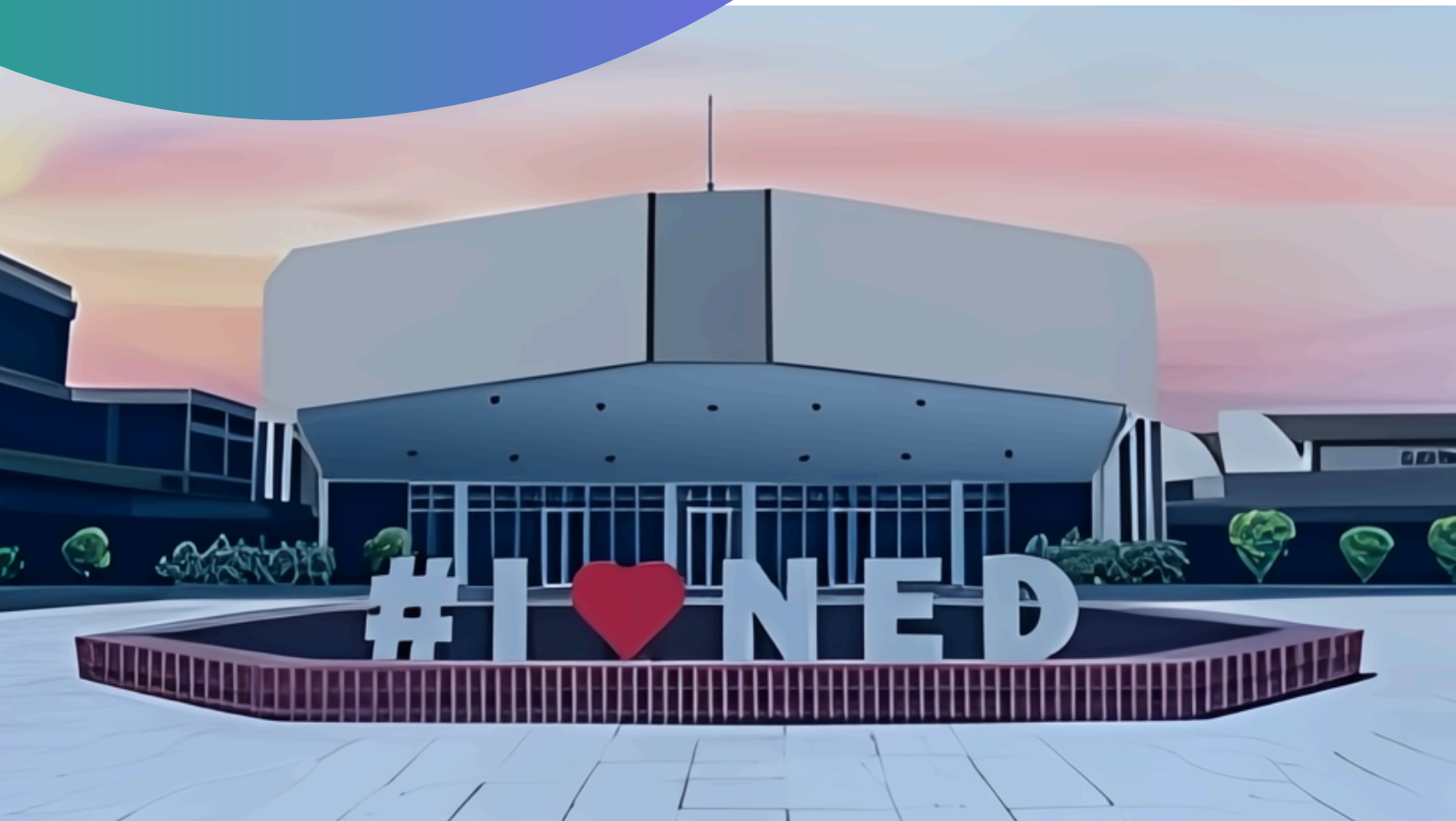
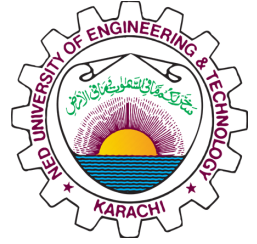
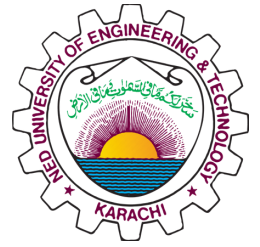


# NED UNIVERSITY

FYDP Booklet  
Batch 2022



# MESSAGE FROM THE DEAN



It is a moment of immense pride to witness the culmination of the dedication, creativity, and perseverance of the Batch of 2022, as reflected in their Final Year Design Projects.

The projects presented in this booklet stand as a testament to the students' ingenuity, technical expertise, and resilience. Despite navigating unique challenges throughout their academic journey, they have demonstrated a strong commitment to developing innovative and sustainable solutions to real world problems. These efforts not only highlight the rigorous academic foundation provided by our institution but also the determination of our students to make a meaningful impact.

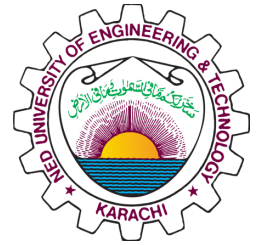
In a rapidly changing world, it is truly encouraging to see our graduates rise to the occasion, ready to contribute to industry, research, and society at large. The diversity of topics explored from advanced technologies to community centered initiatives reflects the multidisciplinary approach and forward thinking mindset we strive to nurture.

I extend my heartfelt congratulations to the Batch of 2022, along with their supervisors and faculty members, whose guidance and mentorship have been invaluable in bringing these projects to fruition. I am confident that our graduates will continue to uphold the values of excellence, leadership, and innovation in all their future endeavors.

Wishing you continued success and fulfillment in the journeys ahead.

**Prof. Dr. Saad Ahmed Qazi**  
**Dean Faculty of Electrical & Computer Engineering**

# FOREWORD



It is a privilege to present the Abstract Booklet for the Final Year Design Projects completed by the graduating students of the Department of Software Engineering. This collection goes beyond a simple record of academic work; it reflects the creativity, technical capability, and problem solving skills that our students have developed throughout their academic journey.

Software engineering, at its essence, focuses on creating solutions to real world problems. The projects included in this booklet cover a diverse range of contemporary themes, from applications in artificial intelligence and data science to impactful solutions in healthcare, education, finance, and sustainability. Each project highlights a strong foundation in design principles, a focus on user needs, and an innovative mindset that we strive to instill in our graduates.

