Lahore Campus

Director

Dr Hammad Naveed
Professor
HEC approved PhD Supervisor
PhD (Bioinformatics), Univ of Illinois, USA (2012)
BS (CS), NUCES, Islamabad (2005)

The Lahore Campus, spread over 12.5 acres, is located in Faisal Town which is the heart of greater Lahore. The campus consists of three blocks, which with their striking exterior brickwork and magnificent marble domes are a valuable addition to the rich architectural heritage of Lahore. The facilities consist of fully air-conditioned purpose built class rooms equipped with teaching aids, and a number of computing and engineering laboratories.

The Engineering labs comprise Electronics, Digital Systems, Embedded Controls, Antenna and Microwave, Microprocessors, and Communications Labs. The computing labs consist of database, programming, software engineering, and computer application labs. Latest computers, workstations and services having LINUX and Windows based environments are readily available for the usage of students. The whole campus is fully equipped with high speed Local Area Network and latest wireless hotspots.

Moreover, there is an Auditorium, Seminar Hall, Cafeteria, Girls Common Room and offices of different students' societies. In addition, Justice Gul Muhammad Library is facilitating FAST-NU, Lahore Campus academic and research programs with prosperous information resources. FAST-NU Library is multi-discipline library having scholarly and research-oriented learning resources on Business Management, Computer Sciences, Civil Engineering, Electrical Engineering, Humanities, Linguistics, Mathematics, and Literature. The library has more than 25000 printed books, around 400 centrally subscribed Ebscohost and Pearson e-books, a number of research Journals and Magazines, 13 HEC databases, and 10 National and International newspapers. All the five campus libraries are using Insignia, the integrated library system that provides access to the union catalog of resources accessible across these FAST-NU five campuses.

The campus has facilities for both indoor and outdoor sports which include Football, Volleyball, Badminton, Cricket, Lawn Tennis, Table Tennis and Jogging.

In addition to the University sponsored financial assistance and scholarships, Lahore Campus also receives scholarships for meritorious students from different Boards of Intermediate and Secondary Education and Punjab Information Technology Board.

Programs offered at Lahore Campus:

BBA
BS (Accounting and Finance)
BS (Business Analytics)
BS (Civil Engineering)
BS (Computer Science)
BS (Data Science)
BS (Electrical Engineering)
BS (Financial Technologies)
BS (Software Engineering)
MBA
MS (Applied Linguistics)
MS (Business Analytics)
MS (Civil Engineering)
MS (Computer Science)
MS (Data Science)
MS (Electrical Engineering)
MS (Mathematics)
MS (Software Project Management)
PhD (Civil Engineering)
PhD (Computer Science)
PhD (Electrical Engineering)
PhD (Management Sciences)
PhD (Mathematics)

Big Data Lab

Big Data Lab provides a platform for conducting research in Data Science and Distributed Computing using emerging technologies. Nowadays, the volume of data has exploded. Data is power; the massive data along with the effective technique, can unravel valuable information. However, processing an enormous amount of data is beyond the capacity of a single processor. The new evolving big data frameworks like Apache Spark and Hadoop provide solutions for such challenges. The big data lab is equipped with the latest cluster computing frameworks like Hadoop, Spark, Map Reduce and provides a platform for the students to carry out research using the latest innovative technologies.

Current and Past Projects

- Improving Mortality Prediction using Machine Learning and Data Augmentation
- Fuzzy clustering of mixed mode data in Apache SPARK
- Exploiting review helpfulness rating on scalable recommendation systems using Apache Spark
- SP-CURE, a clustering algorithm developed on Apache Spark to cluster gigantic datasets
- Personalized User Tag recommender
- for Social Media Photos using Spark
- Tag Recommender for Spark, a system for recommending user tags for huge datasets.
- Social Event - based recommendation system in a distributed environment
- Distributed Typicality-based Recommendation System for Apache Spark

Centre for Information Management and Cyber Security (CIMACS)

The Centre for information management and information security headed by Dr. Taimur Bakhshi is involved in undertaking research and development in the broad domains of information management, cyber security and computer networking. The Centre undertakes work in the following avenues: information systems security consultancy, auditing and advice; software defined infrastructure consultancy, installation and management; Internet of Things (IoT) bespoke security provisioning; behavioural profiling, forensic investigations and E-Healthcare; academic programmes and staff training in above avenues.

Current & Past Projects

- User behaviour profiling
- Securing software defined networks
- Social engineering vulnerabilities
- Ransomware detection and mitigation
- Android platform security.
- Securing the Internet of Things (IoT)
- Fault-Tolerance in Software Defined Networks
- Forensic of Things
- IoT for Smart Cities
- Intelligent Healthcare Management

Further information about these projects is available on the centre website: www.cimacs.org

Cloud Computing Lab

Cloud Computing lab has an instance of OpenStack cloud and a Kubernetes cluster to allow students to experiment with these latest infrastructures. Also with the support of Amazon Web Services, credits are awarded to the students who want to do their FYP and Master theses on AWS public cloud platform. Currently, Dr. Zeeshan Ali Khan is managing this Cloud Computing domain.

