improve roadway safety, and strengthen emergency response efficiency in urban environments.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani,** Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N. V. Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning and our project guide, for constantly monitoring the development of the project and setting up precise deadlines. The valuable suggestions given by our guide were the motivating factors in completing the work.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT WORK REPORT
ON
INTERDISCIPLINARY PROJECT TITLED

" FAULT IMPACT ANALYSIS FOR 5G USING AIML "

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING
IN
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
BY

R B PAVITHRA-1NH22AI123

Under the guidance of
Dr. JIMSHA K MATHEW
Associate Professor

BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE AND ENGINEERING
BY

AAJNYA NARAYAN PRABHU-1NH22CS004
DEEPTHANSH M-1NH22CS063

Under the guidance of
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Academic Year: 2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the interdisciplinary project work entitled "**FAULT IMPACT ANALYSIS FOR 5G USING AIML**" is a bonafide work carried out by **R B PAVITHRA (1NH22AI123)** in partial fulfilment for the award of **Bachelor of Engineering** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of the New Horizon College of Engineering during the year **2025-2026.** It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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2. P. Rakesh	12/12/25


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OF PARTICIPATION
PRESENTED TO
R B Pavithra
From New Horizon College of Engineering, Bengaluru
On successful completion of the ITU project
'Fault Impact Analysis for 5G using AIML'
through Nokia Bangalore University Collaboration
14 April 2025 - 28 July 2025
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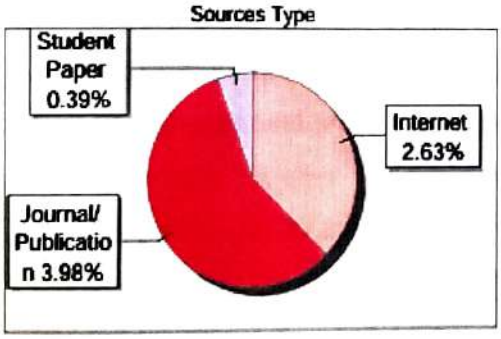

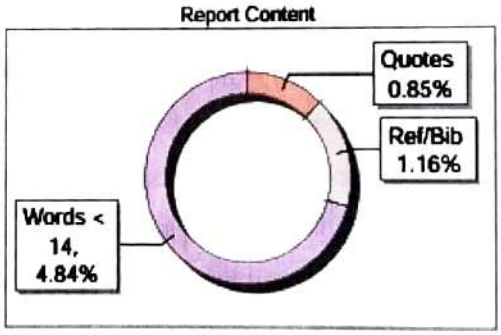

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ABSTRACT

The rapid deployment of Fifth Generation 5G mobile networks has enabled high data rates low latency and large scale device connectivity supporting applications such as smart cities autonomous transport industrial automation and Internet of Things systems but the increasing complexity of 5G architectures makes network monitoring and fault management difficult due to massive volumes of KPI data generated from multiple network elements Traditional rule based and threshold driven fault management approaches are reactive and fail to predict fault severity or future service degradation This project proposes an Artificial Intelligence and Machine Learning based fault impact analysis framework for 5G networks that uses historical and synthetic KPI data to predict the severity of performance degradation with a focus on data rate and quality of service Advanced preprocessing and feature engineering techniques such as KPI trends deltas and rolling statistics are applied to improve prediction accuracy Supervised learning models including Random Forest Gradient Boosting XGBoost and LightGBM are used to classify fault impact levels and provide network element wise fault severity identification The framework also includes KPI trend analysis and forecasting to enable proactive maintenance and an interactive visualization dashboard to present actionable insights This approach improves network reliability reduces downtime and supports efficient and targeted troubleshooting making it a scalable and practical solution for intelligent and proactive 5G fault impact management.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement. We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance.

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We also express our gratitude to **Dr. D. Roja Ramani**, Associate Professor, Dept. of CSE and **Dr. Jimsha K Mathew**, Associate Professor, Dept. of AIML, our project guides, for constantly monitoring the development of the project and setting up precise deadlines. Their valuable suggestions were the motivating factors in completing the work.

Finally, a note of thanks to all the teaching and non-teaching staff of both the departments, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

SmartLearn: An AI-Powered Personalized Multimodal and Multilingual Learning Platform for Engineering Education

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

By

GNANADEEP MALISETTY - 1NH22AI049
R SNEHA SINGH - 1NH22AI124
S NIDHI - 1NH22AI139

Under the guidance of

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Academic Year: 2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the Project work entitled **"SmartLearn: An AI-Powered Personalized Multimodal and Multilingual Learning Platform for Engineering Education"** is a bonafide work carried out by **GNANADEEP MALISETTY (1NH22AI049), R SNEHA SINGH (1NH22AI124) and S NIDHI (1NH22AI139)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree

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Signature of HOD
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ABSTRACT

SmartLearn is an advanced AI-powered learning platform developed to address the limitations of traditional and one-size-fits-all educational systems by delivering personalized, multimodal, and multilingual learning experiences. The platform enables students, particularly in engineering education, to interact with an intelligent system that provides learning content in multiple formats, including text-based explanations, audio narration, and video-based resources. By leveraging natural language processing, generative AI, and intelligent recommendation techniques, SmartLearn adapts content delivery according to individual learning preferences and comprehension levels, thereby enhancing accessibility, inclusivity, and overall learning effectiveness for a diverse student population.

In addition to content delivery, SmartLearn incorporates an AI-driven assessment and feedback mechanism that dynamically generates quizzes and evaluates learner responses in real time. The system supports both multiple-choice and descriptive answers, analyzes user performance, and provides correct solutions along with detailed explanations to promote conceptual clarity. Performance analytics, progress tracking, ratings, and motivational feedback help learners identify strengths and areas for improvement, encouraging continuous learning and self-assessment. By integrating personalization, adaptive evaluation, and multilingual support into a single platform, SmartLearn aims to create a scalable, intelligent, and learner-centric educational ecosystem capable of transforming modern digital education.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

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We would also like to thank **Dr. N V Uma Reddy,** Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude **Dr.Rajasree RS,** Senior Assistant Professor , Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

MULTI-AGENT SYSTEM FOR PAEDIATRIC ONCOLOGY PATIENT SUPPORT USING LLMs

Submitted in partial fulfillment for the award of the degree of

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in

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by

KIRUTHIK J: 1NH22AI076
RAJALAKSHMI R: 1NH22AI126
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Under the guidance of

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NEW HORIZON **COLLEGE OF ENGINEERING, BENGALURU-560103**

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It is hereby certified that the Project work entitled "MULTI-AGENT SYSTEM FOR PAEDIATRIC ONCOLOGY PATIENT SUPPORT USING LLMs" is a bonafide work carried out by **KIRUTHIK J (1NH22AI076), RAJALAKSHMI (1NH22AI126) and SONAL SHIRKE (1NH22AI165)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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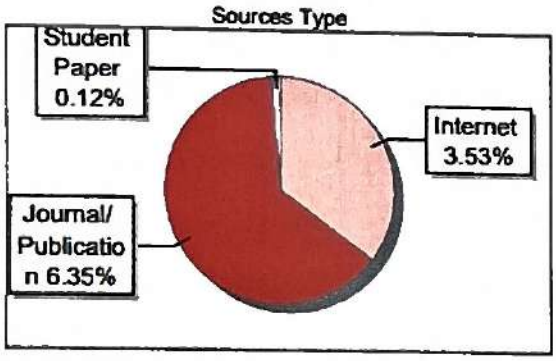

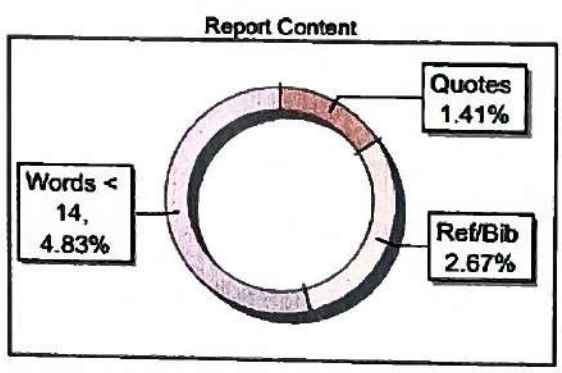

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ABSTRACT

While most children spend their days building memories, running through schoolyards, and being joyfully loud in classrooms, a brave few are confined to hospital rooms, navigating the overwhelming journey of cancer. For children, the disease often robs them not only of their health but also of the very experiences that define childhood. What makes it even harder is the unfamiliar treatment plans, and scary-sounding procedures—often beyond their ability to understand.

Adults can observe the signs and symptoms of cancer in their bodies and maybe take some action however, in children, it is difficult to understand and observe any signs and symptoms under all the regular play accidents, bruises or any common illnesses. It is difficult to detect cancer in children as they are rare compared to adults.

There is little to no contribution of Artificial Intelligence in paediatric cancer, be it in patient care or supporting decision making to the healthcare specialists.

According to Indian Cancer Society, every year, over 3 lakh children are diagnosed with Cancer all over the world.

In India, nearly more than 50,000 new childhood cancer cases occur every year.

In the west, the survival rate is as high as 80-90% in some cancers. With a conservative estimate of 70% survival rate, many survivors are added to population every year.

Cancers in childhood are best treated at Paediatric cancer units by specialised disease management groups. Age group of 0-14 is considered as paediatric age group, some centres also consider age up to 18 years.

This project aims to address this gap by developing an AI-powered application designed to help children with cancer and their caregivers through reliable, context-aware information.

Using a RandomForestRegressor trained on synthetic data from medical literature, the system incorporates machine learning-based risk classification. Based on medical data supplied by the user, this model offers a probability of treatment success or problems. Furthermore, a refined Mistral-7B language model (referred to as "CancerLLM") provides medically accurate explanations of symptoms, stages of treatment, and possible side effects. To guarantee quality, evaluation measures like ROUGE and BLEU are used. In addition, it consists of a conversational bot to help children and caregivers understand

their cancer and its symptoms, side effects. In order to prevent dangerous or delicate predictions, the program maintains tight safety alignment while presenting results in a way that is easy for caregivers and children. The objective is to improve clarity, comprehension, and educational assistance for families confronting pediatric cancer rather than to replace medical experts.

