NUST SEECS -School of Electrical Engineering & Computer Science

SEECS

ABSTRACT BOOKLET

BESE - Bachelor of Software Engineering

CLASS OF
2025

Faculty of
Computing

NUST
SCHOOL OF ELECTRICAL
ENGINEERING & COMPUTER
SCIENCE (SEECS)

Greeting & Message from
Principal NUST-SEECS

Dr. Muhammad Ajmal Khan, SI(M)

PhD (Michigan State University, USA)

It is a pleasure to introduce to you the graduating classes of 2025 in the disciplines of Electrical Engineering, Software Engineering, and Computer Science.

NUST-School of Electrical Engineering and Computer Science (SEECS) is committed to providing first-rate higher education in Pakistan. We emphasize making SEECS a center of excellence for imparting high-quality education in the areas of Electrical Engineering and Computer Science that would lead to the promotion of research and scholarly achievements at National & International levels. We foster a passion for creativity and productivity in our students through an enabling environment of state-of-the-art labs, arranging industry visits, seminars, and international conferences, etc. Besides imparting thorough professional knowledge, we also believe in instilling sound entrepreneurial, social and humanitarian values.

The programs offered at SEECS include Electronics, Digital Systems, RF and Microwave, Telecommunication and Networks, Artificial Intelligence, Machine Learning, Big Data, Cyber Security, and Cloud Computing. Hands-on training in these domains augments the basic knowledge of our students, giving insights into its practical application, an essential prerequisite for potential technical leaders of the 21st century.

The projects showcased in the Open House demonstrate the skill set of our graduating students, and the highly interactive sessions with the industrial professionals provide them a platform for networking. Another aim of holding this event is to address the dire need for industry-academia partnerships in Pakistan. Through Open House, the industry can witness the outstanding research of various disciplines that are being offered at NUST-SEECS. At the same time, the industry feedback helps us update our curriculum according to the contemporary market trends. Henceforth, I take immense delight in presenting the batch of 2025 as the proud product of SEECS and wish them success as they go forward in their respective fields, with all the best for their journey ahead.

Message from Associate Dean - Faculty of Computing

Dr. Rafia Mumtaz

Professor
PhD (Remote Sensing And Satellite Image Processing)

Dear Students of the Graduating Batches of Computer Science and Software Engineering,
As you stand at the threshold of completing your undergraduate journey, I want to take a moment to recognize the dedication, resilience, and growth that have brought you to this point. This phase, filled with anticipation, reflection, and excitement, marks the beginning of a new chapter, and it is truly a moment to be proud of.

Over the past few years, you've navigated through complex codes, late-night deadlines, collaborative projects, and unexpected challenges, emerging each time with greater strength and deeper insight. You've not only gained technical knowledge but also learned to think critically, solve real-world problems, and adapt in an ever-evolving digital landscape.

You are entering a world that urgently needs ethical technologists, innovative thinkers, and compassionate leaders. Whether you choose to dive into industry, pursue research, or carve out your path, I have no doubt that you will make a meaningful impact.

We look forward to celebrating your graduation soon and watching you thrive as proud ambassadors of NUST.

May you continue to lead with integrity, dream boldly, and never stop learning.

Faculty Heads

Dr. Seemab Latif
Associate Professor
PhD (Artificial Intelligence)
University of Manchester
HOD Artificial Intelligence and Data Science (AI&DS)

Dr. Muhammad Imran Malik
Associate Professor
PhD (Machine Learning For Forensic Document Analysis)
Universität Kaiserslautern
HOD Department of Computer Science (CS)

Dr. Mehdi Hussain
Associate Professor
PhD (Steganography)
Universiti Malaya
HOD Department of Information Security (IS)

Dr. Arham Muslim
Assistant Professor
PhD (Learning Analytics)
Rheinisch Westfälische Technische Hochschule Aachen
HOD Department of IT & Innovative Technologies in Learning (IT&ITL)

Dr. Momina Moetesum
Assistant Professor
PhD (Artificial Intelligence)
Bahria University
HOD Department of Software Engineering (SE)

Overview of

OPEN HOUSE

NUST SEECS organizes its annual open house to show case the skills of its graduating students. The idea is to provide a platform where our students and industry representatives can mingle and have informal or formal discussions. The students showcase their final year projects which represent their skill set and enable potential employers to identify any matching requirements. The projects are presented by students from two main departments:

