NUST
School of Electrical Engineering
& Computer Science

Abstract Booklet

BSCS

Bachelors of Science in Computer Science

Class of 2022

Department of
Computing

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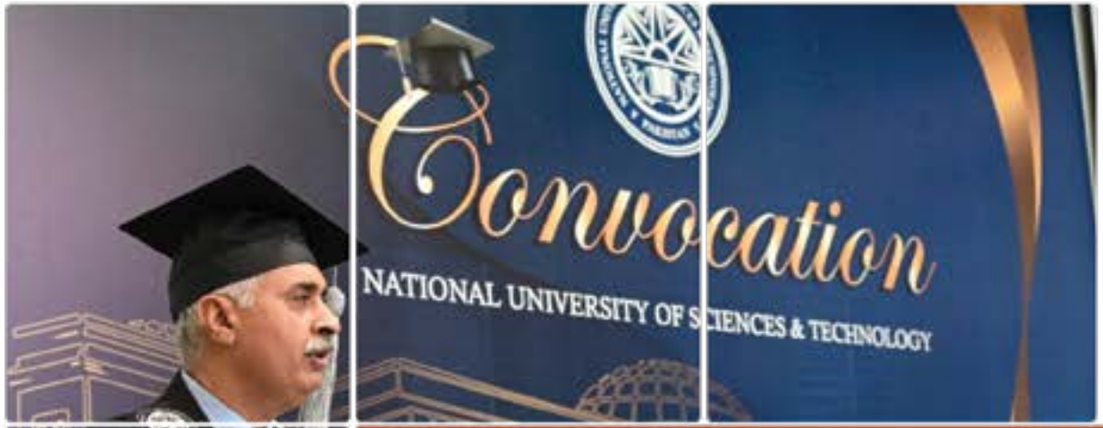

Greeting & Message from

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 2022 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 21stcentury.

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 2022 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 - Department of Computing

Dr. Faisal Shafait

Professor
PhD (Computer Engineering)

Dear Graduating Students,

I am very pleased to see you achieving a momentous millstone of your life. At Department of Computing, we aim to produce graduates who not only have excellent professional and technical competence, but are also inculcated with the norms and etiquettes, which are essentially required to successfully excel in the professional career. Our responsibility is to well equip our students so that they contribute positively and resolve the issues in our society through their technical skills. We also polish the intellectual and entrepreneurial skills of our students and hence we believe that you will be able to make a difference in the market, as you embark upon the new journey.

You are the flag-bearers now and we are very confident that you have the right knowledge-base and technical skill set required to flourish in the computing industry. My advice would be to always welcome challenges in your professional life with dignity, honesty and never forget that there is no replacement for hard work. So step ahead and make your parents, teachers and your alma mater proud! Wish you all the best for your future endeavors.

Faculty Heads

Dr. Abdul Wahid
Tenured Associate Professor
PhD. Computer Science and Engineering
Kyungpook National University, Daegu, Rep of Korea
Head of Computer Science

Dr. Safdar Abbas Khan
Assistant Professor
PhD. Wireless Sensor Networks
University of Paris, France
Head of Innovative Technologies in Learning & Information Technology

Engr. Dr. Rafia Mumtaz
Tenured Associate Professor
PhD, University of Surrey, UK.
Head of Software Engineering

Dr. Muhammad Moazam Fraz
Tenured Associate Professor
PhD
Kingston University London, UK
Head of Artificial Intelligence & Data Science

Engr. Dr. Hasan Tahir
Assistant Professor
PhD. Computer Security
University of Essex, UK
Head of Information Security

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:

Computer Science (CS)
Software Engineering (SE)

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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Financial Forecasting using Data Analytics

Group Members:
Abdullah Waris
Basim Ehsan
Shaheer Ahmad Khan

Advisor: Dr. Sohail Iqbal

Financial forecasting is pivotal to make investment decisions. With the rise of techniques in data analytics, it is possible to come up with new forecasting software with enhanced algorithms that can have improved financial forecasting.