Our academic approach is centered on connecting theoretical knowledge with practical application, and these projects represent the outcome of that vision. By working closely with faculty mentors, industry experts, and in some cases real clients, students have gained valuable experience that mirrors professional practice. This process has enabled them to build essential skills such as technical expertise, project management, effective communication, and a sense of ethical responsibility, all of which are crucial in today's evolving technological landscape.

This booklet not only celebrates their accomplishments but also serves as an invitation to industry partners and stakeholders to engage, collaborate, and support the potential of these emerging professionals. We are confident that our graduates are prepared to make meaningful contributions to the software industry and to society as a whole.

I extend my sincere congratulations to the students, faculty supervisors, and project collaborators for their dedication and hard work. May this collection inspire its readers and reflect the promising future that awaits the field of software engineering.

**Prof. Dr. Shehnila Zardari**  
**Chairperson**  
**Department of Software Engineering**

# LIST OF PROJECTS



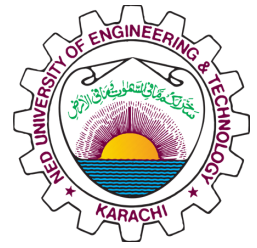
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# AlzTwin - AI Powered, Patient-Centered Digital Twin for Alzheimer's Care and Progression Monitoring



Project ID: SE-22001

Supervisor: Prof. Dr. Shehnila Zardari

## ABSTRACT

AlzTwin is an AI-powered, patient-centered digital twin platform designed to revolutionize Alzheimer's care and progression monitoring by shifting the industry from a reactive to a proactive model. Traditional care systems often fail to provide timely intervention, resulting in 75% of Alzheimer's cases being detected only after irreversible brain damage has occurred. AlzTwin solves this by unifying Digital Twins, IoT, and AI into a single ecosystem that connects clinics and homes, enabling preemptive care and preserving patient dignity. The platform integrates MRI scans, wearable vitals, sleep patterns, mobility, and speech data to create a personalized, dynamic 3D brain model. This holistic monitoring replaces infrequent check-ups with continuous data streams, providing a unified picture of patient health through an intelligent dashboard.

The system utilizes advanced machine learning, including CNN Ensembles for current stage prediction and LightGBM meta-models to forecast disease progression and detect risk events in advance. For clinicians, AlzTwin offers RAG-powered clinical decision support and automated report generation to streamline diagnostic workflows. For caregivers, the platform provides real-time alerts for abnormal heart rate or activity, medication reminders, and cognitive games for memory training, significantly reducing the daily strain on the families who provide 80% of global Alzheimer's care. By empowering stakeholders with data-driven insights and teleconsultation capabilities, AlzTwin aims to enhance independence and safety for the 55 million people living with dementia worldwide. It aligns with global health initiatives and Sustainable Development Goal 3 (Good Health and Well-being) by providing a scalable, technologically advanced solution to an urgent global health challenge.

## Technology Used:



## Project Contribution to SDGs

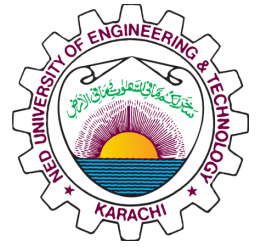


## Group Members:

Yusra Munawwar (SE-22001)  
Mariam Jawaid (SE-22015)

Daniya Sohail (SE-22009)  
Kanza Muhammad Akram (SE-22024)

# Phonolytics: Conversation Intelligence Tool



Project ID: SE-22002

Supervisor: Prof. Dr. Shehnla Zardari

## ABSTRACT

Phonolytics is an AI-driven conversation intelligence platform designed to revolutionize how performance is evaluated in communication-intensive industries such as sales, customer support, and BPOs. Traditional evaluation methods rely primarily on outcomes like conversions, which often overlook agent effort and are heavily influenced by external factors such as lead quality. Phonolytics solves this by using advanced speech processing, NLP, and large language models to analyze calls in real time. The system separates agent effort from client conviction, offering a fair and holistic performance assessment. It provides sentiment analysis, automated call scoring, and real-time coaching suggestions. By empowering organizations to make data-driven decisions and enabling employees to receive fair, transparent evaluations, Phonolytics aims to enhance communication quality, workforce motivation, and operational efficiency. Its scalable design allows application across healthcare, education, government helplines, and other service domains. Phonolytics contributes to broader societal goals by promoting decent work, fair assessment, and reduced inequalities in workplaces, aligning with SDGs 8 (Decent Work and Economic Growth), and 9 (Industry Innovation and Infrastructure). Its technology can extend to healthcare, education, government helplines, and NGOs, improving communication quality, trust, and service delivery across sectors.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

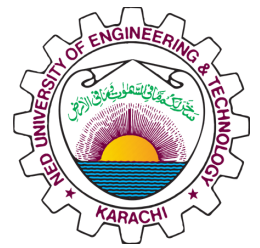
Hashir Jamal Khan (SE-22036)

Shayan Zaheer (SE-22038)

Muhammad Bilal (SE-22037)

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# Climavert: A Blockchain based Carbon Credit Ecosystem for Emission Tracking, Verification and Offset Monetization



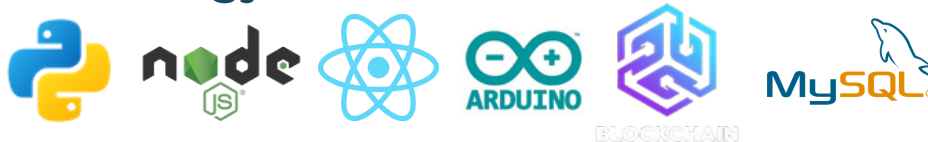
Project ID: SE-22003

Supervisor: Prof. Dr. Shehnila Zardari

## ABSTRACT

The rapid rise in carbon emissions has become a critical global concern, contributing significantly to climate change, environmental degradation, and adverse impacts on human health and ecosystems. Controlling and reducing carbon emissions is essential to mitigate global warming, meet international sustainability targets, and ensure a sustainable future. However, existing systems for monitoring emissions and managing carbon credits often lack transparency, real-time insights, and trust, making them prone to inefficiencies and potential data manipulation. Climavert addresses these challenges by presenting a comprehensive digital platform that integrates blockchain, artificial intelligence, and modern web technologies to facilitate carbon emission monitoring and carbon credit management. The system provides a secure and transparent environment for recording emission data, enabling improved tracking and accountability. It incorporates intelligent analytics to identify irregular patterns and support informed decision-making for emission control and sustainability planning. Furthermore, the platform introduces a structured and reliable mechanism for carbon credit generation and exchange. Emission data and environmental records are handled using decentralized technologies to ensure data integrity and tamper resistance, while blockchain-based processes enhance transparency and trust in transactions. The system also supports predictive analysis to assist stakeholders in anticipating future emission trends and making proactive decisions. Overall, the proposed solution bridges the gap between technological innovation and environmental responsibility by delivering a scalable, transparent, and intelligent framework for carbon management. It promotes sustainable practices, strengthens trust in carbon-related processes, and contributes to global efforts aimed at combating climate change.