Software Engineering (SE)
Computer Science (CS)

This year Department of Computing has divided the projects into different knowledge areas, including Algorithms and Complexity, Architecture and Organization, Computational Science, Graphics and Visualization, Human-Computer Interaction, Information Management, Intelligent Systems, Platform-based Development, Programming Languages, Social Issues and Professional Practice, Software Development Fundamentals, and Software Engineering. There are around 80 different projects in these categories. You will find a large diversity of projects including mobile applications, computer vision based intelligent driving assistant, cloud based security resource sharing, an Alzheimer's prediction application and many more. You will not only find potential employees but excellent ideas as well that can be turned into products.

At NUST SEECS, we take pride in molding our bright entrants into well trained and appropriately groomed professionals in Computer Science, Software Engineering & Electrical Engineering disciplines. Our graduates are actively sought by the industry and our Alumni are occupying promising positions in some of the most prestigious industrial and business houses, both in public and private sectors. We hope that you will enjoy the hard work of our students and find the right candidate or the next big idea for your company.

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01 Knowledge Group

Networking and Communications

AI-Driven Traffic Classification and SDN Control for Enhanced Network Management

Group Members: Muhammad Waseem | Muhammad Zubair Khalid | Rayyan Athar Hussain

Advisor: Arsalan Ahmad Co-Advisor: Salman Abdul Ghafoor

This project aims to leverage Artificial Intelligence (AI) and Machine Learning (ML) techniques to classify different types of network traffic, such as video, voice, and data, in real-time. By training AI/ML models on diverse datasets, the system will accurately identify traffic patterns and characteristics. The classified traffic information will then be utilized to implement an SDN (Software Defined Networking) control mechanism to orchestrate P4 (BMv2) switches. The SDN controller will dynamically manage network resources, prioritizing and filtering traffic based on the AI/ML model outputs. This approach will optimize network performance, enhance Quality of Service (QoS) for critical applications like video and voice, and improve overall network efficiency by ensuring appropriate bandwidth allocation and minimizing congestion. The project will demonstrate the integration of AI/ML with SDN and P4 switches, showcasing a robust solution for intelligent, adaptable, and efficient network management.

LLMs for Intelligent 6G Networks

Group Members: Aamina Binte Khurram | Attiya Waqar | Tayyib Ul Hassan

Advisor: Syed Ali Hassan Co-Advisor: Arsalan Ahmad

As the telecom industry transitions toward 6G, optimal resource allocation has become a critical challenge, requiring intelligent, adaptive solutions. This project explores the use of large language models (LLMs) for solving resource allocation problems in 6G and modern telecommunication networks. Our goal is to develop telecom-specific LLMs capable of assisting with tasks such as spectrum allocation, power distribution, and scheduling by learning patterns from domain-specific datasets and prior optimization solutions. Unlike traditional rule-based or numerical methods, LLMs offer a flexible, prompt-driven interface for modeling complex resource allocation scenarios and generating high-quality solutions. While LLMs have limitations due to their probabilistic nature, we aim to tune them for reliability in telecom contexts and use them as decision-support tools where fast, interpretable resource allocation is essential.

02 Knowledge Group

Computational Science

Leveraging LLMs and Retrieval-Augmented Generation (RAG) for Efficient Seller Recommendation in Online Clothing Search

Group Members: Marriam Naeem | Muhammad Ammar | Syeda Aamna Shahid

Advisor: Muhammad Moazam Fraz Co-Advisor: Maajid Maqbool

Traditional online clothing search often requires users to manually navigate various websites, a time-consuming and inefficient process. This project proposes a novel approach utilizing Large Language Models (LLMs) in conjunction with Retrieval-Augmented Generation (RAG) to streamline seller recommendation for specific clothing items. The system will showcase product listings from nearby active sellers, allowing users to seamlessly access the desired product with a single click. This innovative solution has the potential to revolutionize online clothing search, offering a faster and more efficient way for users to find the items they desire.