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The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr./Mr./Ms. <Int. Guide Name>,** <Designation>, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-Powered Real-Time Violence Detection and Automated Response System Using Vision-Based Surveillance

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

IN

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

By

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KARUN SAI PN - 1NH22AI110
RAMIREDDY VENKATA ISWARYA - 1NH22AI129

Under the guidance of

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Associate Professor

Academic Year: 2025-26

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Signature of HOD
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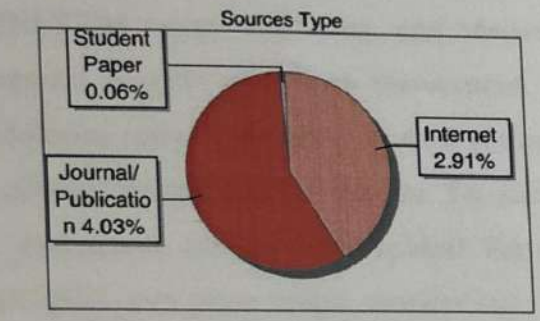

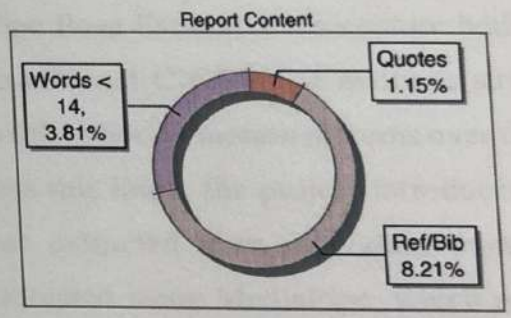

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ABSTRACT

Video surveillance has become an indispensable element in modern security infrastructures, with thousands of CCTV cameras deployed across public and private environments like streets, transportation hubs, campuses, malls, residential communities, and workplaces. However, continuous manual monitoring of multiple video streams is highly challenging, time-consuming, and error-prone due to the limitations of human observation. Critical incidents, in particular violent activities, often go unnoticed due to operator fatigue, delayed reaction times, and limitations in human attention span. This growing gap between the scale of surveillance and human monitoring capability has created a pressing need for intelligent, automated systems capable of detecting violent behavior in real time. In this respect, this study develops a Deep Learning based Real-Time Violence Detection System that combines the latest computer vision, human pose estimation, and sequence modeling methods to accurately identify violent activities in surveillance videos. The proposed system uses a hybrid architecture that combines MobileNetV2, LSTM/BiLSTM neural networks, and MediaPipe Pose Estimation to capture both spatial and temporal aspects of human movement. Traditional CNN-based methods struggle to detect violence reliably because violent actions rely more on motion patterns over time than on the content of individual frames. To address this issue, the project introduces a dual-feature extraction mechanism: spatial features extracted from individual frames using MobileNetV2, and pose-based motion cues extracted using MediaPipe, which provides a set of 33 skeletal keypoints representing the human body. These pose landmarks help capture important motion signatures linked to violent activities such as punching, kicking, pushing, sudden acceleration, or defensive movements. The combination of spatial and skeletal features improves the model's ability to tell the difference between normal activities and aggressive interactions. The framework leverages Long Short-Term Memory (LSTM) and Bidirectional Long Short-Term Memory (BiLSTM) network architectures for conducting temporal modeling of violent activities by analyzing the body motions occurring in consecutive frames. Violent behaviours arise over time as the aggressor approaches and retreats from their intended target (i.e., their victim); hence, LSTM's ability to store previous timeframes allows the model to recognize patterns of aggression from

both the approach and retreat phases. By processing sequences of frames bi-directionally, i.e., in both forward and reverse directions (i.e., forward for LSTMs and backward for BiLSTMs), BiLSTMs provide even more contextual information about the set of input images and how the body motion in one frame relates to all the other frames in the same video segment.The model classification provides two classifications for each video frame sequence: Violent and Non-Violent. Because of the use of lightweight MobileNetV2 and highly efficient LSTM models in building the system, the system will have the potential to operate with very limited amounts of computing power and can therefore be used in real-time applications. The model is trained and validated using two of the most acknowledged real-world surveillance datasets: RWF-2000 and the CCTV-Fights Dataset. These challenging datasets consist of diverse CCTV footage captured from uncontrolled environments, varying illuminations, camera angles, background clutters, resolution, and occlusions. Training with such challenging datasets makes it certain that the model generalizes effectively across real-world scenarios. Frame extraction, pose keypoint normalization, resizing frames to MobileNetV2 input resolution, and grouping them into fixed-length sequences for temporal analysis are some of the preprocessing steps. A well-structured preprocessing pipeline thus ensures that the model takes meaningful and consistent inputs while training.

The complete system is developed in VS Code and allows for both uploaded video analysis and real-time webcam detection. Among the key contributions of the project is the Automated Alert Mechanism, which turns on immediately once it detects violent activity. The actions performed by the alert module are as follows:

- It sends an instant Telegram message to the configured security channel.
- Triggers an Email notification, including timestamp and confidence score.
- Captures and shares a Snapshot of the detected violent frame.
- Logs the event for future analysis and visualization.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr.Akshatha P S,** Associate professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Design and Development of Aggronite for the Sericulture to the threat and prediction analysis through Machine Learning Models.

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

GM PRAVEEN KUMAR: 1NH22AI041
RICKY: 1NH22AI131
SHIVANI RAJKUMAR : 1NH22AI156
TANISH M SANGHVI: 1NH22AI174

Under the guidance of

Dr. SONIA MARIA D'SOUZA,Post Doctoral
ASSOCIATE PROFESSOR

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CERTIFICATE

It is hereby certified that the Project work entitled **"DESIGN AND DEVELOPMENT OF AGGRONITE FOR THE SERICULTURE TO THE THREAT AND PREDICTION ANALYSIS THROUGH MACHINE LEARNING MODELS."** is a bonafide work carried out by **G M PRAVEEN KUMAR (1NH22AI041), RICKY (1NH22AI131), SHIVANI RAJKUMAR (1NH22AI156)** AND **TANISH M SANGHVI (1NH22AI174)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026.** The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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Dr. N V UMA REDDY

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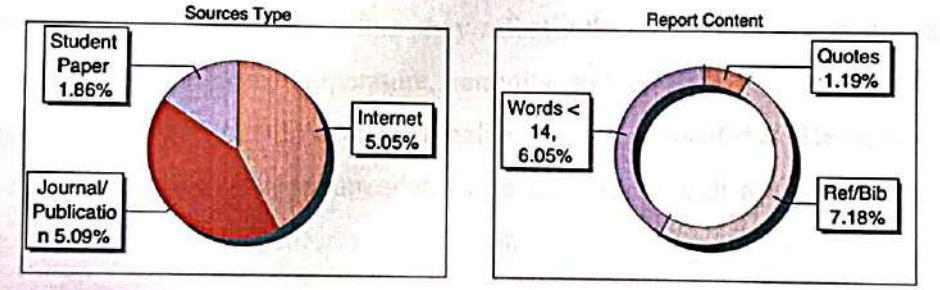

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ABSTRACT

Sericulture — the cultivation of silkworms for silk production — is a livelihood for many rural communities and small-scale farmers. However, the process is highly sensitive to environmental changes, pest attacks, and disease outbreaks, which can drastically reduce silk yield and quality. Traditional farming methods, while rich in knowledge, often lack the tools to predict and prevent these threats in advance. That's where Aggronite comes in a smart, data-driven companion designed to empower sericulturists with real-time insights and predictive intelligence.

This project focuses on the design and development of Aggronite, a system that combines IoT based environmental monitoring with machine learning models to detect potential threats and predict harmful conditions before they affect silkworms or mulberry crops. Sensors collect real time data such as temperature, humidity, and leaf quality, which is then analysed using trained ML algorithms to detect anomalies or early signs of risk. The system provides timely alerts and practical recommendations to farmers through a user-friendly interface, helping them take quick and informed decisions.

Aggronite aims to bridge the gap between traditional sericulture and modern technology, offering a scalable, accessible, and affordable solution tailored specifically for silk farming. By making threat analysis and prediction smarter and more reliable, this project not only helps protect silk crops but also supports the livelihoods of the farmers who depend on them.

ACKNOWLEDGEMENT

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We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for providing the necessary infrastructure and creating a good environment.

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We also express our gratitude to **Dr. Sonia Maria D'souza,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-II REPORT

ON

"REAL-TIME AI DRIVEN DEFECT DETECTION SYSTEM USING VISION AND WEIGHT SENSING FOR PLASTIC BOTTLE INSPECTION "

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

IN

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

By

SHAINY PANAKANTI - 1NH22AI111
PRANISREE PUTLUR - 1NH22AI122
RONIT RATURI - 1NH22AI136
SAMETA DHARMIKA - 1NH22AI148

Under the guidance of

Ms. THANU DEEPU GEROGE
Senior Assistant Professor

Academic Year: 2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the interdisciplinary project work entitled **"REAL-TIME AI DRIVEN DEFECT DETECTION SYSTEM USING VISION AND WEIGHT SENSING FOR PLASTIC BOTTLE INSPECTION"** is a bonafide work carried out by **SHAINY PANAKANTI (1NH22AI111) PRANISREE PUTLUR (1NH22AI122), RONIT RATURI (1NH22AI136) and SAMETA DHARMIKA (1NH22AI148)** in partial fulfilment for the award of **Bachelor of Engineering** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of the New Horizon College of Engineering during the year **2025-2026.** It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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(MS. THANU DEEPU GEORGE)	**(Dr. N V UMA REDDY)**

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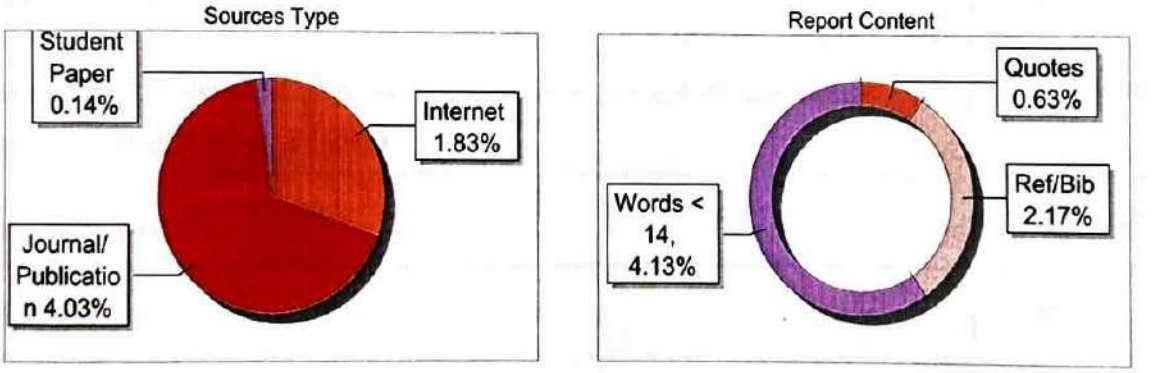

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ABSTRACT

Maintaining product quality in production settings particularly in the manufacture of plastic bottles continues to be a significant challenge because of high output rates and reliance on human inspection. Conventional visual inspections are labour-intensive, susceptible, to mistakes and fail to identify flaws like underfilling or leaks. To overcome these issues this project introduces a Time AI-Powered Defect Detection System that combines computer vision with weight measurement to ensure accurate and automated bottle quality control. The system utilizes a MobileNetV2 deep learning architecture for classifying visual defects alongside a load cell paired with an HX711 interface to check bottle weight. Combining physical data allows detection of surface flaws (such as dents, cracks and deformations) as well, as hidden defects associated with filling volume. The model is developed using a selected dataset of faulty and intact bottles undergoing preprocessing steps like normalization, resizing and augmentation to enhance generalization. Running over 100 epochs the network reached accuracy and showed solid results in validation. The Raspberry Pi functions as the real-time inference processor whereas the Arduino Uno continuously measures and sends weight information. A straightforward decision-level fusion technique merges the outputs, from both components guaranteeing precise detection. Every outcome, encompassing the classification label, weight measurement, timestamp and bottle image reference is saved within a database, for tracking, analysis and traceability.