## Technology Used:



## Project Contribution to SDGs

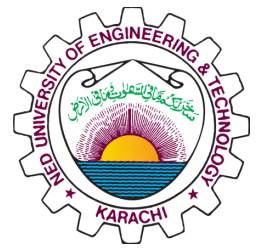


## Group Members:

Eraj Tanweer (SE-22002)  
Tazeen Amir (SE-22020)

Aliya Akhtar (SE-22004)

# HisabKaro - Your AI powered Finance Manager



Project ID: SE-22004

Supervisor: Dr. Raheela Asif

## ABSTRACT

HisabKaro - Your AI-Powered Finance Manager is a mobile-first financial management platform designed to address the challenges faced by small and medium-sized enterprises (SMEs) in Pakistan. Many SMEs rely on manual bookkeeping methods such as paper journals or fragmented applications, which often lead to data inaccuracies, lack of real-time visibility, and compliance risks. This project introduces an intelligent, AI-driven system that automates financial operations including expense tracking, ledger management, invoicing, and reconciliation. By integrating advanced technologies such as voice input, Optical Character Recognition (OCR), chatbot interaction, and email parsing, the system enables seamless multi-source data entry, even for users without accounting expertise. HisabKaro enhances financial accuracy through AI-based categorization. It also provides a virtual financial assistant chatbot that offers real-time insights, answers queries, and supports decision-making. Additionally, the platform ensures tax compliance and promotes transparency, helping businesses improve cash flow and operational efficiency. Overall, the solution aims to digitize and modernize SME financial systems, empowering business owners with accessible, intelligent tools to make informed decisions and scale sustainably.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

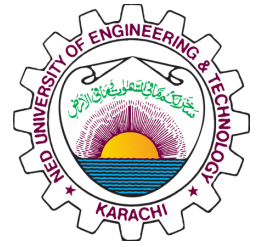
Abdul Moiz (SE-22073)

Saad Afzal (SE-22087)

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Mubashir Abid (SE-22090)

# FloXript - Where Scripts Find Their Flow



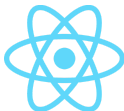
Project ID: SE-22005

Supervisor: Dr. Raheela Asif

## ABSTRACT

Understanding complex and undocumented codebases is a significant challenge for software engineers, often leading to reduced productivity and delayed onboarding. FloXript addresses this critical issue by functioning as an advanced AI-driven Codebase Knowledge Builder. Built upon the research technique of 'Overview Zoom-In', this project automates the generation of structured tutorials directly from GitHub repositories by identifying core abstractions first and then going to the finest details of each abstraction. The system utilizes Large Language Models (LLMs) and agentic workflows to perform deep semantic analysis of the source code. It systematically extracts architectural insights, identifies core functionalities, and translates technical abstractions into readable Markdown documentation. Unlike traditional tools that provide fragmented explanations, FloXript processes the entire repository holistically. It effectively manages context windows to ensure accurate and highly contextual outputs. Crucially, the generated tutorials serve as a Knowledge Base for a RAG-based chatbot. In future, this chatbot can be tuned for tasks such as vulnerability and security scanning; test case, script, and data generation; maintenance suggestions; and edge cases production. Furthermore, using those created embeddings, an MCP server can link the repository with other AI tools. Ultimately, FloXript enhances code maintainability and accelerates developer onboarding.

## Technology Used:



Gemini



Chroma



## Project Contribution to SDGs



## Group Members:

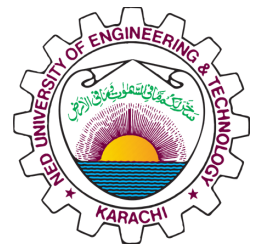
Syed Ibad Ali (SE-22034)

Abdul Rehman Shahvez (SE-22044)

Muhammad Hassan (SE-22075)

M Huzaifa Jamil (SE-22080)

# IRIS: An XAI-Powered Inventory & Warehousing Solution Using Computer Vision and Agentic AI



Project ID: SE-22006

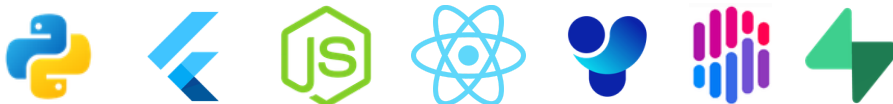
Supervisor: Dr. Muhammad Faraz Hyder

Co-Supervisor: Syed Muhammad Sheraz

## ABSTRACT

Around the world, the retail inventory and warehouse industry functions as a disparate network of traditional practices and largely manual workflows, which contribute to operational bottlenecks, limited scalability, and technological incapacity. As competitive pressures increase, business profitability is at risk of gradual decline if operations remain unequipped with predictive insights and data-driven decision-making capabilities. IRIS is presented as a dedicated platform that introduces modern technologies into conventional grocery environments in a low-friction manner, with the explicit goal of improving warehouse efficiency by up to tenfold while minimising disruption to existing operations. The proposed solution is structured across five major layers that consolidate previously fragmented and siloed business processes through the application of Agentic AI and XAI-powered holistic automation and oversight. Computer Vision is adopted in place of frequency-based tracking mechanisms due to its superior accuracy, speed, flexibility, and psychological acceptability for human operators. Through this approach, target businesses are able to fully replace traditional warehousing solutions with a simple yet robust mobile application that supports item scanning, real-time inventory management, and seamless synchronisation with organisational data systems. At a broader operational level, businesses benefit from informed and timely decisions generated by specialised AI agents that monitor, analyse, and optimise workflows across the value chain. The widespread adoption of IRIS has the potential not only to enhance individual grocery business outcomes but also to drive industry-wide modernisation by setting a new benchmark for efficient, intelligent warehousing and operational excellence.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

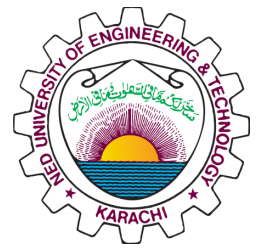
Kanza Fatima (SE-22011)

Nashwah Mohammad (SE-22023)

Mehveen Fasih (SE-22012)

Salman Ahmed (SE-22031)

# ScamShield: AI- Based Detection of Fraudulent Chat Messages and Profile Images



**Project ID: SE-22007**

**Supervisor: Dr. Muhammad Faraz Hyder**

## ABSTRACT

Online scams are rapidly increasing on messaging and social media platforms such as WhatsApp, Instagram, and Facebook Messenger. Scammers often build trust over time using messages, voice notes, and fake profile images, making these scams difficult for users to detect. This project presents Scam Shield, an AI-based mobile application designed to identify fraudulent communication and protect users from online scams.