03 Knowledge Group
Graphics and Visualization

Next-Gen Prosthetics: AR Customization and Visualization App

Group Members: Abdul Arham | Ahmed Abdullah | Fahd Ahmad

Advisor: Momina Moetesum Co-Advisor: Nazia Perwaiz

The Prosthetic AR App aims to transform the process of customizing and visualizing prosthetic limbs using Augmented Reality (AR) and Machine Learning (ML) technologies. This innovative application addresses current limitations in prosthetics by providing an advanced, user-friendly solution that enhances patient satisfaction and improves the efficiency of prosthetic customization.

04 Knowledge Group
Human-Computer Interaction

Augmentize - Empowering Online Retail through Interactive 3D Model Creation in AR

Group Members: Adeel Ahmed Qureshi | Muhammad Ahmad Zafar | Muhammad Ashhub Ali

Advisor: Arham Muslim Co-Advisor: Maajid Maqbool

Online shopping often falls short of providing accurate representations of products, leading to increased return rates and customer dissatisfaction. This project focuses on guided and interactive 3D model creation from images to address this issue, allowing vendors to create and customize 3D models effortlessly. This project involves effectively exploring techniques for mesh creation and utilization, ensuring the incorporation of actual object dimensions into 3D models for a more realistic representation. With lightweight APIs for easy integration into any application, this product offers an interactive model viewer and seamless AR integration for clients, enhancing their shopping experience.

AI-Driven Recruitment Platform for Automated Vetting and Interviewing

Group Members: Asad Ur Rehman | Nimra Arif | Shahmeer Sheraz

Advisor: Arham Muslim Co-Advisor: Momina Moetesum

This project aims to develop an AI-powered recruitment platform that automates the initial vetting and interviewing of engineers, followed by human interviews. The platform utilizes AI algorithms for technical skill assessment and video interview analysis, creating a robust database of vetted engineer profiles. Clients can manage hiring processes through a dedicated dashboard, schedule interviews, and track performance.

AI-enabled blood donation mobile app

Group Members: Muhammed Salman Ahmed | Salman Kafil | Taha Ahmad

Advisor: Ayesha Kanwal Co-Advisor: Iram Tariq Bhatti

An AI-enabled blood donation mobile app can streamline the process of blood donation by leveraging artificial intelligence to match blood donors with recipients efficiently. Here's how such an app might work using the basic features like: 1.User Registration, donor eligibility screening, blood donation scheduling, AI-matching algorithm, health monitoring and alerts and community engagement and reward.

05 Knowledge Group

Information Assurance and Security

FedFusion: Secure Collaboration using Enhanced Federated Learning

Group Members: Misbah Juwayriyyah | Muhammad Saadan | Wasif Mehmood

Advisor: Mohsin Kamal Co-Advisor: Maajid Maqbool

This project aims to develop a secure federated learning platform that addresses the vulnerabilities of current federated learning systems, where multiple devices collaborate to train a single model. Malicious actors can manipulate data or poison the global model, compromising accuracy and leaking sensitive information. Our platform leverages cutting-edge techniques to detect and isolate compromised nodes, ensuring the integrity of the global model and data. It empowers resource-constrained devices, such as phones, to contribute securely by tailoring the training process to their capabilities. By facilitating collaboration among users and enterprises, devices download a secure, pre-trained global model that can be fine-tuned on local data, creating a powerful AI experience while maintaining user privacy. Our goal is to revolutionize federated learning by providing a secure, efficient collaborative environment that enhances model accuracy and ensures data privacy and security.

06 Knowledge Group

Information Management

Prompt-Based Web Scraping Application

Group Members: Hasan Fakhar | Muhammad Farooq Afzal | Muhammad Usman Bashir

Advisor: Ayesha Kanwal Co-Advisor: Nazia Perwaiz

This application leverages AI-powered Large Language Models (LLMs) to extract data from web pages based on user prompts. It offers functionality to monitor desired data at specified intervals, schedule tasks, and create custom scraping bots.

Restaurant OS

Group Members: Abdul Rab | Affan Rehman

Advisor: Maajid Maqbool Co-Advisor: Taufique ur Rahman

Restaurant OS will be a cloud based operating system that is designed to help transform restaurants and make it easy for customers to access menus, order items, and request service via a mobile app / web page. It is meant to make payments easy and facilitate the work of waiters / servers. Restaurant OS will change the global restaurant space and help blend in-store and online experiences.