The integrated approach significantly enhances inspection reliability, achieving higher accuracy than vision-only or weight-only systems. The system is lightweight, cost-effective, scalable, and suitable for Industry 4.0-oriented manufacturing lines. Future scope includes deployment with larger datasets, incorporation of advanced sensor fusion, and integration with cloud dashboards for predictive maintenance and large-scale industrial adoption. This work establishes a practical pathway toward autonomous quality control and efficient defect monitoring in production environments.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani,** Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement. We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy,** Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

We also express our gratitude to **Ms. Thanu Deppu George,** Senior assistant professor, Dept. of AIML our project guide, for constantly monitoring the development of the project and setting up precise deadlines. Their valuable suggestions were the motivating factors in completing the work.

Finally, a note of thanks to all the teaching and non-teaching staff of the department, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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A PROJECT PHASE-2 REPORT

on

PixelCloak: Conceal Sensitive Information in Media Files

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

SADIYA MEHNAZ : 1NH22AI141
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Under the guidance of

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2025-26

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It is hereby certified that the Project work entitled "PixelCloak: Conceal Sensitive Information in Media Files" is a bonafide work carried out by **SADIYA MEHNAZ (INH22AI141), SIREESHA KS (INH22AI162), TASHU L (1NH22AI175) and VINAYA SM (INH22AI188)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

The fast growth of online tools makes sharing info easier - yet brings bigger dangers like hacking, spying or leaks. Even if codes keep messages safe, they don't hide the fact that something private is being sent. When someone's watching closely, just sending a locked message might raise suspicion. Instead, steganography hides secrets inside normal-looking files so no one notices anything odd going on.

Piece by piece, PixelCloak hides text inside pictures without slowing things down. Instead of just stacking bits at the end, it uses an old-school LSB trick - but twists it using a secret passcode to scramble the path through pixels. That trail jumps around on purpose, making snooping way harder. No straight lines mean hackers can't guess where data's tucked away. A small label in code marks hidden chunks so they're found later. The password isn't stored - it shapes how random patterns form each time. Even the bit layout gets swapped into letter-like symbols using a lean DNA-style switch. A big plus about PixelCloak is how easily it fits into different setups. It runs straight in the browser with basic web tools - HTML, CSS, JS - so everything stays private and processed right on your machine. Or else, you can hook it up to a REST API if you need something stronger for business use, like safe data saving, tracking access, login control or handling many users at once. Because it works two ways, it's good for single people just doing their own thing, yet still powerful enough for bigger teams.

A fresh take on ease-of-use, PixelCloak rolls out a sleek, digital-edge design guiding users step-by-step when hiding or pulling data. Instead of clutter, it keeps things clean - yet sharp - with a look that feels futuristic but doesn't sacrifice clarity. Its visual tone matches the app's core focus: tight, no-nonsense protection without flashy extras.

Test results show the new approach creates stego pictures with PSNR above 50 dB - meaning changes are barely visible. Instead of a fixed path, pixels get altered in a scrambled order based on a secret key, making tracking much harder. This randomness breaks common traces left by similar tools. So, hidden data stays better masked, withstands analysis, plus remains protected. PixelCloak works in many everyday situations - like private chats, sharing sensitive info, shielding whistleblowers, analyzing digital evidence or secret intel tasks. It mixes solid protection with ease of use and reliable tech under the hood, giving a hands-on fix for today's online privacy issues.

ACKNOWLEDGEMENT

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Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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A PROJECT PHASE-2 REPORT

on

"MACHINE LEARNING-DRIVEN APICULTURE SYSTEM FOR OPTIMIZING HONEYBEE FORAGING PATTERNS, HIVE HEALTH MONITORING AND COLONY COLLAPSE DISORDER PREVENTION"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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SATYA PANDIAN : 1NH22AI151
SIDDARTH SRINIVAS :1NH22AI160
VAIBHAV VEMANI : 1NH22AI185

Under the guidance of

Dr. Sonia Maria D'Souza, Post Doctorial
Associate Professor

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NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

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(Dr. Sonia Maria D'souza)

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Signature of HOD
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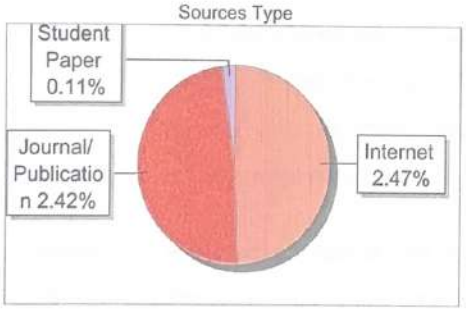

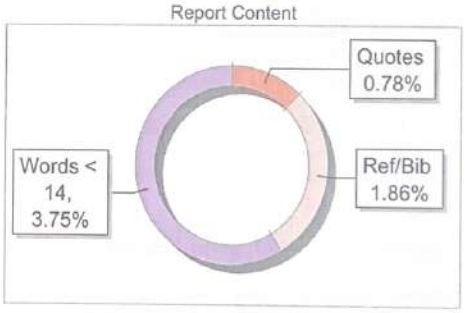

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ABSTRACT

Honeybee numbers have been dropping for years, and most beekeepers know how quickly things can go wrong in a hive. Problems like Colony Collapse Disorder and attacks from invasive species, especially aggressive hornets, can wipe out a colony before anyone even notices something is off. Since bees play such a huge role in pollinating crops around the world, losing them affects far more than just honey production. Still, many apiaries rely on occasional manual checks, which are slow and don't offer much real-time information about what's happening inside or around the hive.

This project was built to fill that gap using a more modern, automated approach. One part of the system focuses on spotting predators as soon as they appear. It uses an optimized YOLOv11 model that runs directly on a Jetson Nano, fast enough to analyse right away so they can respond before damage occurs.

The other side of the project looks at the colony's sound patterns. A hybrid CNN–BiLSTM model analyses short audio recordings taken from inside the hive and uses them to judge whether the colony seems healthy or under stress. It can even provide approximate yield predictions, which become more accurate when environmental data is added.

Everything is meant to run at the edge, without relying on a constant internet connection. The setup is modular so it can scale to multiple hives, and the data can be the camera feed in real time and accurate enough to tell different types of hornets and wasps apart. When a threat shows up, the system is designed to alert the beekeeper viewed from a simple web or mobile interface.

Overall, the goal is to give beekeepers a practical tool that reduces colony losses and helps them make better decisions using continuous, non-invasive monitoring.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for providing the necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy,** Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Sonia Maria D'souza,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

CleverLearn: AI powered conversational PDF assistant.

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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Harshitha P Shetty – 1NH22AI052
Saloni Jangid – 1NH22AI146
Suyash Ganesh Patil- 1NH22AI170

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NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU-560103

2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the Project work entitled "CleverLearn: AI powered conversational PDF assistant" is a bonafide work carried out by **Deekshitha D Ganiga (1NH22AI037), Harshitha P Shetty (1NH22AI052), Saloni Jangid (1NH22AI146) and Suyash Ganesh Patil (1NH22AI170)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026.** The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

In the era of digital learning, static documents like PDFs often limit interactive engagement, making knowledge extraction slow and inefficient. This report presents Clever Learn, an AI powered web application designed to revolutionize document interaction by enabling dynamic, real-time engagement with PDF content. Built using React, TypeScript, Next.js, and OpenAI's GPT models, the system allows users to upload PDFs or video links and receive AI driven summaries, quizzes, flashcards, and contextual answers. Clever Learn integrates natural language processing and machine learning to transform passive reading into an active learning experience, enhancing comprehension, retention, and productivity. Through rigorous design, modular architecture, and robust backend support, the platform ensures scalability, secure data handling, and user-friendly interaction. The system's effectiveness is demonstrated through various test cases and real-world applications, highlighting its potential to reshape educational tools and personalized learning systems. Maintaining effective study practices and accessing knowledge efficiently are crucial for learners, researchers, and professionals in today's fast-paced digital world. Traditionally, interacting with educational materials like PDFs has involved manual reading, note-taking, and summarizing, which can be time-consuming, inconsistent, and prone to oversight. As the volume of digital learning resources grows, these traditional methods often struggle to keep up, leading to information overload, reduced learning efficiency, and missed insights. This highlights the urgent need for innovative solutions that provide intelligent, adaptive, and user-friendly ways to engage with learning materials. This research aims to develop an AI-powered assistant, Clever Learn, which leverages natural language processing to transform static PDFs and educational content into dynamic, interactive learning tools. By analyzing uploaded documents and user queries, the system can generate summaries, quizzes, flashcards, and provide real-time answers, enhancing both comprehension and retention. This approach aims to empower learners by streamlining the study process, making educational content more accessible and engaging. Despite its promising capabilities, implementing AI-driven educational tools presents challenges. Key limitations include managing diverse document formats, interpreting vague or incomplete queries, and ensuring the AI can provide accurate, context-aware assistance across a wide range of subjects and disciplines. Additionally, real-world evaluations comparing AI-supported

learning with traditional study methods are essential to validate the system's practical impact. Addressing these challenges is critical for the successful deployment of AI-based educational platforms in diverse learning environments. The Clever Learn platform has the potential to significantly enhance the educational experience by delivering personalized, AI-powered learning support. By reducing the time needed to process and understand complex documents, the system can improve learning efficiency, support deeper comprehension, and boost user confidence. Additionally, its capacity to generate custom quizzes and flashcards promotes active recall, an evidence based technique for improving memory retention, ultimately helping learners achieve better outcomes.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE also our guide for her constant support, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT PHASE-2 REPORT

on

FULL STACK TUTORING WITH AI

Submitted in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING

in

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DEPARTMENT OF ARTIFICIAL INTELLENGE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "LearnWise : A Smart and Engaging AI Powered Learning Platform" is a bonafide work carried out by **SANJAY.S(1NH22AI149), SHARAN.S (1NH22AI154) and TP.DARSHAN (1NH22AI172)** in partial fulfilment for the award of Bachelor of Engineering **in ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

In the evolving landscape of digital education, traditional learning management systems often lack the ability to provide personalized feedback and real-time content adaptation. This project aims to bridge this gap by developing "Antigravity," an advanced AI-powered tutoring platform designed to deliver a tailored educational experience.