Projects

- D-SimShell - A Distributed Simulation Framework: This project aims to construct a cloud enabled distributed simulation framework. It is using AWS public cloud platform.
- Kubernetes Based Simulation Framework: This project focuses on utilizing the support built in Kubernetes for automatic configuration and execution of containers to rapidly build and deploy Functional Mock-up Units in a distributed simulation over a K8 cluster.

Machine Intelligence Group (MInG)

MInG was established in FAST- NUCES in 2004. The main objectives of this research group are to conduct research in cutting edge technologies and bridging the gap between academia and industry. The main research focus is on: Optimization techniques and Meta-heuristic algorithms. Applications of data science, multi-agent systems, expert systems, machine learning, robotics, computer vision, and other areas in artificial intelligence domain. MInG has published more than hundred research articles in international

conferences and journals. The research team consists of MS and PhD Thesis students, research associates along with faculty members and industrial partners. The group has been working in cutting edge technologies to solve real world problems. Co-founders consist of Dr. Rauf Baig, Dr. Kashif Zafar, and Dr. Usman Shahid. Active research members: Dr. Asma Naseer, Dr. Asma Ahmad, Ms. Sobia Tariq Javed, Ms. Noshaba Nasir, and Mr. Waqas Manzoor.

Past Projects

- Dynamic route planning for autonomous vehicles
- Cancer detection and classification
- Stroke detection using machine learning
- Dimensionality reduction using machine learning
- Interactive games using evolutionary techniques
- Smart gym
- Next generation phenotyping

Areas of Expertise

- Swarm intelligence and computational intelligence
- Data science and artificial intelligence
- Development of nature-inspired meta-heuristic algorithms
- Optimization and automation

Partners & Collaborations

- Allama Iqbal Medical College, Lahore
- ITU, Lahore
- Center for Molecular Biology, PU, Lahore
- Boğaziçi University, Turkey
- Bezmialem Vakif University, Turkey

- Purdue University, USA
- Harvard, USA
- University of Sydney, Australia
- Byonyks Pvt Ltd
- Keep Truckin Inc. USA
- SOCO Engineers GmbH

Funded Projects

Cancer detection and classification
Collaboration:
- Boğaziçi University, Turkey
- Bezmialem Vakif University, Turkey
- Harvard, USA

Funding: Rs. 3.4 million per year

Next generation phenotyping
Collaboration:
- Center for Molecular Biology, PU, Lahore
- Allama Iqbal Medical College, Lahore

Funding: Rs. 0.9 million

Research Group Home Page:
www.mingsystems.com

Software Engineering Research Centre (SERC)

Software Engineering Research Centre is dedicated to conducting research and development in various branches of software engineering. This centre has been established to address problems faced by the practitioners and to help establish efficient and effective software engineering practices in the local software industry. SERC aims to achieve these objectives by studying the local industry and by collaborating with the practitioners to understand and improve productivity, cost, and quality parameters.

Areas of Expertise

- Software Project Management
- Empirical Software Engineering
- Software Processes
- Software Quality
- Requirements Engineering

Recent Final Year Projects

- Automated University Ranking System
- Dress Code Violation Detection System
- UML Comparator
- Quick N Easy Transport
- Hexa Flows – A solution to help software production process

Recent MS Theses

- A Model to Analyze the Effects of MBTI Personality Type on Software Project Manager's Professional Performance
- Rating Prediction Model for Mobile Puzzle Games
- An Improved Process for Mobile Game Development
- A Parametric Model for Effort Estimation of Mobile Apps
- Impact of Pair Documentation on Requirements Quality and Productivity
- Effort Estimation of ETL Projects Using Forward Stepwise Regression
- Impact of Software Team Structure on Software

Productivity and Quality in Software Houses in Pakistan
- A Comparative Study of Practices for SPI in Small and Medium Software Organizations
- Determining the Level of Software Requirements' Detail using Machine Learning
- Using developer factors to recommend bug severity in open-source software projects
- Measuring Software Development Waste
- Software Defect Prediction Using Deep Learning
- A Study of Communication Issues and Team productivity in Global Software Development
- Software Effort Estimation Methods and their Practice in Software Industry

Recent PhD Dissertations

- Improving the Accuracy of Early Software Size Estimation Using Analysis-to-Design Adjustment Factor (ADAF) and Non-Functional Requirements (NFRs) – in progress
- Quantification of Team Homogeneity and Analysis of its Impact on Software Quality and Team Productivity
- Prioritizing Software Requirements by Combining Usage Monitoring and User Feedback Data