Financial Forecasting with Linear Programming

Group Members:
Abdul Moiz Asif
Muhammad Awais
Muhammadi
Zargham Abbas

Advisor: Dr. Sohail Iqbal

Linear optimization for financial forecasting will enable financial planners to figure out the combination of inputs that will yield optimum outputs. The operating model of a business or the decision model for the business to invest in a new area resembles a directed acyclic graph (DAG) of algebraic equations. Typically financial planners go bottoms up in this DAG, i.e what will be the output based on a combination of inputs. A more actionable question for frontline teams is what inputs are needed to achieve a target output? This project will be in the areas of linear optimization and ML to build prediction models utilizing past performance and heuristics to predict future possibilities.

An Augmented Reality Project for Interior Designing

Group Members:
Hassan Munir Ahmad
Muhammad Ali
Muhammad Asim Khan

Advisor: Dr. Zuhair Zafar

This project focuses on designing an app that would help people and professional interior designers to design their rooms, offices, outdoor areas or any other type of space with the help of augmented reality. What the app will do is move a particular object from its place, and a user can place it elsewhere or can even place new objects that the app would provide. The app will provide a wide range of options to the user regarding selection of furniture, decorations, art, paintings etc. and all these products will come from local or online shops hence connecting buyers and seller as well. Of course all this can be done easily with voice commands as well, like select an object, place an object, and search for an object (any kind of product), hire an interior designer and much more.

Humanoid Character Animation using GANs

Group Members:
Aftab Akhtar
Muhammad Abdullah Khan
Usama Ahmed Siddiquie

Advisor: Dr. Muhammad Moazam Fraz

The process of humanoid character animation for video games and animated movies is a time consuming and costly process. Usually this is done using motion capture which requires expensive equipment and/or keyframe animation which requires meticulously setting keyframes to ensure the animation looks natural. We propose an alternative workflow for this task which would automate the keyframe generation process using Generative Adversarial Networks. We will use existing motion capture data to train our models which would be able to take sparse keyframes and interpolate the motion in between. This would reduce the amount of work that the animator has to do and also ensure that we get natural looking animations.

Pedant - an audiovisual autocorrector

Group Members:
Ahmad Amin
Aiman Tahir
Saif Ullah Bin Khaki

Advisor: Dr. Zuhair Zafar

Pedant is a web application providing its services to regain control over the user's audio and video gestures. It is done with deepfake and text-to-speech technologies. Whether its minding the pronunciation or adding dialogues one forgot, pedant has got it all covered.

Advanced Urdu Language Home Tutor for Visually Impaired (VI)

Group Members:
Hurarah Bashir
Saad Ejaz

Advisor: Dr. Farzana Jabeen

This project will assist visually impaired parents and instructors in the education of their children, as well as other people studying Urdu language, by learning to read Braille more effectively with a user-friendly UI and voice instructions, feedback, and updates for navigation around the app.
Additionally, this app will assist visually impaired pupils in learning Urdu in Braille.

- Reading of Urdu alphabets, words and counting
- Evaluation of given tasks like writing and reading
- Urdu Chatbot to test and practice their Urdu Learning Skills
- Writing of Urdu alphabets, words and counting
- Writing Urdu in Braille
- Speech recognition for voice commands
- Voice feedbacks and status updates for navigation
- Teaching Urdu grammar, idioms, proverbs, phrases, dialogues, and vocabulary
- Encouraging learning process using Gamification techniques
- Rewards or tokens will be given based on user's performance in Urdu Studies

Darkweb analytics

Group Members:
Faraz Ahmed
Kainat Tassadaq
Rana Muhammad Waqar Khan

Advisor: Dr. Qaiser Riaz

The dark web or darknet is a tiny fraction of world wide web that is not indexed by search engines. Most of the dark web is only accessible through special protocols such as Tor, I2P, IRC etc. On the Tor network, individual Tor nodes create the darknet and anonymize communications inside the dark web. Tor anonymizes communications and hides the origin and destination of the Internet Traffic. The objective of this project is to develop tools which can be used to analyze different types of activities going on dark web including identity thefts, data leaks, data breaches, and other threats.