NEBA (NUST Electric Bills Automation)

Group Members: Mariyam Abid Cheema | Minahil Shakoor

Advisor: Taufique ur Rahman Co-Advisor: Bilal Ali

A large number of NUST faculty, officers and staff live on campus in family accommodation, maintained and managed by NUST Works Directorate. Electricity to all the residents is provided through local feeders from NUST Grid Station. Monthly electric bills for every consumer are raised by Works Dte based on meter readings acquired manually by meter readers from every residence. These bills are then forwarded to the NUST Finance Dte for deduction of the amount from the employees' monthly salary. With ever increasing number of residents, manual generation and management of these bills has become a cumbersome process, which needs to be automated on the pattern of national level electric supply companies like IESCO etc., ensuring accuracy, transparency and efficiency along with end-user convenience and satisfaction. This task has been undertaking by SEECS as a Living Lab Project. This FYP is part of the above Living Lab project, which is primarily focused to cater for the following sub-tasks:

1. Study of existing NUST Electric Billing System.
2. Acquisition of end-user requirements for the envisaged system from NUST Works Dte and consumers.
3. Identification of hardware/ software resources required for project along with estimated costs.
4. Preparation of project proposal with timelines and execution phases of the project.
5. Designing a cellphone and web-based application with following basic features:
    - Registration of various categories of end-users with respect to roles, like Meter-Reader, Consumer, Billing Manager, Billing Senior Manager, Finance Manager, System Admin etc.
    - Extraction of essential parameters from the picture image of electric meters, taken by the meter-reader.
    - Backend database to store the meter readings.
    - Automatic generation of monthly electric bills applying all applicable parameters and formulas.
    - Review/ validation of generated electric bills by the Billing Manager.
    - Creation of a consumer dashboard, highlighting all relevant information for the current and previous 11 months electric bills record.
    - Automated prompt generation for the consumers to view their electric bills covering all relevant details, with option to forward request for deferred payment through installments.
    - Approval of the installment plan, if any, by the Senior Billing Manager.
    - Forwarding of the monthly generated bills summary to Finance Dte in the desired format for deduction of the amount from the employee's monthly salaries.

6. The abovementioned features would be reviewed for addition/ deletion/ amendments in consultation with concerned individuals during the initial phase of the project.
7. The envisaged app must also be future proof for integration with the smart meters to provide real-time consumption information to the consumers.

07 Knowledge Group
Intelligent Systems

Intelligent virtual assistant for cognitive risk reduction of Alzheimer's disease using Brain Imaging analysis

Group Members: Muhammad Hassan Javed | Muhammad Saim Iqbal | Muhammad Talha Habib

Advisor: Farzana Jabeen Co-Advisor: Tahira Lashari

The scope of this project includes the development of a comprehensive virtual assistant application that integrates brain imaging analysis, machine learning, and artificial intelligence to provide personalized cognitive health insights. The virtual assistant will interact with users through a user-friendly interface, offering cognitive assessments, exercises, and health tips. Additionally, the project will involve collecting and analyzing brain imaging data to build predictive models for cognitive decline. The final deliverable will be a fully functional application capable of assisting users in maintaining cognitive health and reducing the risk of Alzheimer's disease.

Presentlify: Master Your Presentation Skills

Group Members: Saddam Hussain | Umer Bashir Mirza Bashir Ahmed | Yuvraj Sagar

Advisor: Rabia Irfan Co-Advisor: Farzana Jabeen

This platform is designed to help users improve their presentation and communication skills through an innovative, interactive pairing system. By partnering users with similar proficiency levels, it provides structured practice and personalized feedback to enhance fluency, confidence, and overall communication abilities. The platform offers a comprehensive solution by incorporating human interaction, AI-driven evaluation, and guided reading exercises.

AI-Driven Medical Imaging and Personalized Treatment Platform

Group Members: Abdul Wasay | Mohad Naeem

Advisor: Farzana Jabeen Co-Advisor: Mehvish Rashid

Develop a generative AI system that analyzes medical images (e.g., X-rays, MRIs, CT scans) and integrates textual inputs from patients to detect anomalies, diagnose diseases, and suggest personalized treatment options. The platform will generate personalized treatment plans based on a patient's genetic profile, medical history, and self-reported symptoms.