The system analyzes exported chat data and real-time incoming messages from messaging platforms. Real-time data is captured through a notification listener and screen content monitoring using Android accessibility services, enabling detection of suspicious messages directly from messaging apps. For text analysis, a transformer-based DistilBERT model is used to classify messages as scam or non-scam. Voice messages are converted into text using Whisper, after which they are analyzed using the same text classification pipeline.

In addition, XceptionNet is used to analyze profile pictures to detect fake images commonly used by scammers. To improve transparency, the system integrates Explainable AI using SHAP, which highlights key words contributing to scam predictions.

The solution is implemented as a Flutter mobile application with a FastAPI backend and Firebase integration. By supporting both real-time monitoring and analysis of previous chat history, the system helps users identify suspicious interactions early and enhances digital safety in everyday communication platforms.

## Technology Used:



## Project Contribution to SDGs

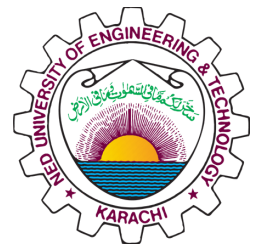


## Group Members:

Maheer Shakil (SE-22056)  
Abdul Wahab (SE-22085)

Saira Shaikh (SE-22062)  
Manaim Khalid (SE-22303)

# SwiftOps - LLM and MCP based DevOps Assistant for smart monitoring and incident management



**Project ID: SE-22008**

**Supervisor: Dr. Muhammad Faraz Hyder**

## ABSTRACT

As modern software systems scale across distributed microservices and containerized environments, DevOps engineers are left juggling fragmented data from dozens of tools, reacting to failures long after the damage is done.

SwiftOps is an AI powered DevOps assistant designed to change that. Built on a dedicated Logging Layer that pulls real time logs and resource data directly from Docker containers across Kubernetes clusters, the platform enriches every signal with contextual metadata, namespace, pod, container, and node, creating a single structured view across the entire microservices landscape.

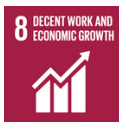
At its core, SwiftOps fuses large language models with ML-based time-series forecasting to detect anomalies, failures and predict faults before they cascade. When a risk is identified, the system automatically generates a detailed incident report, delivers root cause analysis, and provides possible fixes.

Detected incidents are pushed directly into project management tools like Jira and Asana, eliminating manual ticket creation entirely. Throughout the pipeline, PII sanitization ensures sensitive log data is never exposed to the model.

## Technology Used:



## Project Contribution to SDGs

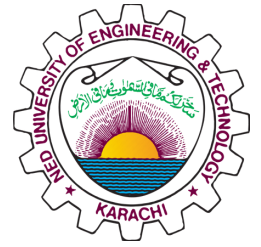


## Group Members:

Muhammad Rao (SE-22066)  
Ebad Tahir Khan (SE-22088)

Hamdan Khan (SE-22067)  
Syed M. Zaid Ali (SE-22097)

# Lumen: Security and Quality Evaluation of LLM Generated Code



Project ID: SE-22009

Supervisor: Dr. Mustafa Latif

Co-Supervisor: Dr. Muhammad Faraz Hyder

## ABSTRACT

Large Language Models (LLMs) are increasingly used in software development to generate code, which helps improve productivity. However, this AI-generated code often contains hidden security vulnerabilities and quality issues. Many developers rely on such code without fully understanding the risks, leading to unsafe and unreliable software systems. Existing tools are not enough to properly evaluate the unique problems found in AI-generated code.

To address this issue, Lumen is proposed as a unified platform for analyzing and comparing LLM-generated code with human-written code. It combines multiple static analysis tools and a machine learning model to detect vulnerabilities, and quality issues. The platform also includes a search system to retrieve human-written code for fair comparison. All results are mapped to industry standards such as CWE, CERT, and OWASP Top 10 to ensure reliable and standardized evaluation.

Lumen provides clear reports, visual dashboards, and comparison metrics that help developers and organizations understand the strengths and weaknesses of AI-generated code. This system supports secure coding practices, reduces technical risks, and promotes responsible use of AI in software development.

## Technology Used:



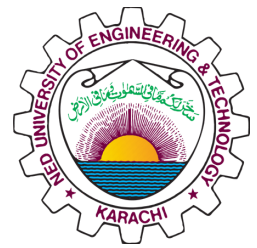
## Project Contribution to SDGs



## Group Members:

Hafiz Muhammad Hassam Ata (SE-22030) Muhammad Ayan Tahir (SE-22035)  
Muhammad Anas Khan (SE-22040) Abdul Ahad Khan (SE-22045)

# LeakSense: Water Leakage Detection in Pipelines



**Project ID: SE-220010**

**Supervisor: Prof. Dr. Shehnila Zardari**

**Co-Supervisor: Dr. Mustafa Latif**

## ABSTRACT

Rapid urbanization and aging water infrastructure has led to significant water losses worldwide primarily due to, leakages in aging and corroded pipelines, with current manual and reactive detection methods failing to identify leaks in time, resulting in massive wastage and worsening scarcity. To address this challenge, LeakSense develops a prototype to detect water leakage using acoustic sensors mounted on pipes to capture vibration signals under controlled leak conditions. The collected acoustic data is processed into waveform representations and augmented using SpecAugment technique to overcome the limitation of scarce real-world samples. The enhanced dataset is then used to train a Convolution Neural Network (CNN) model capable of detecting and localizing leaks within the setup, providing accurate results even in non-metallic pipes where conventional methods struggle. By combining low-cost sensing with AI, the project offers a practical, scalable foundation for reducing water losses in urban distribution networks and contributes toward more efficient and sustainable water management in mega cities aligning with the UN Sustainable Development Goals for Clean Water and Sanitation, Industry, Innovations and Infrastructure and Sustainable Cities and Communities.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

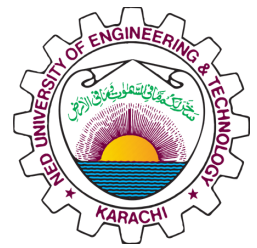
Syeda Fatima Jaffar (SE-22051)