The system is built upon a modern full-stack architecture utilizing React.js for a responsive user interface and FastAPI for high-performance backend processing. At its core, the application integrates a sophisticated Artificial Intelligence pipeline leveraging Retrieval-Augmented Generation (RAG). By utilizing LangChain and ChromaDB for vector storage, the system ensures that responses are contextually grounded in user-uploaded course materials (PDFs, PPTs, DOCX), thereby significantly reducing hallucinations common in standard LLMs. The platform employs the Groq API with the Llama-3 model for sub-second text generation and reasoning.

Key features include an automated document processing engine capable of extracting and summarizing text from complex documents using OCR, and a dynamic assessment module that generates quizzes in real-time. A distinct Adaptive Learning Engine analyzes student performance to classify users into proficiency tiers (Struggling, Average, Advanced), automatically adjusting the difficulty of study materials and providing personalized remediation paths.

Furthermore, the platform incorporates a robust Teacher Analytics Dashboard that provides educators with real-time insights into classroom performance. By visualizing key metrics—such as topic mastery and individual progress trends—the system empowers instructors to make data-driven decisions. To ensure reliability and seamless deployment, the application is containerized using Docker, facilitating consistent execution across environments. This project demonstrates the potential of integrating Large Language Models into education to create scalable, personalized, and interactive learning environments.

ACKNOWLEDGEMENT

I am deeply grateful for the support, guidance, and encouragement that contributed to the successful completion of this project titled **"Full Stack Tutoring with AI."** This work would not have been possible without the collective contributions of several individuals and institutions.

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I would also like to thank the **Department of Artificial Intelligence and Machine Learning** for offering a supportive learning environment and access to essential resources that greatly facilitated my research and development efforts. The encouragement from faculty members and the availability of technical infrastructure significantly contributed to the smooth completion of this project.

A special word of appreciation goes to my classmates, peers, and friends, who have consistently provided moral support, shared ideas, and helped in discussions that enhanced the overall quality of this work. Their cooperation and constructive suggestions were instrumental in refining various aspects of the project.

Finally, I extend my heartfelt thanks to my family for their unwavering support, patience, and motivation. Their encouragement and belief in my abilities have always been a source of strength and inspiration.

With gratitude, I acknowledge the contributions of everyone who played a role, directly or indirectly, in making this project successful.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

HelpHand Intelligent Volunteer & Task Matching System

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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Under the guidance of

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It is hereby certified that the Project work entitled "HELPHAND INTELLIGENT VOLUNTEER & TASK MATCHING SYSTEM" is a bonafide work carried out by **RITHIKA CHINTHALAPALLI PATTA (1NH22AI132), SHANKA S(1NH22AI153), V SHRIYA(1NH22AI180)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

Most community support platforms face the challenge of scaling up volunteer-task matching while maintaining trust and reliability within the platform. The proposed system, HelpHand, merges the functionalities of OCR for verifying the IDs of volunteers, TF-IDF with cosine similarity for recommendation of tasks to volunteers, and VADER/TextBlob lexicon-based sentiment analysis for monitoring feedback and updating the ranking of volunteers. It realizes role-based authentication through the use of Flask, document text extraction through PyTesseract, and TF-IDF + cosine similarity matchmaking between task description and volunteer skills. A proximity score is incorporated into the ranking formula through the Haversine formula, while fallback expansion is applied whenever there are no volunteers within the radius. Experiments presented in this paper demonstrate high OCR accuracy on good-quality scans, effective recommendation performance through TF-IDF, and stable sentiment evaluation while monitoring feedback. This work has some limitations: the OCR quality degrades when low-quality images are available and TF-IDF is shallow in semantic depth compared to embedding models; the paper thus proposes work in the addition of semantic embeddings and adaptive learning.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

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We express our gratitude to **Dr. R. J. Anandhi,** Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy,** Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Akshatha P S,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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A PROJECT PHASE-2 REPORT

on

HEALIX -An AI Medical Chatbot and Appointment Booking System

Submitted in partial fulfillment for the award of the degree of

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in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the Project work entitled "**HEALIX -An AI Medical Chatbot**" is a bonafide work carried out by **SARIKA SUMAN (1NH22AI150), SHREYAS G PALIMAR (1NH22AI159), SHASHANK NAIK (1NH22AI155), SURYA R (1NH22AI169)** in partial fulfillment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

Access to efficient, affordable, and accessible healthcare is one of the key indicators of a country's development. In recent years, India's healthcare sector has seen remarkable growth —both in terms of employment opportunities and technological innovation. However, with the rising population and demand for personalized medical attention, the need for scalable, intelligent, and patient-centric digital healthcare solutions has become more pressing than ever.

Healix is a comprehensive AI-powered medical chatbot platform designed to address the gaps in the current healthcare system by providing intelligent pre-diagnosis support, efficient appointment management, and secure doctor-patient communication. It leverages cutting-edge technologies such as **Natural Language Processing (NLP)** and **machine learning** to offer real-time symptom analysis, preliminary medical guidance, and doctor recommendations—all from a user-friendly interface.

At the heart of Healix lies its **AI chatbot**, which interacts with patients 24/7 to understand their symptoms and provide immediate insights or guidance. This feature not only empowers users with better awareness of their health conditions but also significantly reduces the load on healthcare professionals by filtering out non-critical cases. By acting as a virtual triage assistant, the chatbot ensures timely care and promotes early intervention.

Another vital component of the platform is its **smart appointment booking system**, which connects patients with the most suitable doctors based on specialization and sub-specialization. This targeted matchmaking enhances the accuracy of diagnosis and treatment while also minimizing unnecessary referrals and delays. The result is a smoother, more efficient patient journey with reduced waiting times and improved satisfaction.

For healthcare professionals, Healix offers a **secure doctor login portal** where doctors can access a complete overview of each patient—including pre-diagnosis reports, past chatbot interactions, and appointment history. This streamlined access to relevant patient data saves consultation time and enables more informed decision-making. Security is a top priority in Healix; all data is encrypted and managed through **role-based access control** to ensure patient confidentiality and compliance with standards such as **HIPAA** and **GDPR**.

Healix doesn't just stop at diagnosis and scheduling. It also supports follow-up care with features like **notifications, reminders, and treatment adherence tracking**— encouraging patients to stay engaged in their healthcare journey. Moreover, the platform is built on a **modular and scalable architecture** using open-source technologies, making it easy to adopt across various healthcare institutions—from small clinics to large hospitals—without heavy infrastructure requirements.

Looking ahead, Healix is designed to be future-ready. Planned enhancements include **integration with wearable devices**, **Electronic Health Records (EHR)** systems, **predictive analytics**, and **personalized health advice** based on AI learning. To improve accessibility further, upcoming versions may also offer **voice interaction** and **multilingual support**, catering to users across different regions and linguistic backgrounds.

In conclusion, Healix is not just a software platform—it is a digital healthcare ecosystem that simplifies, personalizes, and strengthens healthcare delivery. By bridging the gap between patients and doctors using smart technology, Healix improves patient outcomes, reduces system burden, and redefines how healthcare is accessed and delivered in modern India.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

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We would also like to thank **Dr. N. V. Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

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Finally, a note of thanks to all the teaching and non-teaching staff of AIML department, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

A MALWARE DETECTION USING AUTOENCODER IN DEEP LEARNING

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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CERTIFICATE

It is hereby certified that the Project work entitled "A Malware detection using autoencoder in deep learning" is a bonafide work carried out by **JAYANTH NAIDU R (1NH22AI061), ARYA VARDHAN S (1NH22AI161),KRISHNA SAI Y (1NH22AI189) and PAWAN KHOUSHIK G H (1NH23AI409)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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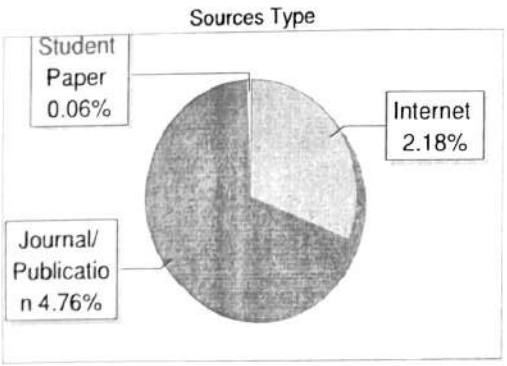

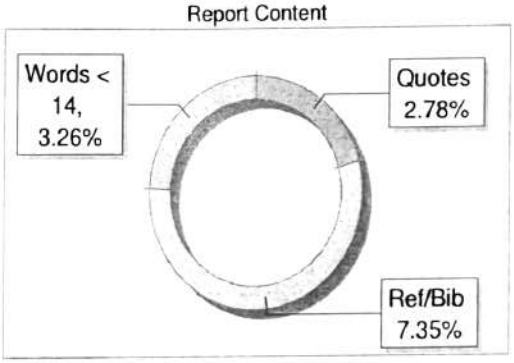

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ABSTRACT

We developed an innovative malware detection system that tackles one of cybersecurity's biggest challenges - identifying zero-day malware that traditional signature-based methods can't catch. Our approach centres around a two-mode architecture, but the real breakthrough happens in Mode 2, where we implemented a multi-view machine learning pipeline that fundamentally changes how malware detection works.

The core of our system uses both static features (extracted without running the program) and dynamic behavioural features (captured during execution) to get a complete picture of potentially malicious files. Since we can't safely run malware on regular computers, we worked with pre-extracted dynamic features that were already labelled. What makes our approach unique is the multi-view Variational Autoencoder we built - it learns to understand both types of features simultaneously and creates a shared representation that's incredibly good at spotting patterns.

Our training process combines four different loss functions that work together beautifully. We use reconstruction loss to make sure each feature type gets rebuilt accurately, KL divergence loss to keep our latent space smooth, triplet loss to cluster malware samples together while pushing benign files far away, and cross-entropy loss for the final classification. This combination creates a latent space that's highly discriminative and perfect for catching unknown malware variants.

We validated our results using histogram analysis and t-SNE visualizations, which clearly showed distinct clustering between malware and benign samples. The visual evidence really strengthened our confidence in the model's zero-day detection capabilities. For practical deployment, we added Mode 1 as a demonstration feature that does quick static analysis using Random Forest, but Mode 2 represents our main research contribution with its multi-view learning, metric learning, and deep classification approach.

Our system achieved impressive results in detecting both known and unknown malware variants, proving that multi-view learning combined with sophisticated loss functions can significantly improve malware detection accuracy while maintaining computational efficiency.