Doodle World - A fun way to socialize through AR doodles

Group Members:
Hamiz Ali
Nauman Ali
Saad Ashraf

Advisor: Dr. Farzana Jabeen

Doodle world is a mobile app that allows its users to draw doodles in Augmented Reality. The app will feature a friend list and doodles once drawn to a particular area will be visible to all other friends of the user. The app will also allow users to send doodles as messages pinned to an area to its friends for surprising communications. The app will also feature a public mode, that can be used for general information about an area, which could vast from

writing less known facts on the historic sites to writing the best spot to dine at a restaurant. The text written will be converted to doodle words and doodles drawn on the screen will be enhanced using AI.

On-Device Fruit Disease Classification

Group Members:
Sadia Munir

Advisor: Dr. Hasan Ali Khattak

Automated system to getting information from the video stream to classify fruit diseases using image processing.

Real-time audio to sign language animation

Group Members:
Maha Shahwar Rana
Maira Tariq
Um E Hani

Advisor: Dr. Khawar Khurshid

In today's fast paced world, staying connected and up to date with others through multimedia has become an utmost necessity.However. news, seminars, tv shows and the radio still communicate through spoken languages.For the deaf community of Pakistan, it is a major challenge to keep up with the hearing world. Hence, this project aims to convert real-audio and video inputs to sign language animations,allowing deaf community to easily understand the spoken world by the use of speech recognition and natural language processing, which will ultimately bridge the communication gap between the deaf community and other members of the society.

AndroSecure: Android Malware Detection using Machine Learning Techniques

Group Members:
Ali Hasnain
Saif Ur Rehman

Advisor: Dr. Mehdi Hussain

The increasing popularity of Android smartphone and its open app market system have caused the proliferation of malicious Android apps. With the advancement of anti-forensic technology most of the malicious apps remain undetected in devices. There is need to exploits existing malicious app detection frameworks and improve its accuracy of malicious detection by employing existing machine learning techniques.

Darkweb Forensics

Group Members:
Muhammad Bilal
Muhammad Ehsan Qadir
Muhammad Zeerak

Advisor: Dr. Qaiser Riaz

The "dark web" is an internet shadow world where the good and the bad co-exist. The anonymity of illicit activity on the dark web raises serious concern to the authorities. The exact annual revenue generated through illicit activities over the dark web is unknown however it estimates in billions of dollars. Trading over dark web mainly relies on anonymity and crypto-currencies. The objective of this project is to explore the dark web from the perspective of forensics by collecting and analyzing data and learning the underlying trends by means of data driven models.

Plug and Play Cryptocurrency Payment Gateway

Group Members:
Muhammad Bilal Afzal
Muhammad Kumail
Syed Muhammad
Hussain Rizvi

Advisor: Dr. Muhammad Khuram Shahzad

The idea of this project is to create a payment system that can be integrated in third party e-commerce stores. The payment gateway will enable crypto payments on the store just like stripe enables debit/credit payments. Users can select their wallets on the available extension and make payments. We will handle all the steps in the underlying blockchain technology as follows:
On one time approval of a wallet at a specific website
On approval of the currency such as BTC for transaction
On approval of sending payments from the user end
On confirmation of payment to the user
Confirmation of payment to the seller
Scope of the project ranges from building all the application and network logic on blockchain architecture, with its performance and security being the primary concern.

Annotation Tool for Biomedical Images

Group Members:
Fatimah Zulfiqar
Muhammad Shaafay Saqib

Advisor: Dr. Hasan Ali Khattak

A common problem in the development of machine learning models is the high time and human cost of preparing accurate datasets to be fed into the models. There is a lot of human intervention as well as rote, repetitive and time-consuming tasks that need to be done. These tasks can range from general labelling to domain-specific tasks. In addition to requiring a tool that does this work, we also need to speed up the process without sacrificing the accuracy of the data. With this in mind, we propose a software solution that acts as an intuitive dashboard with tools that streamline the dataset labelling and preprocessing activity. It aims to place focus on AI techniques as well HCI considerations to develop a platform that enables the labelling and preprocessing of datasets with the goal of it being intuitive and efficient; time taken should be reduced and human intervention minimized, insofar that the accuracy of the dataset is not compromised.