Radixpert: "Mulitomadal Radiology Diagnostic Assistant"

Group Members: Areeb Ahmad Chaudhry | Muhammad Abdul Rafey Farooqi | Muhammad Yasir Ghaffar

Advisor: Hashir Moheed Kiani Co-Advisor: Nazia Perwaiz

The core focus of this project is to develop an advanced intelligent system that leverages specialized multimodal language models, enhanced with Retrieval-Augmented Generation (RAG) architecture, to assist radiologists in efficiently diagnosing diseases by analyzing X-rays, MRIs, and CT scans, significantly reducing the time required to generate accurate reports. Unlike general LLMs, which are prone to inaccuracies and hallucinations in sensitive medical domains, our model will be fine-tuned specifically for the radiology domain to ensure precision and reliability. The incorporation of RAG architecture allows the model to stay updated with the latest research and data, ensuring continuous improvement and relevance. This system will be implemented as a web-based application, making it easily accessible for radiologists, patients, and clinics. By integrating this application, we aim to streamline the diagnostic process, allowing radiologists to swiftly and accurately interpret imaging results, thereby reducing patient waiting times and enhancing overall clinical workflow. This innovation not only accelerates disease diagnostic report generation but also ensures that patients receive timely and accurate diagnoses, ultimately improving patient care and satisfaction.

Cvision

Group Members: Ayesh Ahmad | Muhammad Faras Siddiqui | Muhammad Qasim

Advisor: Ayesha Kanwal Co-Advisor: Nazia Perwaiz

This project develops an advanced software solution leveraging deep learning, computer vision, and real-time web technologies to enhance virtual try-on (VTO) experiences, specifically tailored for eyewear applications. Current market solutions are predominantly 2D, unresponsive, and lack environmental adaptability. Our solution addresses these shortcomings by introducing a 3D VTO model driven by real-time facial detection, reconstruction, and precise landmark identification, ensuring high fidelity and dynamic responsiveness to user movements and environmental conditions. The software is architected as a scalable Software-as-a-Service (SaaS) platform using modern web technologies (React, WebRTC), facilitating seamless integration and widespread deployment. This innovative approach significantly improves customer engagement, reduces return rates, and enhances the online eyewear purchasing experience by enabling realistic and reliable virtual fittings.

safAI: AI-Driven Garbage Detection via Satellite Imagery

Group Members: Ahmed Obaidullah | Muhammad Abdul Basit | Taimoor Sardar

Advisor: Hashir Moheed Kiani Co-Advisor: Maajid Maqbool

This project aims to develop a platform capable of detecting garbage in satellite images. The primary objective is to address environmental pollution by creating a tool for identifying and monitoring garbage accumulation in various regions. The proposed platform will feature an intuitive user interface that allows users to upload satellite images and receive real-time analysis results. This system will be a valuable resource for environmental agencies and policymakers. The successful implementation of this project has the potential to enhance waste management strategies and contribute to cleaner, more sustainable environments.

AI-Powered E-Commerce Web Application with Chatbot

Group Members: Affan Bin Faisal | Sohaib Ahmed | Taimoor Ikram

Advisor: Ayesha Kanwal Co-Advisor: Sana Qadir

An AI-Powered E-Commerce application where users can leverage AI to find the products that best match their needs and budgets. The product features a web application where Machine Learning models compare prices and features of similar products from different marketplaces and provides a chatbot feature, where users can prompt the AI to suggest products that best match their descriptions. The web application allows the user to search for the name of the product and find the best suggestions for them to buy.

X-AI for Automated EEG Interpretation

Group Members: Waleed Ahmed | Zainab Saad

Advisor: Faisal Shafait Co-Advisor: Muhammad Naseer Bajwa

The project aims to develop an innovative AI system capable of analyzing electroencephalogram (EEG) data to generate comprehensive and explainable diagnostic reports for neurological disorders. EEG is a critical diagnostic tool used to monitor brain activity and detect abnormalities associated with various neurological conditions. However, the interpretation of EEG data requires specialized expertise and can be time-consuming, leading to delays in diagnosis and treatment. The developed AI model will not only provide accurate diagnoses but also generate transparent and interpretable reports, outlining the rationale behind its conclusions. By incorporating explainable AI techniques, such as attention mechanisms and saliency maps, the system will highlight the key EEG features contributing to the diagnosis, empowering clinicians to understand and trust the AI-generated reports.