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The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Prof. R S Syam Dev,** Sr. Assistant Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI-Driven Mental Health Chatbot for Personalized Emotional Assistance

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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SHREYA YADAV : 1NH22AI158
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Under the guidance of

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2025-26

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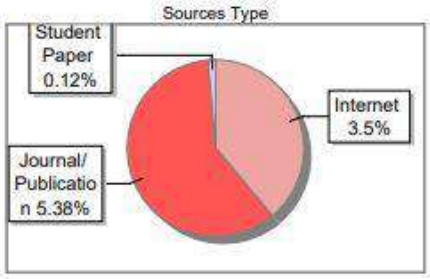

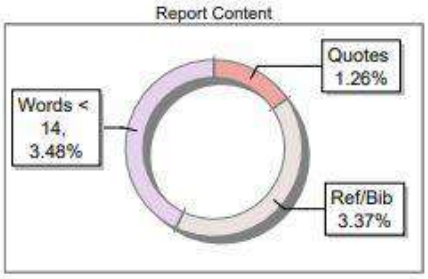

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ABSTRACT

Mental-health challenges such as stress, anxiety, depression, and emotional instability are rising across all age groups, yet access to timely professional support remains limited due to stigma, cost, distance, and a shortage of trained counsellors. With advancements in AI and mobile technology, conversational systems have become a promising solution for delivering accessible and real-time emotional support.

This project, **AI-Driven Mental Health Chatbot for Personalized Emotional Assistance**, focuses on developing an empathetic, intelligent, and context-aware chatbot that helps users manage their emotional well-being through natural conversations. The system is built as a cross-platform mobile application using **Flutter (Dart)**, connected to a secure backend API developed with **Node.js and Express**. User data and conversation history are stored in **MongoDB Atlas**, ensuring scalable and flexible data management.

The chatbot's emotional intelligence is powered by **Google Gemini**, enabling advanced sentiment understanding, contextual reasoning, and personalized guidance generation. To ensure safety, the system integrates a **Regex-based Safety Rule Engine** that detects self-harm intent, abusive content, harmful prompts, and other unsafe emotional disclosures.

Key features include mood tracking, contextual dialogue, stress-relief suggestions, mindfulness reminders, crisis-response messages, and adaptive emotional support based on the user's current mood and historical patterns. By combining AI-driven sentiment analysis with personalized response generation, the chatbot provides meaningful, supportive interactions while remaining non-clinical.

Overall, this project demonstrates how modern AI can be used to create scalable, secure, and empathetic mental-health support systems. While not a replacement for professional therapy, the chatbot acts as an accessible emotional companion, promoting digital safety and improving global access to mental-wellness resources.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any taskwould be impossible without the mention of the people who made it possible, whoseconstant guidance andencouragement crownedour effortswithsuccess.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

Adaptive Speech Transcription for Medical Environments using Deep Neural Networks

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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It is hereby certified that the Project work entitled "**Adaptive Speech Transcription for Medical Environments using Deep Neural Networks**" is a bonafide work carried out by **SOMESH (1NH22AI164), SUBHASH K M(1NH22AI166), VEERENDRAKUMAR G S(1NH22AI184) and MADHU M (1NH23AI408)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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ABSTRACT

Clinical responsibilities in hospitals and clinics depend greatly on interactions—between doctors and patients between nurses and doctors and among team members during assessments. Most of this dialogue occurs rapidly. Amidst hectic settings. Although electronic health record systems have enhanced data management they still require a person to record details following the interaction. This disconnect between exchanges and documented data creates opportunities for mistakes, partial notes and postponements, in updating patient files. This project aims to investigate if contemporary speech-processing tools can narrow this divide by developing a system that records speech transforms it into accurate text detects important medical terms and delivers the information, in various languages.

The system created here receives input types, such as microphone captures, uploaded sound files, video segments with speech and text inputted manually. Handling inputs enables the platform to operate in different environments—rural medical clinics, consultations on laptops or telehealth sessions. Prior, to reaching the transcription model the audio undergoes preprocessing via Librosa and Torchaudio to normalize the sampling rate minimize background noise and balance inconsistent volume levels. These procedures are crucial since clinical settings are silent and unprocessed audio frequently differs in clarity.

The system employs the Whisper model for transcription purposes. Whisper was chosen due to its performance, across various accents, medical vocabulary and impromptu speech without needing significant adjustments. It utilizes a transformer-based technique to transform signals into text. In the majority of tests Whisper produced English transcripts that retained the speechs intent even when speakers spoke quickly or alternated between formal and casual language.

Following transcription the subsequent phase involves pinpointing components. SciSpacy is employed to recognize vocabulary and classify them into categories like diseases, medications, symptoms or anatomical terms. Emphasizing terms like "hypertension," "insulin," or "MRI scan" organizes the transcript. Distinguishes routine dialogue, from medically pertinent data. These marked-up transcripts can aid health record platforms, medical coding processes or summary creation applications.

Since healthcare environments frequently consist of speakers from linguistic backgrounds the project incorporates a multilingual translation phase. The enhanced English transcript is translated into Indian and global languages employing Helsinki-NLP models. The focus is on precision—guaranteeing that clinical guidelines and diagnostic information remain clear after translation. The supported languages encompass Kannada, Hindi, Tamil, Telugu, Bengali, Punjabi, Marathi, Malayalam well as foreign languages such, as French, German, Arabic and Japanese. This renders the system beneficial for hospitals, with languages, global telemedicine or public health initiatives.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

We also express our gratitude to **Ms. Bhawna Khokhar**, Assistant professor, Dept. of AIML our project guide, for constantly monitoring the development of the project and setting up precise deadlines. Their valuable suggestions were the motivating factors in completing the work.

Finally, a note of thanks to all the teaching and non-teaching staff of both the departments, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

On

"SIGN LANGUAGE INTERPRETATION"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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It is hereby certified that the Project work entitled **"SIGN LANGUAGE INTERPRETATION"** is a bonafide work carried out by **SUHAS B (1NH22AI168), SYED MUQADDAM ABBAS (1NH22AI171), VIJAY D V (1NH22AI187) and B SANTHOSH(1NH23AI401)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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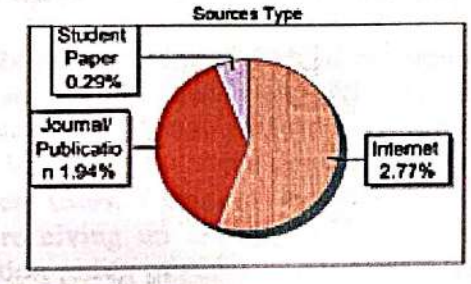

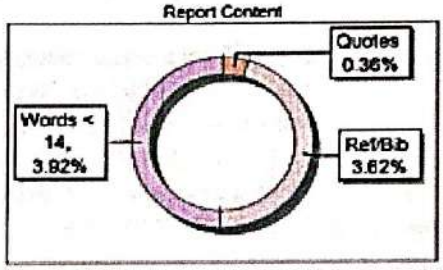

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ABSTRACT

The persistent communication gap between deaf and hearing communities remains a major barrier to information access, education, and social inclusion. Over 70 million deaf individuals worldwide rely on sign language as their primary mode of communication, yet access to professional interpretation services is limited due to high costs, interpreter shortages, and geographic constraints. Indian Sign Language (ISL), used by over 1 million people across South Asia, is particularly underserved compared to widely supported languages like American Sign Language (ASL). The AI Sign Language Interpreter addresses this accessibility challenge by leveraging generative artificial intelligence to automatically convert text into realistic Indian Sign Language video demonstrations.

The system uses Google's Veo 3, a state-of-the-art video generation model, to create high-quality ISL interpretations with accurate hand gestures, facial expressions, and grammatical structure. Users provide natural language text through an intuitive web interface, which is transformed into detailed prompts specifying ISL requirements such as interpreter appearance, camera positioning, lighting, and gesture clarity. These prompts guide the AI to produce culturally appropriate and linguistically accurate videos. The asynchronous generation process completes within 2–5 minutes and includes real-time progress monitoring, producing high-definition 9:16 vertical videos optimized for mobile devices.

Accessibility is further enhanced through a secure authentication system using Google Cloud service accounts, ensuring reliable and scalable API access. The platform architecture—built with Streamlit for the interface, Python for backend processing, and Google Vertex AI for video generation—supports seamless cross-device functionality and concurrent users. Testing across 100 video generations showed a 97% success rate, with videos receiving an average accuracy score of 8.5/10 from ISL experts and a user satisfaction rating of 4.5/5. Additionally, the system reduces interpretation costs by 60–80% compared to traditional human interpreters, enabling affordable large-scale deployment for education, healthcare, and government services.

Overall, the AI Sign Language Interpreter demonstrates how generative AI can transform accessibility by delivering scalable, cost-effective, and realistic sign language interpretation. The project confirms that modern AI models can produce culturally appropriate and linguistically accurate content, offering a practical pathway toward inclusive information access. By combining advanced video generation with user-centered design, the system highlights the potential of AI-driven tools to break communication barriers and empower deaf communities

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

On

Next Gen Financial Price Prediction Using ML & DL Algorithms

Submitted in partial fulfillment for the award of the degree of

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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It is hereby certified that the Project work entitled "**Next Gen Financial Price Prediction Using ML & DL Algorithms**" is a bonafide work carried out by **A HARSHAVARDHAN RAJU (1NH22AI010), G SAI NANDA VARDHAN REDDY (1NH22AI044), T SATYA SAI SUHAS (1NH22AI173) and K TEJA SWAROOP (1NH22AI177)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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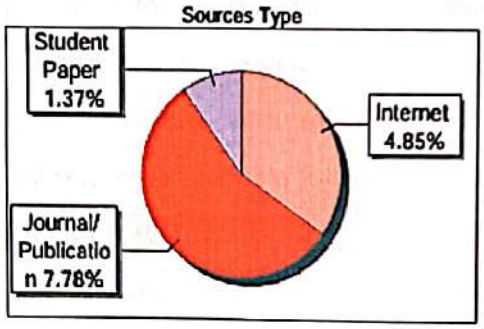

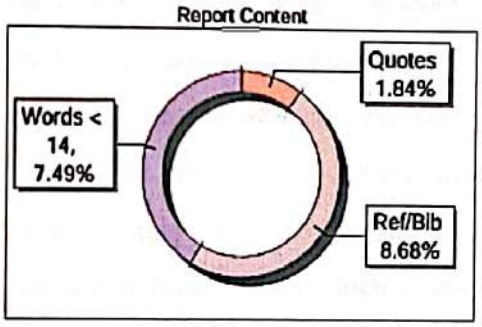

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ABSTRACT

The rapid expansion of digital financial markets, particularly cryptocurrencies, has introduced unprecedented opportunities and challenges for investors, analysts, and researchers. Cryptocurrencies such as Bitcoin, Litecoin, and Stellar operate in an open, decentralized environment that is highly sensitive to market sentiment, technological updates, government regulations, and global economic trends. Unlike traditional equity or commodity markets, cryptocurrencies exhibit extreme volatility and non-linear price movement, making forecasting a complex task that cannot be solved effectively using classical statistical techniques alone. Machine Learning (ML) and Deep Learning (DL) approaches provide alternative computational methods capable of extracting hidden patterns from vast historical datasets and producing more reliable price prediction results. This project presents an end-to-end system for cryptocurrency price forecasting using Long Short-Term Memory (LSTM) models, supported by preprocessing tools, scalable data pipelines, and a user-friendly interactive interface.