Urwa Qadir (SE-22061)

Namra Imtiaz (SE-22060)

Fathima Raihaan Ihsan (SE-22100)

# COOLience: An Environment-Friendly Approach to Smarter Cooling and Carbon Reduction in Data Centres



Project ID: SE-220011

Supervisor: Engr. Dr. Syed Muhammad Sheraz

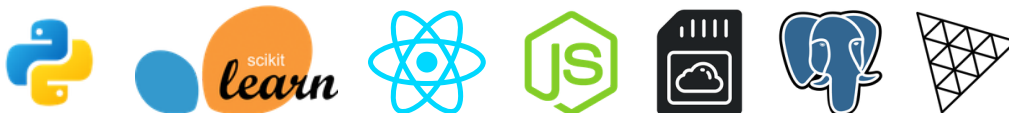
## ABSTRACT

In the era of rapidly growing digital services, the number of data centers has increased drastically to support cloud computing, artificial intelligence, and real-time applications. However, these data centers consume a large amount of energy, and cooling systems account for a major portion of this usage. Many existing solutions rely on fixed calculators or traditional methods that do not adapt to changing workloads or environmental conditions. This issue is more critical in small-scale and edge data centers.

COOLIENCE is a simulation-driven decision support tool that analyzes and optimizes air-based cooling strategies. The system uses simulation and data analysis to help users choose the best options, reduce the energy use, and improve the sustainability of the data center operations. It evaluates different techniques, including air-side economization, chilled water cooling, and evaporative cooling, under realistic environmental conditions. The system also applies machine learning models to estimate performance metrics such as Coefficient of Performance (COP) and therefore allowing faster and more efficient evaluation. It compares various cooling approaches based on energy consumption, Power Usage Effectiveness (PUE), cost, and carbon impact, and suggests the most suitable option.

By using simulation and data analysis, the system helps users make better decisions, reduce energy usage, and move toward more sustainable data center operations.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

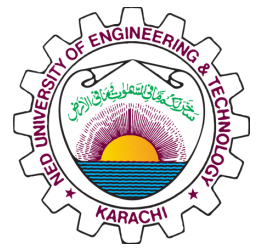
Aleeza Hussain (SE-22018)

Iman Jawad (SE-22025)

Mavra Iqbal (SE-22019)

Khatija Zaidi (SE-22026)

# FabriGrade - AI-powered Fabric Quality Control System



Project ID: SE-220012

Supervisor: Engr. Asma Khan

## ABSTRACT

Fabric quality inspection is essential in the textile industry, as it directly impacts product quality and production efficiency. However, existing methods rely on manual inspection, destructive GSM testing, and tools like pick meters, which often produce inconsistent and inaccurate results, especially for knit fabrics. These approaches are time-consuming and not suitable for real-time use. To address this, this project proposes an AI-based, non-destructive fabric quality inspection system.

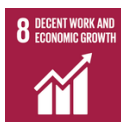
The system includes three main modules: defect detection, GSM estimation, and color consistency analysis. The defect detection module uses a deep learning model (YOLOv8) to identify surface defects. The GSM module focuses on knit fabrics and estimates fabric density by detecting courses and wales from images, using a ruler-based calibration method to extract a one-inch area for accurate measurement. The color analysis module evaluates color variations using image-based techniques, reducing reliance on subjective human inspection.

The system follows a structured process of image acquisition, preprocessing, and feature analysis, with a semi-automatic calibration step to ensure accuracy. A user feedback mechanism is also included to improve results over time. A web-based interface is being developed for system demonstration. Overall, the proposed solution aims to provide a faster, more accurate, and non-destructive approach to fabric quality inspection.

## Technology Used:



## Project Contribution to SDGs



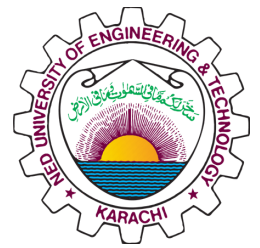
## Group Members:

Diya Fatima (SE-22053)

Laiba Emaan (SE-22059)

Hamnah Adnan (SE-22055)

# HIRELY: The AI Powered Interview Evaluation System



Project ID: SE-22013

Supervisor: Engr. Asma Khan

## ABSTRACT

The need for effective interview preparation tools highlights the limitations of traditional approaches, which often lack objective, multimodal, and data-driven feedback. HIRELY: The AI-Powered Interview Evaluation System addresses this gap by proposing a scalable platform that simulates real-world interviews and evaluates candidate performance using multimodal Artificial Intelligence and Machine Learning techniques. The system integrates a modern full-stack architecture, utilizing Next.js and Node.js for application development, FastAPI for machine learning services, Prisma for database management, and Docker for containerized deployment, while Redis enhances performance through caching and asynchronous processing. HIRELY performs multimodal analysis by extracting audio features using OpenSMILE and visual features such as gaze, head pose, and facial action units using OpenFace and MediaPipe. Separate predictive models based on ensemble learning methods, including XGBoost and Random Forest, are trained to generate modality-specific representations of communication and non-verbal behavior, which are then combined through a multimodal data fusion strategy to predict overall interview performance. Experimental observations indicate that the fusion-based approach provides more robust and reliable predictions compared to unimodal methods, and the system generates detailed feedback to help users identify strengths and areas for improvement. By combining multimodal feature extraction, ensemble learning, and scalable system design, HIRELY contributes a practical and intelligent solution for automated interview assessment.

## Technology Used:



## Project Contribution to SDGs

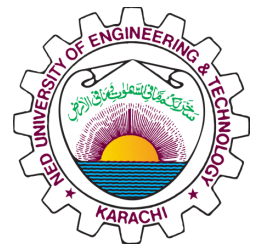


## Group Members:

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Mariam Arshad (SE-22054)  
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# Nafa Ai- Ai powered Financial Recommendations Model



Project ID: SE-220014

Supervisor: Engr. Asma Khan

## ABSTRACT

Nafa AI is an intelligent financial assistant designed to support smart investment decision-making. It analyzes real-time market data, historical trends, and external indicators using machine learning models. The system predicts optimal “Time to Invest” opportunities for users. It includes a personalized risk assessment module based on user preferences and financial goals. A FinRAG-based recommendation engine provides context-aware investment suggestions. Users can interact through a dashboard to track portfolios and receive alerts. The platform ensures scalability through a cloud-based backend architecture. Continuous model training improves prediction accuracy over time. Nafa AI simplifies complex financial data into actionable insights for all types of investors. By bridging the gap between complex financial data and user-friendly insights, Nafa AI aims to democratize investment intelligence, making sophisticated financial guidance accessible to both novice and experienced investors. The platform not only improves decision accuracy but also enhances user confidence in navigating modern financial markets.