Recent Publications

- Marriam Daud and Ali Afzal Malik, "Improving the Accuracy of Early Software Size Estimation using Analysis-to-Design Adjustment Factors (ADAFs)", IEEE Access, Volume 9, Issue 1, June 2021
- Munib Ahmad, Zeeshan Ali Rana, "Comparative Analysis of Light Weight Practices for SPI in Small and Medium Software Organizations", In Proceedings of the 15th IEEE International Conference on Open Source Systems and Technologies (ICOSST 2021), 15-16 December 2021, Lahore Pakistan
- Malik Jahan Khan, Irfan Awan, Zeeshan Ali Rana, "Deep Learning in Mobile Information Systems", Mobile Information Systems, Special Issue on Deep Learning in MIS, Volume 2021. January 2021. (Editorial)
- Nosheen Qamar and Ali Afzal Malik, "Determining the Relative Importance of Personality Traits in Influencing Software Quality and Team Productivity", Computing and Informatics, Volume 39, Issue 5, December 2020
- Arooj Arif, Zeeshan Ali Rana, "Refactoring of code to Remove Technical Debt and Reduce Maintenance Effort", In Proceedings of the 14th IEEE International Conference on Open Source Systems and Technologies (ICOSST 2020), 16-17 December 2020, Lahore Pakistan
- Humaira Aslam Chughtai, Zeeshan Ali Rana, "People Profile Metrics for Improved Classification of Defect Prone Files in Open Source Projects", In Proceedings of the 3rd International Conference on Advancements in Computational Sciences (ICACS 2020), 17 - 19 February 2020, Lahore, Pakistan. (Best Paper Award)
- Nosheen Qamar and Ali Afzal Malik, "Birds of a Feather Gel Together: Impact of Team Homogeneity on Software Quality and Team Productivity", IEEE Access, Volume 7, Issue 1, July 2019
- Shahzad Ali, Zeeshan Ali Rana, "Evaluating Performance of Software Defect Models Using Area Under Precision-Recall Curve (AUC-PR)", In Proceedings of the 2nd International Conference on Advancements in Computational Sciences (ICACS 2019), 18 - 20 February 2019, Lahore, Pakistan.
- Maham Noor, Zeeshan Ali Rana, Towards Better Knowledge Management in Global Software Engineering, In Proceedings of the 5th International Conference on Computer & Information Sciences (ICCOINS 2018), 14 - 15 August 2018, Kuala Lumpur, Malaysia.

Liberty Lab

Liberty lab aims to put together and apply the knowledge gained from diverse areas of expertise including robotics, embedded systems and artificial intelligence, to engineer out-of-the-box solutions that practically solve the problems faced by the local society. Research is done to make robots that can achieve autonomous behaviour. Problems of localization, mapping, navigation and image processing in robots are explored. Control algorithms on ground and air robots are developed to improve the navigation capabilities of such robots. The goal is to make autonomous mobile and industrial robots, and induce learning and long-term autonomy in them. This lab achieves its aims via projects at both graduate and undergraduate levels.

Completed FYPs

- Smart Student Monitoring System
- Spy Copter
- Personal Assistant for Elderly (PIE)
- Visual Guidance for Navigating UAV
- Multi-Hop DTN Based Phone to Phone Communication
- Obstacle detection and object recognition robot
- Bionic hand
- Object fetching Robot
- Home automation system
- Indoor Navigation Systems

Research Areas and Ongoing Projects

- Mobility Modelling for Fully Autonomous Micro UAVs in Urban Traffic Surveillance Scenario
- Security Audit Tool for IOT devices

RFNT: Research on Future Network Technologies

RFNT (Research on Future Network Technologies) is a research Lab that focuses on research in wireless communication and networking arena. The purpose of the RFNT Lab is to investigate, formalize and develop robust solutions for research problems occur in present wireless networks i.e., VANETs, MANETs, WSNs, IoTs etc. Dr. Rana Asif Rehman supervise the RFNT research Lab at FAST School of Computing, National University of Computer and Emerging Sciences, Lahore Campus. The members of the Lab are currently working on Internet of Things, Block chain, Future Internet architecture such as ICN, CCN, NDN etc. RFNT Lab published several journal and conference papers in top notch publication venues. Furthermore, RFNT also has international research collaborations on various projects.