E-Homeopathic Hospital

Group Members:
Muhammad Ali
Muhammad Ammar
Muhammad Waleed

Advisor: Engr. Taufique ur Rahman

Main aim of this project is to collect, store and analyse patients' history and data over internet and recommend suitable homeopathic remedies

FHIR enabled Healthcare Information Management System

Group Members:
Ali Hamza
Masood Tariq
Muhammad Hussain
Murtaza

Advisor: Dr. Hasan Ali Khattak

A Web/App-based platform where people can share their health information in a secure yet standardize way.

Geo-locating Twitter Users Using Tweet Content

Group Members:
Hamdan Rashid
Muhammad Faraz Khan
Muhammad Rafay Nadeem

Advisor: Dr. Muhammad Moazam Fraz

In recent times, it has become a concern of researchers, companies and governments alike to triangulate the location of a particular type of person within a certain specified region. In the modern world, it is often faster to check social media for news about certain events. An example would be load shedding within a city or reports of cases of a virus. We propose a system that:

(i) locates Twitter users based only on the contents of their tweets. This means we need not see their profile information nor directly request the user's location. The system;

(ii) identifies words that are local to a particular region;
(iii) attempts to refine estimates using probability. Our system computes a list of estimates for each user and returns the most likely location.

Social Network for Skilled Persons

Group Members:
Muhammad Haider Ahmad
Muhammad Talha Qadir
Muhammad Yousaf Saddique

Advisor: Dr. Hasan Ali Khattak

A Web/App-based platform where skilled people can sell their skills through training others or helping others in those specialized areas, they are an expert in. These skills could be anything from Cooking to Engineering.

StockSight - Real time stock market analysis for price and risk rate prediction in quantitative finance

Group Members:
Huda Asif
Mirza Shahzaib Baig
Noor Ul Ain

Advisor: Dr. Muhammad Ali Tahir

Stock market prediction is the act of attempting to forecast the future value of a company stock or other financial instrument traded on an exchange. This project will assist us in predicting closing market prices based on historical stock price patterns. We'll train our software using dataset which includes the open, high, low, close and volume of trades for each day to make informed predictions that will assist investors in obtaining abundant returns through accurate estimation of stock price trend.

Tourism Mobile Application in Flutter

Group Members:
Alam Khalid
Mohammad Abubakr

Advisor: Dr. Rabia Irfan

Build an application that is intuitive and provides a sleek and attractive UI/UX to its users who wants to take a tour of Pakistan. The basic goal is to provide an all-in-one platform where any new visitor can get the knowledge of all famous places in any city and also are able to plan their trip. The features of the application include

- Adding all the tourist spots in a city
- Recommendation of restaurants and food spots
- Recommendation and management of hotels for staying
- Itinerary planning of your trip
- Recommendation of local travels like travel agency
- Recommendation of flights
- Recommendation of best routes and stop-points

Roam-Interactive Travel Planner

Group Members:
Ayesha Siddiqui
Muhammad Suleman
Shehriyar Shariq

Advisor: Dr. Rabia Irfan

A web portal that showcases the best travel/adventure destinations available in Pakistan with special focus on the offerings of Gilgit Baltistan. We are building a community of adventurers and a rich database of experiences that can be had in Pakistan and guidelines against the same. All this is to be offered with an easy-to-absorb interactive map.

AuditorsPal - Project Management System for Auditors

Group Members:
Kh Asad Mukhtar
Muhammad Waleed Asif
Rao Obaid Ur Rehman

Advisor: Dr. Hasan Ali Khattak

AuditorsPal - A web based portal to connect project managers with auditors and have an eagles eye view of the overall projects which are being audited. This portal will enable the project managers to be paper free and see the progress of each project and also of the auditors which are assigned to them. Data Analytics will be used to see the progress of auditors and predict the efficiency and suitability of auditors for prospective projects.

Generate insightful text and audio summary from documents

Group Members:
Abeesha Atiq
Alina Ahmed Qureshi
Zainab Noor Ahmad

Advisor: Dr. Seemab Latif

Often we have to read large documents and understand their content but we do not have sufficient time to read all of it. There are different tools available to create summaries from documents but most of them create content that loses the meaning of the original text. We aim to develop a system that could use AI to generate an efficient, concise summary from texts of various kinds and also convert it to audio for the user to listen to. This would not only save a lot of time that would otherwise be wasted in going through large amounts of information but also enable people to listen to it whenever convenient.