## Technology Used:



## Project Contribution to SDGs



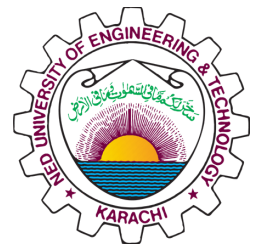
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# Jobsinc - Agentic AI Recruitment with WhatsApp- Powered Workflows



Project ID: SE-220015

Supervisor: Engr. Shumaila Ashfaq

## ABSTRACT

Jobsinc is a multi-tenant recruitment platform designed to streamline and standardize the hiring process through centralized job aggregation, integrated communication, and automated evaluation. The system consolidates job listings from multiple external sources into a unified platform, enabling applicants to discover and apply for opportunities through a single interface without repetitive data entry. For organizations, Jobsinc provides a dedicated dashboard to manage job postings, track applicant pipelines, and coordinate hiring activities efficiently. A key component of the platform is its integration with WhatsApp Business, which serves as the primary communication channel for application updates, interview scheduling, and candidate interaction, ensuring accessibility and high engagement. The platform further incorporates an automated evaluation layer that analyzes submitted CVs and supports structured interview assessments through a browser extension capable of transcription and checklist-based scoring. By reducing manual effort in screening and coordination, Jobsinc improves hiring efficiency, minimizes delays, and enhances transparency for both recruiters and applicants. The system is designed to operate as a scalable service, supporting multiple organizations while maintaining data isolation and consistent workflow management.

## Technology Used:



## Project Contribution to SDGs

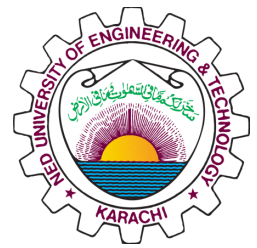


## Group Members:

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Saham Ahmed (SE-22082)

Abdullah Musharraf (SE-22081)  
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# AllerGuard-A Smart System for Allergen Detection and Symptom Prediction



Project ID: SE-220016

Supervisor: Engr. Sidra Masood

## ABSTRACT

Food allergies affect millions of people worldwide and can cause reactions ranging from mild discomfort to severe and life-threatening conditions. Identifying allergens in packaged food is challenging because ingredient labels often use complex scientific names, derivatives, or chemical codes such as E-numbers, making manual interpretation difficult and increasing the risk of accidental exposure.

This project proposes an intelligent allergy detection and management application to help users make safer food choices. The system allows users to create a personalized allergy profile and scans product labels using Optical Character Recognition (OCR) with ML Kit to extract ingredient information. Lightweight Natural Language Processing (NLP) techniques compare the extracted text with a comprehensive allergen database containing common allergens, alternative names, derivatives, and chemical codes to generate real-time alerts when potential allergens are detected.

Beyond allergen detection, the application predicts possible symptoms based on the user's allergy profile and can also analyze user-reported symptoms and consumed foods to predict potential allergies. Additionally, the platform connects patients with doctors by enabling urgent or regular appointments, in-app chat, video consultations, and in-person visits.

By integrating OCR, NLP-based ingredient analysis, symptom prediction, and doctor patient connectivity, the proposed system provides a comprehensive digital solution for safer allergy management and improved healthcare accessibility.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

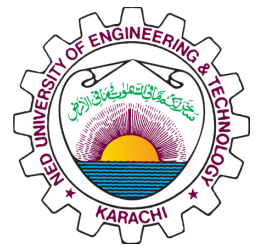
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Aliza Khalid (SE-22057)

Aneeq Ansari (SE-22302)

# LegalAssist - AI Powered Legal Aid Platform



Project ID: SE-220017

Supervisor: Engr. Sidra Masood

## ABSTRACT

LegalAssist is an AI-powered legal aid platform designed to improve access to legal information and support in Pakistan, particularly in the domains of family law and women's rights. Traditional legal systems are often difficult to navigate due to complex legal terminology, limited public awareness, and barriers to timely consultation with legal professionals. LegalAssist addresses these challenges by leveraging artificial intelligence and Retrieval-Augmented Generation (RAG) to deliver simplified, accurate, and accessible legal guidance.

The platform enables users to explore laws in plain language, access summarized case judgments, and interact with an intelligent chatbot for real-time legal queries. It also incorporates a document analysis feature that extracts and explains key clauses from legal documents, helping users understand critical information before signing or submission. Additionally, LegalAssist provides a community forum for discussion and a lawyer directory to facilitate professional consultation. By grounding responses in verified legal sources, the system ensures reliability while minimising misinformation. LegalAssist aims to empower individuals, especially women and non-legal users, to make informed decisions, reduce dependency on intermediaries, and promote legal awareness. Its scalable architecture allows future expansion into broader legal domains and public service sectors.

Aligned with Sustainable Development Goals such as Quality Education, Gender Equality, Reduced Inequalities, and Peace, Justice, and Strong Institutions, LegalAssist contributes toward building a more informed, equitable, and accessible legal ecosystem through technology.

## Technology Used:



## Project Contribution to SDGs

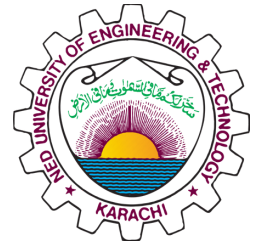


## Group Members:

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# SpeechSpectrum - Early screening of autism-linked speech delays



Project ID: SE-220018

Supervisor: Engr. Sidra Masood

## ABSTRACT

Speech and language delays in children aged 1–10 years are among the earliest indicators of Autism Spectrum Disorder (ASD), yet early identification remains a significant challenge. Parents frequently overlook subtle developmental warning signs, while formal diagnostic processes demand specialized clinical expertise and remain financially and logistically inaccessible to many families.

SpeechSpectrum addresses this need through an AI-powered mobile and web application that enables parents to perform preliminary ASD-linked speech delay screening at home. The system employs a two-phase approach: first, a structured behavioral questionnaire based on Q-CHAT items, processed by supervised machine learning model, Random Forest to generate an immediate ASD risk score; second, a child speech recording module that extracts acoustic features and analyzes them using a Convolutional Neural Network (CNN) to produce an objective speech pattern assessment.

Beyond screening, the platform supports a complete post-analysis workflow: low-to-moderate risk cases receive trackable intervention activities and re-assessment support, while high-risk cases are directed toward professional consultation through an integrated specialist network.