FinForecast Hub - Your Scenario-Based Financial Forecaster

Group Members: Hamza Ali | Jazib | Rayyan Lakhani Muhammad Rizwan

Advisor: Hashir Moheed Kiani Co-Advisor: Rafia Mumtaz

Optimizing sales, profits and other financial features while reducing the costs is what every company wants. But unfortunately, startups and even big firms within Pakistan lack such intelligent systems that can forecast their finances like sales, and profits and can help them reduce their costs. FinForecast Hub is a one-place Scenario-based Financial Forecaster that can help companies forecast their sales, profits and other financial terms so that they can know what their future holds and can take necessary steps to improve their finances.

Computer Vision-based Robotic (arm) Control

Group Members: Emaan Umer | Muhammad Bilal | Umair Asim

Advisor: Muhammad Jameel Nawaz Malik Co-Advisor: Usman Ali

Stereo camera is used to calculate the correspondence using triangulation, and machine learning. This will be used to estimate the 3D points on the human arm pose and then using inverse kinematics to obtain degrees of freedom (DoFs). These DOFs will be transmitted to the robotic arm which will then mimic the human in front of it. This project involves both research and development.

AI-Powered Teaching Assistant for Enhanced Classroom Engagement

Group Members: Abdullah Tahir | Imaan Ibrar | Laiba Atiq

Advisor: Seemab Latif Co-Advisor: Aimal Rextin

This project aims to revolutionize classroom dynamics through the development of an AI-powered teaching assistant designed to automate administrative tasks and foster an engaging learning environment. Traditional classroom settings often burden teachers with the dual responsibilities of delivering quality education and managing classroom logistics, which can detract from both teaching effectiveness and student engagement. Our AI assistant addresses these challenges by automating routine tasks such as attendance tracking and facilitating interactive Q&A sessions following lectures. This project envisions a future where technology enhances the teaching process, allowing educators to dedicate their efforts to inspiring and educating, while students benefit from a more engaging and supportive learning experience.

Generating 3D Facial Models from Genomic Data

Group Members: Navaira Rehman | Syed Ahsan Ullah Tanweer

Advisor: Muhammad Moazam Fraz Co-Advisor: Maajid Maqbool

This project aims to develop and evaluate "DNA-to-Face" computational methods and models that enhance forensic investigations by generating accurate 3D facial models from genomic data. By analyzing genetic variants associated with facial morphology, the aim is to predict an individual's facial appearance from their DNA.

QuickCart - Transforming D2C Commerce through Enhanced Checkouts, COD, and Customer Engagement

Group Members: Asfand Yar Jamali | Muhammad Yameen | Vishal Sagar

Advisor: Muhammad Daud Abdullah Asif Co-Advisor: Rafia Mumtaz

This E-commerce solution comprises three key products: Quick Checkout, offering a lightning-fast and seamless checkout process that enhances conversions; Smart COD Suite, which mitigates return-to-origin issues through advanced risk intelligence; and Quick Chat, a comprehensive WhatsApp solution for personalized customer interactions, boosting engagement and recovery rates. Together, these products streamline operations, improve customer satisfaction, and drive significant growth for Direct-to-Consumer (D2C) E-commerce businesses.

Legal Comprehension through Efficient Models: Bridging the Gap with Smaller LLMs

Group Members: Muhammad Bin Usman | Syed Hasan Abbas | Zain Ul Abideen

Advisor: Ayesha Kanwal Co-Advisor: Farzana Jabeen

This project aims to contribute to NLP research by training smaller LLMs tailored for legal comprehension tasks and evaluating their performance against larger LLMs. We hypothesize that through meticulous training and optimization techniques, smaller models can rival or even surpass the performance of larger counterparts in terms of comprehension, efficiency, and ethical considerations. To achieve this, we will utilize a curated dataset of legal texts, financial documents, and general domain information, ensuring legal permissibility and ethical standards in data collection. We will be training SLMs from scratch and will be employing techniques such as transfer learning and fine-tuning, to further specialize in tasks such as contract drafting, regulatory Q&A, and structured data manipulation.