Online Auction Service for Properties

Group Members:
Syed Mehdi Raza Bukhari

Advisor: Dr. Syed Taha Ali

An online portal to run auctions for properties

Deep Learning based Forest Health Analysis

Group Members:
Mian Muhammad Ishaq Khattana
Saad Amir
Ziayan Javed

Advisor: Dr. Faisal Shafait

In the recent years, deforestation has emerged as one of the biggest environmental degradation issue. Governments all over the world are striving to develop monitoring mechanisms to save the forests. Several programmes have been initiated by Pakistani government for forest cultivations, such as billion tree Tsunami Program. This project will focus on the deep learning based forest change detection in KPK; since the region of KPK is mostly cloud covered, the current research will use the radar imagery together with the multi-spectral data to overcome the problem of tenacious cloud coverage/occlusion.

Deep Visual-Semantic Alignments for Generating Image Descriptions

Group Members:
Muhammad Umer
Roshan Kaleem
Sheraz Ahmed

Advisor: Dr. Muhammad Imran Malik

This project aims at presenting a model that generates natural language descriptions of images and their regions and will learn about inter-modal correspondences between language and visual data. Such model would have multifarious applications ranging from editing and virtual assistants to social media applications.

In-car Human Detection and Activity Recognition with Deep Learning

Group Members:
Abdul Rahman Jawad
Ahmed Rehman Chauhan
Saad Khan

Advisor: Dr. Muhammad Jameel Nawaz Malik

The goal of this project is to design a deep network to detect bounding boxes of humans (i.e. localization) and recognize activities (such as ‘using_phone’, ‘bending_down’, ‘take_something_from_dashboard’ etc.) in a front car cabin using RGBD images. The project finds its application in advanced driver assistant systems, novel human-vehicle interfaces, and autonomous driving.

Knowledge Incorporated Deep Learning for Visual Recognition

Group Members:
Mohammad Awais
Syed Rumman Ali

Advisor: Dr. Muhammad Imran Malik

Artificial intelligence can be broadly categorized into two domains, knowledge driven and data driven. Although neural networks have shown exceptional performance in visual recognition domain, they have their limitations which traditional knowledge driven

methods don’t. This projects aims to develop methods that incorporate knowledge into neural networks. This will involve building a suitable knowledge base along with suitable neural network architecture that allows for knowledge fusion.

MusiSwap

Group Members:
Abdul Basit
Huzefa

Advisor: Dr. Muhammad Imran Malik

In 2020, artists only received 12% of $17 billion profit generated by the Music Industry. In the USA, only 3 major labels hold two-third of recording rights and 58% of publishing rights which gives them monopoly over the centralised streaming platforms to prioritise a handful of pop-hits. Furthermore, in the past year , the market share of independent artists increased by 5.1%. Musicians are turning to the Blockchain music industry to share their content. For instance, Musician 3LAU sold crypto music album, making $11.6 million in under 24 hours. Therefore, a decentralised platform is needed where artists upload their content and get a fair share of the revenue.

Privacy Preserved AIIOT powered Remote Digi-health care Platform

Group Members:
Abdullah Hassan Chaudhry
Hamza Qaisar
Syed Sajeel Hassan

Advisor: Dr. Rafia Mumtaz

The project will extend existing solutions in the health monitoring platform by taking advantage of AI-IoT & trusted platforms. The resulting internet of medical devices (IoMD) would provide healthcare facilities to a wide populace ranging from teenagers to the elderly. The elderly people can use the platform to monitor aging-related health deterioration & enable emergency medical response. Patients of infectious diseases like Covid-19 under self-quarantine belonging to any age group can monitor health conditions at home. Additional users would be health-conscious athletes & people struggling with obesity. AI & IoT are advanced & well-suited approaches but to make the system more practical and robust; usability, security, & privacy of the healthcare platform must be considered. This is of special relevance to developing countries, where people may be reluctant to seek medical help due to a lack of trust & privacy concerns about the healthcare system. Therefore, our research aims to do a comprehensive analysis of AI-IoT-based healthcare solutions from a public health perspective where decentralized trusted infrastructure will be used for various security services, privacy & trust development.