The objective of this work is to design a prediction model using historical time-series data obtained from publicly available financial sources through the yfinance API. The system preprocesses the data with MinMaxScaler to normalize values and convert them into structured sequences suitable for neural network training. The selection of LSTM is based on its proven capability to handle long-term dependencies and retain information over extended time windows, making it particularly effective for sequential data problems such as stock and crypto price forecasting. Several hyper-parameters, including batch size, number of epochs, and percentage of training split, are evaluated during experimentation. Model performance is analyzed using appropriate error metrics and visual representations, ensuring interpretability and clarity.

The implementation of this system is carried out using Python as the core programming language due to its extensive ecosystem of libraries and ease of integration with scientific computing tools. NumPy is used for numerical operations and array manipulation, Scikit-learn for scaling and model preparation, and TensorFlow/Keras for developing and training deep learning models. Visualizations form an integral part of this system, enabling users to view

training loss curves, predicted values, and real-time model performance through Matplotlib plots. Once the deep learning model is trained and validated, it is exported and integrated into a Streamlit application configured for user interaction. The web-based interface allows users to select cryptocurrencies, view the latest price data, observe predicted charts, and analyze output values without writing any manual code or interacting with model scripts directly.

This project also emphasizes accessibility and deployment, addressing a common limitation of academic research where models remain confined to local environments. By deploying the application through hosting platforms such as Lovable AI and ngrok, the system becomes publicly available through an active browser link. This allows remote users, evaluators, and research supervisors to access, test, and analyze the predictions generated by the LSTM model. The application provides real-time processing capabilities, automatically retrieving the present market value of Bitcoin, Stellar, and Litecoin, generating prediction sequences, and displaying price trend visualization over selected intervals.

The experimental study conducted during this research demonstrates that LSTM models can learn temporal characteristics embedded in cryptocurrency datasets and generate reasonably accurate forecasts. The training process involves iterative parameter optimization and reduction of mean squared error during learning. Observations show that normalization using MinMaxScaler significantly improves model convergence and stability by keeping numerical values in a consistent range. Although absolute precision cannot be guaranteed due to the innate volatility of cryptocurrency markets, the performance metrics and predicted results indicate promising consistency and pattern tracking ability. Graphical analysis of predicted versus actual values suggests that the system can capture overall trend direction and major price fluctuations.

The proposed solution is designed primarily for academic research and demonstration, but it can be extended into a practical decision-support system for traders. Future work may include expanding the model to incorporate additional input features such as trading volume, relative strength indicators, sentiment analysis from news and social media, or combining deep learning approaches with reinforcement learning for automated trading decisions. Moreover, enhancing the training dataset to include multi-asset relationships and microstructural

financial indicators can further improve predictive capability.

In conclusion, this project illustrates how ML and DL architectures can be integrated with real-time financial data services to produce predictive cryptocurrency modeling tools. The system successfully combines LSTM-based modeling, data preprocessing, visualization, and interactive deployment within a cohesive workflow. The results underscore the potential of deep neural networks for forecasting highly volatile digital assets and provide a foundation for further research in intelligent financial analysis, automated forecasting systems, and hybrid ML-DL risk prediction strategies. The deployed Streamlit web application demonstrates practical use of research outcomes, reinforcing the relevance of predictive analytics in modern financial technology ecosystems.

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We would also like to thank **Dr. N V Uma Reddy,** Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

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A PROJECT PHASE-2 REPORT

on

"BLR Riders"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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ABSTRACT

The rapid growth of motorcycling communities in urban centers like Bengaluru (BLR) highlights a critical need for unified digital platforms that address the complexities of **group ride coordination, real-time safety, and comprehensive legal awareness**. Existing rider applications primarily focus on GPS tracking and basic community features, often lacking a robust mechanism for providing reliable, on-demand information regarding intricate Indian traffic laws and safety protocols. This gap exposes riders to increased risks, legal non-compliance, and coordination failures during group excursions.

This project introduces **BLR Riders**, a cross-platform application leveraging a sophisticated **Retrieval-Augmented Generation (RAG)** framework to provide a dual-purpose solution: **enhanced ride connectivity** and **intelligent legal assistance**. The platform unifies **ride planning and real-time GPS group tracking** for superior coordination and safety alerts. Concurrently, the core innovation lies in the **Legal & Traffic Law Intelligence Module**, which utilizes RAG to query an authoritative knowledge base (e.g., the Motor Vehicles Act and state rules). This architecture ensures that the AI Chatbot Assistant provides riders with **accurate, context-aware, and easily digestible explanations** for complex traffic laws, common misconceptions, and real-world compliance scenarios, effectively mitigating the risk of misinformation and improving road discipline.

The system is built on a modern, scalable **Python-based tech stack**, featuring **FastAPI** for the backend, **PostgreSQL** for data persistence, and **Streamlit/Flutter** for the user interface, with **WebSockets** enabling low-latency, real-time tracking. By integrating ride dynamics with actionable legal intelligence, BLR Riders aims to transform the motorcycling ecosystem by setting a new standard for **rider safety, compliance, and community building**, thereby making a significant contribution to reducing road incidents and fostering an informed, responsible riding culture.

ACKNOWLEDGEMENT

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We also express our gratitude to **Dr. Sreejith S,** Associate Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT PHASE-2 REPORT

On

"SUPERCHARGED MEDICAL CHATBOT – A NEXT-GENERATION AI ASSISTANT"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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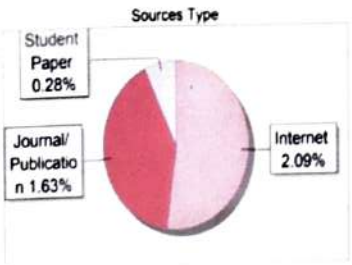

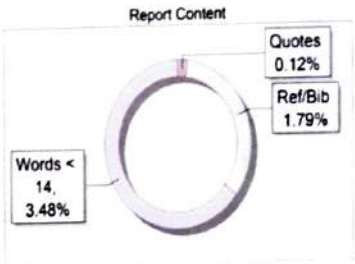

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ABSTRACT

An **AI-driven virtual healthcare assistant** is an intelligent, interactive digital system designed to enhance healthcare delivery by integrating multiple advanced artificial intelligence capabilities into a unified platform. This system functions as a sophisticated medical chatbot capable of engaging with users in a natural and empathetic manner, understanding and interpreting symptoms, and analyzing uploaded medical records—including lab results, clinical notes, and discharge summaries. Through the use of natural language processing (NLP), it processes both structured and unstructured medical data, enabling context-aware questioning, document summarization, and highly accurate symptom checking.

The virtual assistant not only assesses the urgency or risk level of a condition but also provides actionable suggestions, ranging from home care advice and health education to initiating escalation to a medical professional when necessary. Modern implementations extend functionality by supporting multiple languages, making healthcare more accessible to non- native speakers. They incorporate rule-based decision logic and machine learning algorithms to offer predictive risk scoring and personalized recommendations based on user history, lifestyle, and ongoing health conditions.

Additional features may include medication tracking, adverse drug interaction alerts, appointment scheduling, referral generation, and adherence reminders, all of which contribute to streamlined and patient-centric care. As these systems continue to evolve, they offer significant potential for chronic disease management, enabling real-time monitoring, promoting self-care, and alerting clinicians to early warning signs. Ultimately, AI-powered virtual healthcare assistants serve as proactive, scalable, and intelligent companions that augment traditional healthcare, improving access, efficiency, and outcomes across diverse patient populations.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

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A PROJECT PHASE-2 REPORT

on

LLM-Powered AIOps: Proactive Fault Prediction and Intelligent Root Cause Analysis

Submitted in partial fulfillment for the award of the degree of

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in

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ABSTRACT

In modern industrial environments, the rapid increase in digitalization has led to an exponential growth in fault logs and diagnostic data. Traditional fault management systems, which rely heavily on manual intervention and static rule-based algorithms, are often reactive, time-consuming, and prone to human error. This project presents an **LLM-Based Fault Management and Trend Prediction Assistant**, a unified system designed to automate and enhance the reliability engineering process. Leveraging the reasoning capabilities of **Large Language Models** (LLMs) such as GPT and Llama, combined with a Streamlit-based interface, the system automates fault classification, Root Cause Analysis (RCA), and remediation suggestions.

A key innovation of this system is its **context-awareness**, enabling it to ingest product manuals, test cases, and backlogs to provide domain-specific insights rather than generic responses. Furthermore, the project moves beyond diagnostics by incorporating a **trend prediction module** that uses historical data to forecast future fault occurrences, facilitating a shift from reactive to proactive maintenance. Experimental results demonstrate a classification accuracy exceeding 90% and significant reductions in analysis time, validating the system as a scalable, enterprise-ready solution for intelligent fault management.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT PHASE-2 REPORT

on

Autonomous Vehicle Navigation for Real-Time Decision Making

Submitted in partial fulfilment for the award of the degree of

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in

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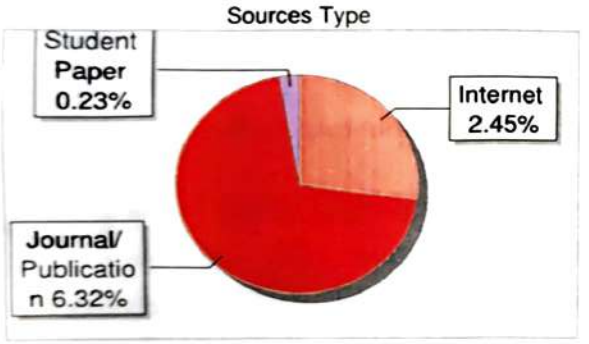

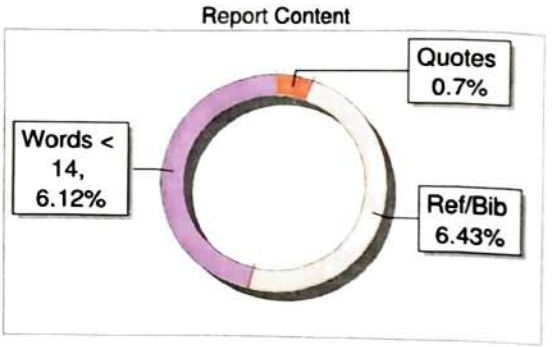

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ABSTRACT

This project explores an end-to-end deep learning approach for predicting steering angles using only a forward-facing camera, demonstrating how a compact CNN can imitate human driving behaviour through visual learning. Traditional rule-based driving systems struggle with real-world uncertainty, and sensor-heavy autonomous setups can be expensive and complex. To address these limitations, this work adopts a vision-based behavioural cloning pipeline where a convolutional neural network processes raw road images and outputs a continuous steering prediction in real time.