By making AI-driven autism screening accessible and affordable to families of all backgrounds, SpeechSpectrum aims to bridge the gap between parental concern and timely clinical intervention, improving long-term outcomes for children at risk of ASD.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

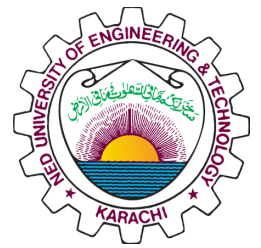
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Vaiz Hasan (SE-22047)

Syed Muhammad Reyan Imam (SE-22091)

# DroneMate AI: Intelligent Conversational Assistant for Safe and Explainable ArduPilot-Based Drone Operations



Project ID: SE-220019

Supervisor: Ms. Sana Fatima

## ABSTRACT

DroneMate AI is an AI-powered conversational assistant that simplifies drone mission planning and execution for operators. Instead of navigating complex Ground Control Stations like Mission Planner, which require manual configuration of waypoints, geofences, and flight parameters, operators can simply describe their mission in English and let the system handle the rest.

Built on a Large Language Model integrated with the ArduPilot stack via MAVLink, DroneMate AI translates natural language commands into precise drone instructions in real time, supporting everything from basic operations like takeoff, landing, arming, speed control, and navigation, to fully automated guided and multi-waypoint missions across grid surveys, circular orbits, spline paths, and custom flight paths.

Safety is built into every layer of the system. A real-time compliance engine continuously monitors altitude, battery, GPS signal, and no-fly zones throughout each flight, automatically triggering emergency protocols such as Return-to-Launch when critical limits are breached. An explainable AI module keeps operators informed of every decision the system makes, from route adjustments to failsafe activations, while a smart recommendation engine guides users toward optimal flight parameters and flags any unsafe inputs before execution. All commands and system events are logged throughout each session, ensuring complete operational traceability.

DroneMate AI makes drone operation intuitive, transparent, and accessible, turning a conversation into a complete, safe, and intelligent mission.

## Technology Used:



## Project Contribution to SDGs

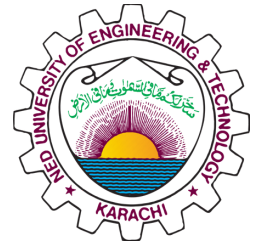


## Group Members:

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Samrah Fatima (SE-22013)  
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# Hive: AI Powered Social Media Automation



Project ID: SE-220020

Supervisor: Engr. Sana Fatima

## ABSTRACT

Hive is a GenAI-powered social media automation platform designed for solo entrepreneurs and small business enterprises (SMEs). In today's world where social media is the primary marketing channel, SMEs struggle to maintain a consistent online presence while juggling multiple roles, often held back by time constraints, limited capital, and a lack of tools and skills. With SMEs spending 4.2 hours weekly on manual management and existing solutions failing to meet their needs, 5.2 million businesses in Pakistan are left behind.

Hive addresses this by unifying the entire social media lifecycle, from ideation and creation to scheduling and engagement, into a single seamless workflow, automating a month's worth of cross-platform content in one click and reducing management time by 90-94%.

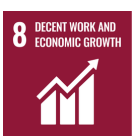
What makes Hive powerful is the technology driving it. Built on a cost-efficient serverless cloud architecture utilizing AWS, Hive leverages GenAI models to generate brand-relevant text and visual content, trend analysis to keep businesses ahead of the curve, and RAG technology to power smart automated DM responses that feel personal and timely. A unified dashboard ties it all together, delivering actionable analytics on growth, competitors, and content performance, with OAuth authorization and encrypted token storage securing every platform integration.

Ultimately, Hive gives small businesses the power to compete online, turning presence into measurable growth.

## Technology Used:



## Project Contribution to SDGs



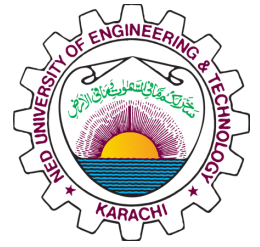
## Group Members:

Sadia Khan (SE-22003)

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Zehra Batool (SE-22006)

# WisprNet - The Offline Emergency Messaging Network



Project ID: SE-220021

Supervisor: Engr. Sana Fatima

## ABSTRACT

**WisprNet** is a low-cost, decentralized, offline-to-online communication network designed to address the critical failure of traditional connectivity systems in rural and infrastructure-deficient environments. Conventional communication technologies rely heavily on cellular towers, internet access, and continuous power, making them unreliable in remote areas and during network outages where communication is needed most.

WisprNet addresses this challenge by leveraging a solar-powered mesh architecture built on ESP32 and LoRa technology, enabling secure, long-range communication without dependence on mobile networks or internet connectivity. The system forms a multi-hop network where nodes relay encrypted messages across distances of up to 5 kilometers, ensuring continuity even in completely offline conditions. A gateway node is incorporated to bridge offline communication to external platforms such as SMS, email, or internet services when connectivity becomes available.

The primary focus of this Final Year Project is to implement and validate offline emergency messaging as a proof-of-concept, demonstrating the feasibility of decentralized communication during network outages. The system is designed to be rapidly deployable, energy-efficient, and scalable. While the current implementation is limited to messaging, the architecture is designed to be modular and adaptable for future extensions.

## Technology Used:



## Project Contribution to SDGs

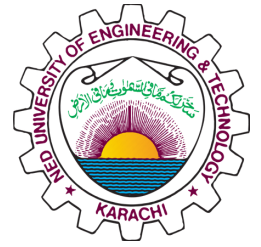


## Group Members:

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Syed Abdul Ahad (SE-22048)

Syed Arham Hasan (SE-22039)

# SatIntel - Satellite Intelligence for Planning and Disaster Management



Project ID: SE-220022

Supervisor: Dr. Raheela Asif

## ABSTRACT

SatIntel is an intelligent system designed to analyze high-resolution spatial satellite imagery (e.g., Sentinel-2) using advanced artificial intelligence techniques. It integrates Vision Transformers (ViT) for land cover classification along with ViT-based approaches and Segment Anything Model (SAM) for improved feature extraction and object segmentation, enabling the identification of roads, buildings, and disaster-affected areas such as floods. However, existing models often lack strong reasoning capabilities and struggle with accurate object identification in complex satellite scenes due to variations in scale and environmental conditions, which this project aims to improve. A multimodal approach combines computer vision with natural language processing, allowing users to query images in simple language. The system uses a scalable microservices architecture with FastAPI, along with caching and optimized pipelines for efficient performance. A user-friendly web interface supports image upload and interaction. Overall, SatIntel enhances decision-making in urban planning, environmental monitoring, and disaster management, while reducing manual effort and enabling scalable, real-world applications.