Product description synthesis using keyword

Group Members:
Amaaz Arshad
Jahan Zaib Zafar
Wajih Iqbal

Advisor: Dr. Seemab Latif

Keyword ranking is one if the most important factor in ranking any product online on any platforms like Google, Amazon etc. High relevancy and high Search-Volume keywords help rank a product on the first page. The idea is to create a tool using machine learning (possibly NLP) that will generate new or optimize existing descriptions against the required parameters. The data to evaluate these product descriptions is widely available in the form of keyword search-volume, and already high-ranking descriptions can also be used to train the model.

Visnotate: Prompt Generation of Labelled Data for Medical Imaging

Group Members:
Affan Zafar
Mohammad Hamza
Musharraf Tameer Islam

Advisor: Dr. Faisal Shafait

One of the key bottlenecks preventing researchers from leveraging the true potential of deep learning in medical imaging applications is the non-availability of large datasets. Although data digitization has enhanced the speed of data acquisition, labelling of medical imaging data requires investment of substantial effort by Doctors. Eye gaze annotations have the potential to speed up the data labelling process. In such a setting, data labels can be generated without the Doctors having to invest any labelling effort. A Doctor would continue to examine data as part of her normal clinical routine while a gaze tracking hardware automatically generates data labels by keeping track of her gaze on the computer screen. This project aims to explore the viability of using eye gaze labelling compared to conventional hand-based labelling for training deep learning models. We also plan to investigate various challenges associated with gaze-based labelling and methods to generate accurate data labels. Our preliminary analysis on Pathology data demonstrates that gaze-based labelling is much quicker in comparison to hand-based labelling andcan save a Pathologist valuable time. Furthermore, it also delivers good performance when employed for training a deep object detector. In this project we will develop a software framework that employs domain knowledge along with, lightweight, machine learning algorithms to generate prompt, reliable and noiserobust labels for medical imaging data.

Adversarial Attacks on Self Driving Cars

Group Members:
Muhammad Hasnain Naeem
Muhammad Umar Javed

Advisor: Dr. Faisal Shafait

Deep neural networks (DNNs) are being successfully used in vision-based autonomous driving systems, but are found vulnerable to adversarial attacks where small-magnitude perturbations into the inputs during test time cause dramatic changes to the outputs. A lot of attacks and defense methods have been introduced by different researchers in literaure that revolve around digital world problems. This work aims to focus on devising such

systems for physical world use cases like autonomous driving systems. This will include identifying and addressing physical world challenges to devise adversarial systems. And use this information to create physical-world resilient adversarial examples for misleading autonomous driving systems.

Autonomous Drone for Document and light items delivery

Group Members:
Areeb Amir
Fahad Fahim Hassan
Talaal Yousaf Bajwa

Advisor: Dr. Shams Qazi

This project aims to program drones to be able to traverse from point A to point B and back without any human intervention. The drones will automatically travel to a certain destination and return to the command centre. The drone is going to use a special recognition system for delivery to avoid any security breaches.

Fusion of Knowledge and Data for Time Series Forecasting

Group Members:
Ahmad Jarrar Khan
Haleema Ramzan
Sharique Pervaiz

Advisor: Dr. Muhammad Imran Malik

Enhancing performance of neural networks through knowledge fusion is important since end-to-end data-driven network optimization techniques are reaching their potential in many domains. This project would focus on development of a novel latent space fusion technique for time series forecasting that combines strengths of both knowledge and data domains. Leveraging information from knowledge domain to complement performance of neural networks will prove useful in very many real world application scenarios.