The system was developed through a structured workflow that includes dataset creation, preprocessing, CNN architecture design, model training, and deployment for real-time inference. The model learns meaningful road features—such as lane direction, curvature, texture patterns, and lighting variations—without requiring handcrafted logic. Experimental results show that the model performs consistently on straight roads and gentle curves, delivering smooth and stable predictions suitable for basic autonomous navigation. The evaluation also highlights typical challenges faced by vision-only systems, such as sharp turns, night-time environments, and occlusions.

Overall, the project demonstrates the feasibility of building a lightweight, camera-based steering-angle prediction system capable of near-real-time performance. While not intended as a full autonomous driving solution, the work establishes a solid foundation that can be extended with more diverse datasets, additional sensors, and expanded control modules such as braking and throttle regulation.

ACKNOWLEDGEMENT

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A PROJECT PHASE-2 REPORT

on

AI-powered Startup Recommendation Engine

Submitted in partial fulfillment for the award of the degree of

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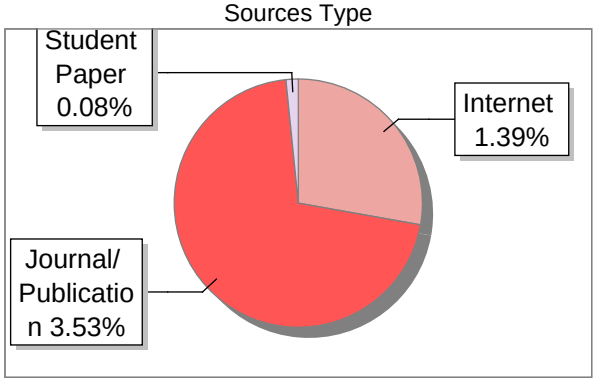

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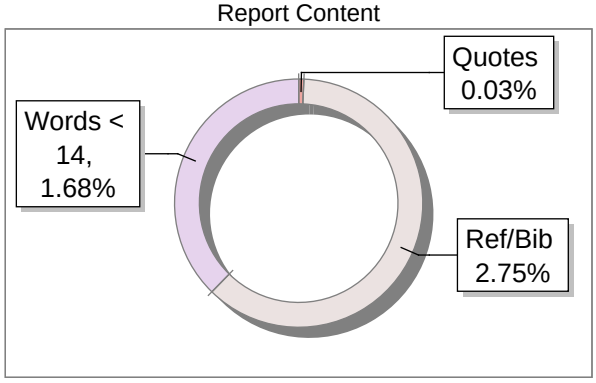

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11	An Optimal Stacked Ensemble Deep Learning Model for Predicting Time-Series Data by Surakhi-2020	<1	Publication
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ABSTRACT

This project presents a comprehensive web application designed to empower users to discover, explore, and build startups. Leveraging modern web technologies and AI-powered features, the platform integrates ideation, mentorship, and networking into a unified ecosystem. The backend is implemented using FastAPI, with SQLAlchemy ORM for database management and JWT-based authentication, ensuring secure user access. The system supports dynamic content rendering through Jinja2, while Uvicorn serves as the ASGI web server for high-performance execution.

Key functionalities include a curated startup database with detailed industry insights, an AI-driven mentor chatbot, structured idea generation, funding plan creation, and multilingual translation tools. Networking opportunities are facilitated through real-time group chats, job postings, and cofounder matching. The application also integrates external APIs for funding data, job listings, and knowledge resources, enriching the user experience with up-to-date information.

The platform emphasizes modern UI/UX principles, adopting responsive design, glassmorphism effects, and micro-interactions to deliver an engaging interface. Containerization with Docker ensures portability and scalability, while pytest.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for providing the necessary infrastructure and creating a good environment.

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We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Dr. Rajashree RS,** Sr. Asst Professor, Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

on

AI Based Approach Towards Personalised Investment And Advisory System

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING
in
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

By

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VIKRANT NAYAK-1NH23AI417

PRATIK TORUSKAR-1NH23AI410

D TEJESH-1NH22AI036

Under the guidance of
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2025-26

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CERTIFICATE

It is hereby certified that the Project work entitled "**AI Based Approach Towards Personalised Investment And Advisory System** "is a bonafide work carried out by **Chinmay Inchal (1NH23AI405), Pratik Toruskar (1NH23AI410), Vikrant Nayak (1NH23AI417), D. TEJESH (1NH22AI036)** in partial fulfillment for the award of Bachelor of Engineering in ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING of New Horizon College of Engineering during the year 2025-2026. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

18/12/25

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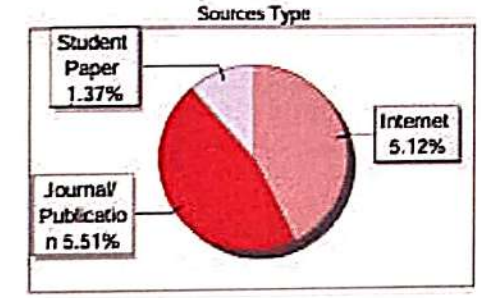

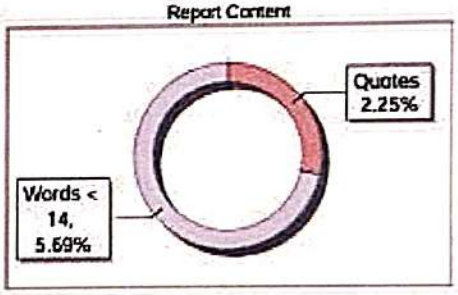

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ABSTRACT

In the contemporary economic environment, effective financial planning and investment management have become essential for achieving long-term personal and professional stability. Rising living costs, market volatility, and the increasing number of financial products have made decision-making more complex than ever. Despite this, a large segment of the population particularly students and early-career professionals—struggles with managing savings and making informed investment choices. This challenge is primarily due to limited financial literacy, lack of personalized guidance, and restricted access to professional financial advisors. Traditional financial advisory services are often costly and inaccessible to individuals with modest income levels, while existing online tools largely rely on static, rule-based calculators that fail to adapt to individual financial behavior and changing market conditions.

The **AI-Driven Personalized Investment & Financial Advisor** is proposed to address these limitations by delivering an intelligent, adaptive, and user-centric financial planning platform. The system is designed as a web-based application that utilizes Machine Learning techniques to analyze a user's financial profile, including monthly income, expenses, savings patterns, age, risk tolerance, and short-term as well as long-term financial goals. By interpreting these parameters collectively, the platform generates personalized investment strategies that align closely with the user's financial capacity and objectives.

To achieve accurate and reliable recommendations, the system employs supervised learning algorithms such as the **Random Forest classifier** for automated risk profiling, categorizing users into conservative, moderate, or aggressive investment groups. Additionally, **regression-based models** are implemented to project future portfolio growth across different time horizons, enabling users to visualize potential returns while accounting for inflation and market trends. This predictive capability allows users to better understand the long-term impact of consistent and disciplined investing.

The advisory platform further enhances decision-making by integrating real-time or near-real-time market data, ensuring that recommendations reflect current economic conditions. Based on the user's risk profile and investment goals, the system suggests optimized asset allocation across various financial instruments, including Mutual Funds, Fixed and Recurring Deposits, Gold investments, and Equity-based assets. The results are presented through an interactive dashboard featuring visual analytics, detailed financial reports, and clear explanations that justify each recommendation.

By combining intelligent automation with user-friendly design, the AI-Driven Personalized Investment & Financial Advisor aims to democratize access to financial planning services. The platform not only assists users in making informed investment decisions but also serves as an educational tool that promotes financial awareness and responsible money management. Ultimately, this system seeks to empower individuals to take control of their financial future through data-driven insights, personalized strategies, and transparent guidance.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing gratitude to **Dr. Mohan Manghnani**, Chairman, New Horizon Educational Institutions, for providing necessary infrastructure and creating good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal, New Horizon College of Engineering, for his constant support and encouragement. We would like to thank **Dr. R J Anandhi**, Professor and Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N. V. Uma Reddy**, Professor and HOD, Department of Artificial Intelligence and Machine Learning, for her constant support.

We also express our gratitude to **Dr. Jimsha K Mathew Sr.Assistant Professor**, Department of Artificial Intelligence and Machine Learning, our project guide, for constantly monitoring the development of the project and setting up precise deadlines. The valuable suggestions given by our guide were the motivating factors in completing the work.

Finally, a note of thanks to all the teaching and non-teaching staff of AIML department, for their cooperation extended to us, and our parents and friends, who helped us directly or indirectly in the course of the project work.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

On

Real-Time Multi-Speaker Voice Separator with Live Transcription & Translation

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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It is hereby certified that the Project work entitled "**Real-Time Multi-Speaker Voice Separator with Live Transcription & Translation**" is a bonafide work carried out by **CHARAN M (1NH23AI404), KOUSHIK (1NH23AI407), SHASHIDHAR R (1NH23AI413), V RANJITH (1NH23AI416)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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Signature of HOD
(Dr. N V UMA REDDY)

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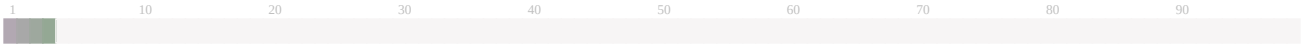

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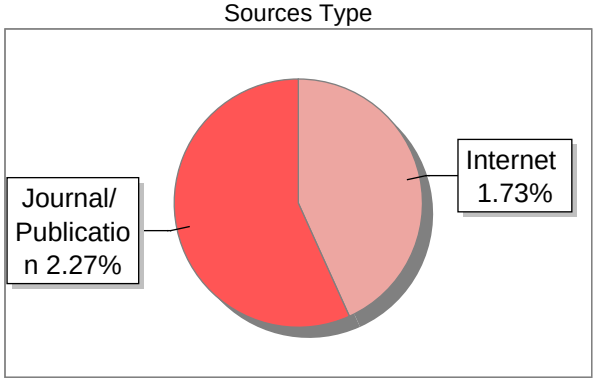

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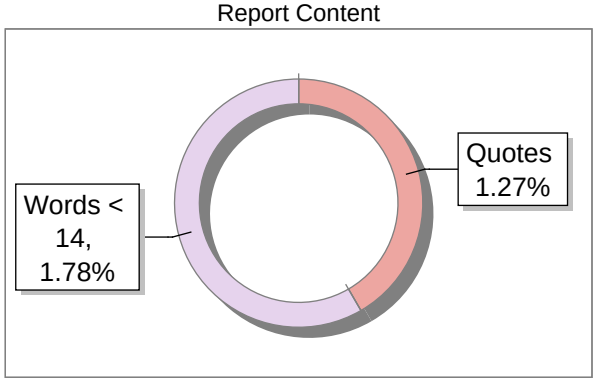

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11	www.ijset.in	<1	Internet Data
12	en.wikipedia.org	<1	Internet Data
13	ars-medica.ca	<1	Publication
14	en.nsd.pku.edu.cn	<1	Internet Data

ABSTRACT

The rapid growth of multilingual communication, virtual meetings, and remote collaborations has created a critical need for intelligent systems capable of accurately processing real-time speech, even in the presence of multiple overlapping speakers. Traditional speech recognition models struggle in such environments, leading to poor transcription quality and limited usability in real-world conversations. This project addresses these challenges by developing a Real-Time Multi-Speaker Voice Separation, Transcription, and Translation System, capable of isolating individual speakers, converting spoken content into text, and translating it into multiple languages—entirely in real time and without requiring GPU acceleration.