## Technology Used:



Express JS

## Project Contribution to SDGs



## Group Members:

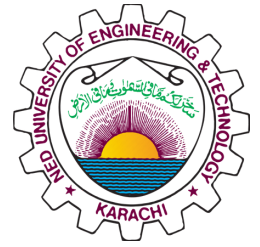
Mubashir Azhar (SE-22084)

Fatima Hassan (SE-22098)

Abdul Rauf Kaka (SE-22094)

Jassica Allen (SE-22099)

# KubeDDoS : Adaptive Security Framework for Auto Scalable Indirect DDoS in Kubernetes



Project ID: SE-220023

Supervisor: Engr. Sheerina Khattak

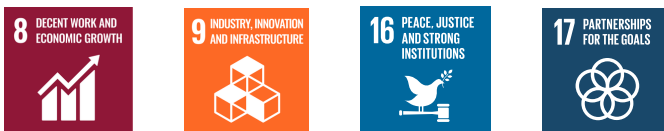
## ABSTRACT

KubeDDoS is a Kubernetes-native network security system designed to detect and mitigate Crossfire (indirect) Distributed Denial of Service (DDoS) attacks in containerized cloud environments. Unlike traditional DDoS attacks that directly target services, Crossfire attacks congest shared network links using decoy traffic, making them difficult to detect. KubeDDoS addresses this by continuously monitoring cluster and network metrics and applying a 4-invariant detection model to accurately identify indirect attack patterns while reducing false positives. Once an attack is confirmed, the system uses an intent-based networking approach, translating detection events into high-level mitigation intents that define the desired network state. These intents are enforced through a Kubernetes-native controller that applies adaptive strategies such as bandwidth control, network isolation, resource limiting, topology-aware eviction, and victim workload protection. Operating through an event-driven pipeline using Custom Resource Definitions (CRDs), KubeDDoS enables automated, modular, and reversible mitigation with minimal manual effort. By combining intelligent detection, intent-driven decision-making, and automated enforcement, KubeDDoS maintains service availability and significantly improves resilience compared to traditional Kubernetes-based mitigation approaches.

## Technology Used:



## Project Contribution to SDGs

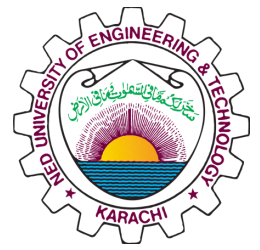


## Group Members:

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Saad Ehsan (SE-22071)

Huzaifa Ali Siddiqui (SE-22042)  
Shahroz Asif (SE-22079)

# Vocalog: Industry-Tailored, AI-Powered Meeting Intelligence & Documentation System



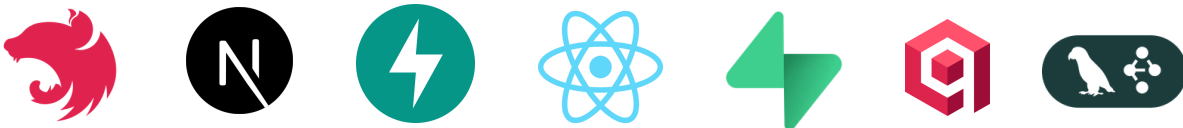
Project ID: SE-220024

Supervisor: Engr. Sheerina Khattak

## ABSTRACT

Vocalog is an AI-powered meeting intelligence system that converts meeting conversations into standardized documentation and actionable outputs across the project lifecycle. Organizations rely heavily on meetings for decision-making, yet these discussions often remain unstructured and require significant manual effort to convert into formal documents like SRS, while existing tools typically stop at transcription or summaries, resulting in inconsistent outputs, lost context, and reduced productivity. Vocalog addresses this by capturing meeting audio from virtual or physical environments, performing speaker-aware transcription, and generating structured Minutes of Meeting along with next-meeting agendas, while also leveraging accumulated cross-meeting context to assist in creating domain-specific documents such as Software Requirement Specifications, design documents, and product requirement reports throughout the lifecycle. A human-in-the-loop workflow ensures that users can review, refine, and adapt outputs to organizational standards, maintaining both accuracy and flexibility, while integrations via the Model Context Protocol convert discussions into actionable tasks and synchronize them with third-party tools like project management and communication platforms. By combining transcription, contextual intelligence, and automated documentation, Vocalog streamlines workflows and enables teams to move seamlessly from conversation to execution.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

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Muhammad Shahzeb Khan (SE-22070)

Ali Ahmed Shaikh (SE-22089)

Muhammad Hamza (SE-22092)

# AutoGrade- Transforming manual grading into fast, consistent, and AI-driven evaluation



Project ID: SE-220025

Supervisor: Engr. Sheerina Khattak

## ABSTRACT

AutoGrade is an AI-powered automated grading system designed to address the challenges of manual evaluation of student answer sheets in the education sector. Traditional grading methods are time consuming, prone to human error, and often lead to inconsistencies in assessment. Additionally, most existing automated systems are limited to objective type questions and lack the capability to evaluate handwritten responses effectively.

The proposed system leverages Optical Character Recognition (OCR) to extract text from scanned or handwritten answer sheets and integrates advanced Artificial Intelligence techniques using LangChain and Retrieval-Augmented Generation (RAG) to evaluate student responses against predefined marking schemes. By combining these technologies, AutoGrade enables accurate, consistent, and efficient grading of subjective answers.

The system is developed as a full-stack application, utilizing Django for backend services and Flutter for cross-platform frontend accessibility. AutoGrade aims to significantly reduce the workload of educators, provide timely feedback to students, and generate performance analytics to support academic improvement. While the system focuses on text-based answers, it offers a scalable and practical solution for modern educational environments, enhancing the overall efficiency, fairness, and reliability of the assessment process.

## Technology Used:



## Project Contribution to SDGs



## Group Members:

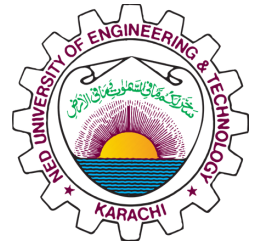
Muneeb Masood (SE-22041)

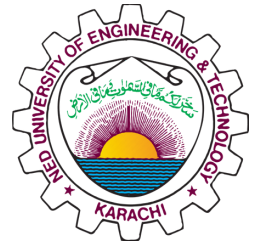
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# Industrial Partners and Collaborators





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