i-Tour Planner

Group Members:
Abdullah Shahid
Ahmad Dawood
Dhanesh Kumar
Muhammad Bilal

Advisor: Mr. Jaudat Mamoon

“What, you have never been to Naran?”, your friends ask, in utter shock. They then proceed to list down everything you are missing out on, from the picturesque towering mountains of the Kaghan region, to the omnipresent Kunhar River and the aura of serenity it radiates. You fall in love with this picture they have painted and decide, for the next weekend, the purpose of your life will be solely to explore the depths of the Kaghan Valley. Guess what? It never happens. Since you are not a regular traveller, you are absolutely clueless about what hotels to pick, what places to visit, and what restaurants to try. Your friends can only offer you suggestions. Making all arrangements would entirely be your responsibility. You check out some packages offered by tour companies, but you find only one that falls on your chosen dates. And it involves camping. Oh, snap! You absolutely abhor camping. You have only camped once in your entire life,

and that experience was so dreadful you swore never to do it ever again! There is no shortage of tourism apps and websites in Pakistan. But virtually all of them share the same shortcoming—they don't allow you to customize trips. You have to pick from the packages they've already made for you. There are a select few companies and startups that give you some control over your itinerary, but to actually finalize your trip you have to discuss all the details with one of their representatives first. There is no app that automatically books everything for you without requiring any human contact. The goal of this project is to develop a mobile app where one picks a destination, dates, and other preferences, and it generates a plan for him/her that covers all must-see places in that area. Once can then choose what to add or drop from this plan, and when satisfied, all one has to do is tap a button and the app will automatically make all bookings and reservations for you.

Speech Therapy Application for Articulation Disorder

Group Members:
Hamna
Syed Haseeb Asim Zaidi
Syed Muhammad Irtaza Haider

Advisor: Dr. Seemab Latif

The inability to produce correct coherent sounds in speech is known as articulation disorder. Children with such disorders generally show error in small subsets of sounds. Mostly there is no known cause for articulation disorder and is generally attributed to mistakes in learning stage. Approximately 15% children by the age of 3, have unintelligible speech. Children having Articulation disorder have mild to moderate speech defects. The proposed solution is an application that will guide the patient suffering from articulation disorder through effective course work, build in consultation with a speech therapist, that will help them practice sounds at different levels, such as sounds of phonemes, vowels, consonants, and moving up the ladder they will practice speaking words and sentences. We will also integrate speech recognition that will let the users know by giving feedback if they are speaking correctly or not.

Vent Out

Group Members:
Alina Tabish
Ayesha Muqeem
Laiba Basit

Advisor: Dr. Hasan Ali Khattak

In this world, there have been people who don't always express their feelings even if they are emotionally repressed, and this situation has become worse ever since the pandemic began. You may have noticed a divide among your friends which might have caused you to be alone with your thoughts and emotions. In recent years, communication with computers has become increasingly 'chatty' like for instance we've got Siri, Alexa and Google Assistant but can any of them really detect and respond to our emotions the way a human would? Well, we are going to create an AI agent with whom you can converse and connect at a personal level.

Anomaly detection in network using packet header information

Group Members:
Hamad Ul Karim
Muhammad Ahsan
Sana Shafiq

Advisor: Dr. Muhammad Zeeshan

With the rapid rise in the use of Internet technology and the associated, increasing number of network attacks, network anomaly detection has become an important research area. Considering the need, this project is centered on monitoring data flow in a network and detecting any anomalous behavior through packet capturing and filtering. The derived information may help in detection and prevention of network break-ins and secure the network.

MAD Autovehical

Group Members:
Ahmed Abdullah
Danial Azeem
Syed Maaz Shah

Advisor: Ms. Zunera Zahid

Someone is on the way and having any defect in vehicle, then he does not have the facility to repair their vehicle on roadside. People not have the facility to search online workshops. They manually go to the workshops and drag their vehicle, that is very stressful for the people. The existing manual system bases on finding workshops for customers 1s very time consuming and tiring process for the customers. to drag vehicle is very tough for the people. They worried with this system and feel very stressful. If the vehicle is defected people cannot take help on the way, if they are at an unknown place.
The main aim is to provide access for customers to give a platform where they can find nearest workshops or filling stations according to their needs and location. There s need for the current manual system to be computerized. This system will be online that customer facilitate to contact online with workshop owners. Our purpose is that the customer that stuck in way due to in their vehicle defect, they see their current location and see nearest workshop and take benefit with this application.

- Workshops Management Module
- Customer Management Module
- Registration Management Module

Knowledge Area: Social Issues and Professional Practice

Legal Dictionary

Group Members:
Masab Bin Nasir
Muhammad Ammar Haider
Muhammad Mustafa Asim

Advisor: Ms. Zunera Zahid

We aim to provide people with a proper channel that will raise awareness for their legal rights and laws.
It will also provide assistance in some of their legal issues.