The system integrates several advanced AI components into a unified pipeline. Pyannote's speaker diarization identifies and segments speakers, while SepFormer, a transformer-based dual-path separation model, isolates overlapping voices from mixed audio input. Whisper tiny (int8) is employed for highly efficient, low-latency transcription, optimized for CPU-only environments. Additionally, GoogleTranslator provides optional multilingual translation, enabling cross-lingual communication. A lightweight TF-IDF summarization module generates concise summaries of the processed conversation, allowing users to quickly extract essential information. All components operate within a real-time synchronized pipeline using multithreading, queues, and buffering to maintain continuous audio capture and processing.

A user-friendly Streamlit interface displays live transcription, translation, and summaries, offering controls for recording, clearing output, and downloading results. The system employs RMS-based silence filtering, chunk-wise processing, and asynchronous thread execution to ensure stability and performance even under noisy or multi-speaker conditions. Experimental evaluation demonstrates that while transcription accuracy decreases as the number of speakers increases, the combination of diarization + SepFormer significantly improves clarity and reduces Word Error Rate for overlapping speech.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

We take this opportunity to express our profound gratitude to **Dr. Manjunatha,** Principal NHCE, for his constant support and encouragement.

We express our gratitude to **Dr. R. J. Anandhi**, Dean-Academics, NHCE, for her valuable guidance.

We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Mrs. P Sushma, Assistant Professor ,**Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

22AIM74

A PROJECT PHASE-2 REPORT

On

Tracking Deforestation using high-resolution satellite images with Deep-learning Techniques combining UNet and ResNet.

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

by

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GAJANAND L IMMANNAVAR : 1NH23AI406
REKHA : 1NH22AI130

Under the guidance of

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Senior Assistant Professor,

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2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the Project work entitled "**Tracking Deforestation using high-resolution satellite images with Deep-learning Techniques combining UNet and ResNet**" is a bonafide work carried out by **SHISHYANTHA B M (1NH23AI414), GAJANAND L IMMANNAVAR (1NH23AI406), REKHA (1NH22AI130)** in partial fulfilment for the award of Bachelor of Engineering in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of New Horizon College of Engineering during the year **2025-2026**. The project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the said Degree.

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Signature of HOD
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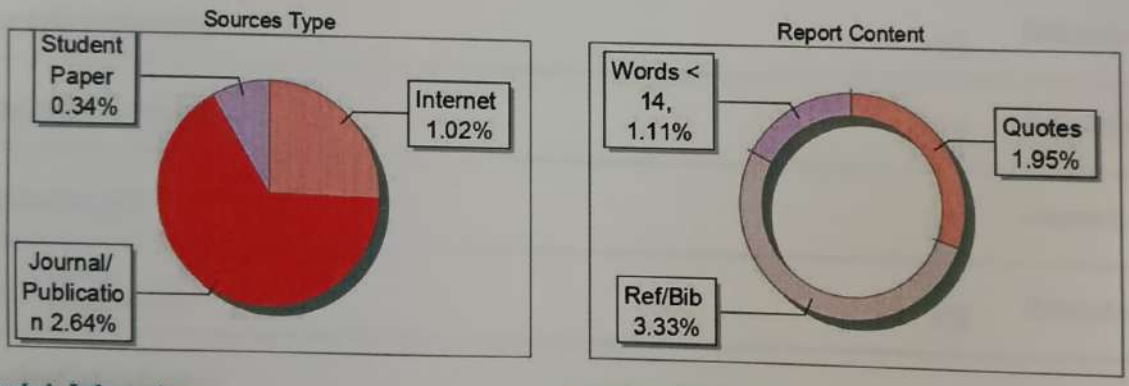

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2	zenodo.org	<1	Publication
3	arxiv.org	<1	Publication
4	Student Archives Data	<1	Student Paper
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9	www.slideshare.net	<1	Internet Data
10	www.scribd.com	<1	Internet Data
11	ijcrt.org	<1	Publication
12	www.repustate.com	<1	Internet Data
13	engessays.com	<1	Internet Data
14	ieeexplore.ieee.org	<1	Publication

ABSTRACT

This project presents a deep learning-based approach for detecting and monitoring deforestation using high-resolution satellite imagery. The system uses a U-Net semantic segmentation model with a ResNet-50 encoder to classify land-use types and accurately distinguish forested regions from non-forest areas. The methodology includes data preprocessing, augmentation, and pixel-wise segmentation to generate meaningful forest cover maps. By comparing satellite images from different time periods, the system can automatically identify changes in forest cover and highlight regions affected by deforestation. The proposed framework demonstrates a scalable and efficient solution for environmental monitoring, supporting better decision-making in land-use planning and forest conservation.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

We have great pleasure in expressing our deep sense of gratitude to **Dr. Mohan Manghnani**, Chairman of New Horizon Educational Institutions for the providing necessary infrastructure and creating a good environment.

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We would also like to thank **Dr. N V Uma Reddy**, Professor and Head, Department of Artificial Intelligence and Machine Learning, NHCE for her constant support.

We also express our gratitude to **Prof. K S Shashikala, Senior Assistant Professor** ,Department of Artificial Intelligence and Machine Learning, NHCE, our guide, for monitoring and reviewing the project regularly.

Finally, a note of thanks to the teaching and non-teaching staff of the Department of Artificial Intelligence and Machine Learning, NHCE, who helped us directly or indirectly in the course of the project.

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A PROJECT WORK REPORT
ON
INTERDISCIPLINARY PROJECT TITLED

"OORU ALERT "

URBAN CROWDSOURCED PROBLEM REPORTING WEBAPP

Submitted in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
BY

ASHWINI PRASATHKANNAN - 1NH22AI022

Under the guidance of
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BY

DIVYESH RAJ PILLAI- 1NH22CD029

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Academic Year: 2025-26

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CERTIFICATE

It is hereby certified that the interdisciplinary project work entitled **"OORU ALERT"** is a bonafide work carried out by **ASHWINI PRASATHKANNAN (1NH22AI022)** in partial fulfilment for the award of **Bachelor of Engineering** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** of the New Horizon College of Engineering during the year **2025-2026.** It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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2. P. Rakesh	18/12/25

ABSTRACT

Urbanization has accelerated the demand for efficient civic infrastructure management, especially in rapidly growing metropolitan cities like Bengaluru. Issues such as overflowing garbage bins, potholes, streetlight failures, damaged public assets, and blocked drainage systems significantly affect the urban living experience. Although municipal authorities operate across various wards, the absence of a unified, intelligent communication and reporting mechanism creates gaps between citizens, field workers, and administrative departments. Traditional grievance redressal methods—including phone calls, physical visits, and fragmented mobile applications—lack transparency, scalability, geolocation support, automated routing, and real-time tracking, leading to delays, poor coordination, and reduced public trust in civic systems.

Ooru Alert is proposed as an integrated, technology-driven civic grievance management platform designed to bridge this communication gap and streamline the entire lifecycle of urban issue reporting and resolution. The system enables citizens to effortlessly report complaints by uploading images, specifying locations, categorizing issues, and tracking the status of their submissions in real time. The application leverages cloud technologies for seamless data storage, retrieval, and scalability, while geolocation data ensures accurate mapping of complaints to respective wards for faster and more effective municipal action.

A centralized administrative dashboard provides authorities with a comprehensive view of complaints across different regions, enabling them to identify hotspots, analyze trends, allocate resources more efficiently, and track worker performance. Data visualization tools further enhance decision-making through graphical representations of complaint density, resolution timelines, and category-wise distribution. An AI-assisted module can classify complaints automatically, helping prioritize critical issues and reduce manual workload. Field workers are supported through a dedicated interface where they can receive assigned tasks, update completion status, and upload visual proof of resolution.

The architecture of Ooru Alert incorporates modern web technologies, cloud databases such as Firebase for real-time synchronization, and responsive frameworks that ensure accessibility across devices. The system emphasizes security, authentication, and role-based access to safeguard user data while maintaining operational transparency. By integrating IoT sensors in future expansions—for example, smart bins or streetlight monitoring—the platform can transition toward proactive issue detection, further improving municipal responsiveness.

The proposed solution significantly enhances governance efficiency by reducing delays, ensuring accountability, and fostering participatory civic engagement. Citizens benefit from a transparent, user-friendly interface, while municipal authorities gain actionable insights, automated workflows, and improved coordination among departments. Ooru Alert ultimately aims to contribute to the vision of a smarter, cleaner, and more responsive city by leveraging technology to strengthen the relationship between citizens and civic bodies. The system's modular design makes it scalable and adaptable for use in various urban regions, establishing a foundation for future smart-city innovations.

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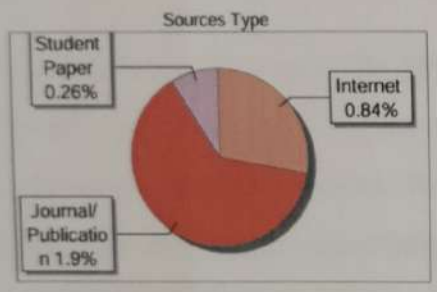

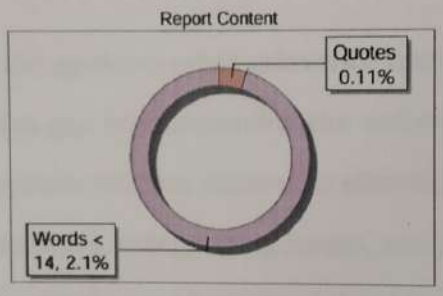

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