RingNet - Real-Time Platform for Emergency Alerts & Updates in Locality

Group Members: Abubakar Javed | Rana Mahad Ahmer

Advisor: Ayesha Kanwal Co-Advisor: Farzana Jabeen

RingNet is a state-of-the-art real-time alert and update system designed to revolutionize personal safety, community preparedness and communication. This innovative platform leverages advanced ML/AI to provide users with immediate localized alerts and comprehensive information about various situations, including natural hazards (generated earthquakes, floods, heatwaves and disease outbreaks etc) or human made situations (protests, traffic jams etc.) or any kind of localized information (goods & services providers) that might impact that user. Accessible via both web and mobile applications, RingNet ensures users stay informed and safe in their locality.

Chatbot for Sports analytics using Deep learning

Group Members: Muhammad Ehtisham Raza | Muhammad Momin Rauf | Muhammad Taha Khan

Advisor: Rafia Mumtaz Co-Advisor: Mehdi Hussain

A chatbot tailored for football fans, designed to provide insightful responses to various queries using embedded visualization and text. For visualizations, it will offer a Game Flow Chart to illustrate score changes over time, a feature for scanning a specific player and displaying their stats, and explanations of team formations and tactics

used by the coach. The chatbot will utilize datasets such as ISSIA and Soccernet for player detection and tracking with Multi-Object Tracking (MOT) models, localization, and augmentation in football video content to enhance its analytical capabilities.

MockMate: AI-Powered Mock Interview Platform

Group Members: Hussain Mehdi Kazmi | Muhammad Ahsan Sajjad | Shumail Qaiser

Advisor: Muhammad Daud Abdullah Asif Co-Advisor: Maajid Maqbool

MockMate is an AI-driven mock interview platform designed to help job seekers prepare for interviews. The platform conducts realistic interviews using real-time voice interaction between AI and interviewee, evaluates responses, and provides detailed feedback. Users interact with the AI interviewer through voice, and their facial expressions are analyzed via webcam. MockMate aims to provide a comprehensive preparation tool for job interviews by offering feedback on performance, coding skills, and non-verbal communication.

Visual Interpretation of X-ray images to enhance chest disease detection with Deep Learning and Explainable AI

Group Members: Jamal Ahmad Khan | Muhammad Hassaan Qaisar | Shaheer Ahmad Iqbal

Advisor: Muhammad Daud Abdullah Asif Co-Advisor: Muhammad Naseer Bajwa

To develop and evaluate a robust deep learning model enhanced with Explainable AI (XAI) techniques for the automated detection and classification of various chest diseases from X-ray images. The project aims to provide accurate diagnostic insights and visual evidence of detected conditions, thereby supporting healthcare professionals in making informed clinical decisions.

Self-Optimizing Rewards: Leveraging LLMs for Context-Specific Reinforcement Learning

Group Members: Mohammad Mehran Zafar | Muhammad Armaghan Shakir | Umar Abdullah

Advisor: Faisal Shafait Co-Advisor: Adnan Ul-Hasan

This project aims to transform reinforcement learning by allowing Large Language Models (LLMs) to create their reward functions based on the specific needs of different tasks. Traditional methods rely on manually designed reward functions, which can be time-consuming and may not adapt well to various tasks. By using LLMs' built-in understanding of tasks, this project seeks to develop adaptive, context-specific reward functions automatically. The primary objective is to employ advanced techniques in LLM utilization, where the models assess task-specific contexts and dynamically generate reward functions that guide the learning process. Key challenges include ensuring the reliability and accuracy of these self-defined reward functions and addressing potential biases inherent in LLM-generated rewards. By implementing this system, the project aims to make virtual agents more adaptable and robust, allowing them to effectively perform a wider range of tasks. This would reduce the need for manually defining reward functions, streamlining the development of intelligent agents, and expanding their use in various scenarios.

Prediction of Water Scarcity in Pakistan using Satellite Imagery

Group Members: Izzah Aslam | Nida Naveed | Umaamah Leghari

Advisor: Hashir Moheed Kian Co-Advisor: Muhammad Daud Abdullah

This project aims to address Pakistan's water scarcity issue by using machine learning techniques and satellite imagery analysis to predict regions at risk and future water availability trends. Utilizing data from different satellites, we will focuses on analyzing changes in surface water, groundwater levels, and land use, employing deep learning techniques for spatial feature extraction and temporal forecasting. The goal is to create a predictive model that informs policymakers, environmentalists, and water resource managers about impending water scarcity, facilitating proactive and informed decision-making.

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