Knowledge Area: Software Development Fundamentals

Crypto Trading Market Predictor

Group Members:
Abdullah Khurram
Hamza Iqbal
Taha Jamshaid

Advisor: Dr. Muhammad Imran Malik

The goal is to implement an AI software that would study the candlestick graphs and patterns of the crypto trading market and predict the next calls for the user according to their preferences. It will assess the risk factor and the loss ratio and make the entry point calls and can either completely take over the trading or offer advice to the users when to invest or when to sell or when to make long or short calls.

Parent Eye

Group Members:
Abdullah Khurram
Hamza Iqbal
Taha Jamshaid

Advisor: Dr. Muhammad Imran Malik

Parent Eye" where the parents will be able to keep a check on their child's activities on mobile as the technology is affecting the physical and mental health of children. The frequent use of mobile phones stimulates health issues, reduces sleep quality, diminishes relationships and social skills in the children. The Parent Eye app will allow parents to set some restrictions on devices for their children to keep an eye on them.

SafeLoud

Group Members:
Fatima Shafqat
Maryam Siddiqa Ahmad
Muhammad Aetazaz Siddiqi

Advisor: Dr. Asad Waqar Malik

An SOS app that triggers on a keyword and generates an alert and sends it to your closed contacts, law enforcement agencies, and other nearby users so that someone can come and help.

Knowledge Area: Software Engineering

Machine Learning based Smart System for EEG Classification

Group Members:
Anum Zehra
Talia Khan Khattak

Advisor: Dr. Faisal Shafait

With the emergence of smartphones, heavy computers and machinery can be easily replaced in multiple fields. This project will focus on developing an end-to-end system that deploys machine learning with servers at the backend for the classification of normal and abnormal EEG. The system will enable on-time detection of abnormal EEG and assist the medical practitioners in making informed decisions.

Application for Speech Synthesis from American Sign Language

Group Members:
Ahtasham Ahmed
Farhaan Mukarram
Zaeem Ahmed

Advisor: Dr. Rafia Mumtaz

There are 72 million people all over the globe who are vocally impaired and use sign language as their primary means of communication. As the majority of the general population doesn't understand the Sign language this creates a communication barrier between the vocally impaired community and the general populace. Our project aims at bridging this gap by developing an application that uses computer vision and deep learning to reliably convert a video feed of an individual signing into speech in real time, allowing them to communicate with those who do not understand sign language. There are many different types of sign languages varying from region to region, but our focus, initially, will be on American sign language due the availability of recent, high-quality datasets. We aim to deploy our application in the form of a mobile application that will allow the user to point their camera at themselves while signing and generate real-time audio.

Food House

Group Members:
Azmeena Sheikh
Javeria Syed

Advisor: Dr. Rabia Irfan

The online food industry has now flourished through services like Foodpanda, FoodRunner, Cheetay, etc, with respect to connecting restaurants with their potential customers. However, a sub-domain of the food industry, the ""Home-Kitchen"" is slowly rising to popularity but doesn't have a proper platform to be promoted on. Multiple home businesses have taken to Facebook, Instagram, etc. to promote their cooking and reach towards their clients. This often ends up being tough for them considering they have to manage their business profile on a social media platform and operationally, as well. This FYP is aiming to provide a platform for home cooks in Pakistan to not only promote

their food but to receive a food delivery service that will make their job easier. A mobile app is convenient and can provide a platform like Foodpanda, not to restaurants but to people with their own cooking businesses. This application would be one-stop shop for home-based businesses and customers. This will give them a simple solution to run their business on a larger, well developed platform that is specifically designed to suit their business needs.

Gym Booking Application

Group Members:
Mehboob Alam
Muhammad Abdullah
Zeeshan Azhar

Advisor: Dr. Muhammad Ali Tahir

With the emergence of smartphones, heavy computers and machinery can be easily replaced in multiple fields. This project will focus on developing an end-to-end system that deploys machine learning with servers at the backend for the classification of normal and abnormal EEG. The system will enable on-time detection of abnormal EEG and assist the medical practitioners in making informed decisions.

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