RFNT Lab. Members:
- Dr. Rana Asif Rehman (Head)
- Mr. Umer Farooq (PhD student)
- Mr. Muhammad Fahad (MS student)
- Ms. Kinza Sail (MS student)

Research Areas includes:
- Future Internet Architectures (ICN, CCN, NDN)
- Software Defined Networking in Named Data Networking based Wireless Networks
- Wireless Routing Protocols in Cognitive Radio Ad Hoc Networks (CRAHNs)
- Home Automation Technologies, IoTs and Smart Cities
- Cross Layer Designs for Wireless Networks (MANETs, VANETs, WSNs, WMNs)
- Medium Access Control (MAC) Protocols in Wireless Networks such as IEEE 802.11x, 802.15x, 802.16x, 802.20, LTE.

Web Link:
https://sites.google.com/view/rfnt

Optimization and Data Science (OptiMi'nDS) research group, headed by Dr. Irfan Younas, carries out research and development in Optimization and Data Science related areas. Major research themes in our research group include Evolutionary Computation, Swarm Intelligence, Evolutionary Deep Learning, Multi/Many-objective Optimization, Artificial Intelligence, Data Science, Machine Learning, Natural Language Processing and Information Retrieval.

Solving large scale optimization problems have always been very challenging and demanding. Our research group carries out multi-disciplinary research into mathematical models and intelligent algorithms for a variety of real world optimization, specifically NP-hard problems. The NP-hard problems are very complex with intractably large and highly complex search spaces.

Our research group also works in area of Natural Language Processing (NLP) and Machine Learning. NLP addresses fundamental questions at the intersection of human languages and computer science. Understanding complex language utterances is also a crucial part of artificial intelligence. Applications of NLP are everywhere because people communicate almost everything in language: web search, advertisement, emails, customer service, language translation, radiology reports, etc.

Research Group Members:
- Dr. Irfan Younas (Faculty member)
- Dr. Maryam Bashir (Faculty member)
- Dr. Aamir Wali (Faculty member)
- Dr. Asif Gilani (Faculty member)
- Mr. Muhammad Amir Iqbal (Faculty member & PhD student)
- Mr. Saad Farooq (Faculty Member and PhD student)
- Miss Aouniza Ahmad (PhD student)
- Miss Mammona Tasadduq (PhD student)
- Miss Shafaq Nisar (PhD student)
- Mr. Shakeel Zafar (PhD student)
- Ms. Umber Nisar (PhD student)
- Mr. Asif Ameer (PhD student)

Past and Ongoing Projects:
- Sectarian and Ethnic Hatred Detection in Social Media for Pakistan
- LSTM Hyper-parameter Optimization for sentiment Analysis
- Feature Selection using Metaheuristics
- Designing novel Socio-inspired Optimization Algorithms for Global Optimization
- Developing Transfer Learning Based Classifier System for Image Classification
- Evolving Deep Neural Networks using Evolutionary Computation
- Large scale optimization of Assignment, Planning and Scheduling Problems
- Distributed Large Scale Many Objective Optimization
- Multi and Many Objective Optimization Algorithms
- Many Objective Optimization for IoT
- Learning Regular Expressions using Learning Classifier Systems
- Solving Large-scale Optimization Problems using Evolutionary Computation and Machine Learning
- Solving Classification and Learning Problems using Evolutionary Machine Learning
- Predicting Future News Events and Crimes using Data Science

International Collaborations:
- Carleton University, Ottawa, Ontario, Canada
- Higher Colleges of Technology, Fujairah, UAE

Center for Computational Biology & Health Informatics (C2BHI)

Center for Computational Biology & Health Informatics (C2BHI) brings together Bioinformatians, computational biologists and computer scientists who focus on biomedical discoveries through computational modelling. The Center currently hosts the Computational Biology Research Lab (CBRL) at the Islamabad and Lahore Campuses. CBRL uses computer science algorithms to solve biology related problems. CBRL works in the areas of algorithm development, genomics, characterization of protein-protein interactions, characterization of protein-drug interactions, pharmacovigilance, protein function prediction and disease identification using various imaging techniques. The lab comprises of ~25 full time researchers, engineers, MS & PhD students and support staff. The lab works closely with hospitals in Pakistan and is actively involved in a number of projects of national significance. The lab has raised over 50 Million PKR in research grants.

Areas of Expertise

- Applications of Data Science and Artificial Intelligence in biology and medicine
- Algorithm development
- Genomics, Proteomics & Bioinformatics
- Protein-protein and protein-drug interactions
- Applications of Computer Vision in disease identification

Partners & Collaborations

- Molecular and Systems Computational Bioengineering Lab, University of Illinois at Chicago
- Structural and Functional Bioinformatics Group, KAUST
- Biophysics Group, University of Stuttgart
- Tissue Image Analytics Lab, University of Warwick
- Department of Biology, Lahore University Management Sciences
- Rehman Medical Institute, Peshawar
- InfoMatrix Pvt Ltd
- Pakistan Institute of Medical Sciences
- Shaukat Khanum Memorial Cancer Hospital & Research Centre
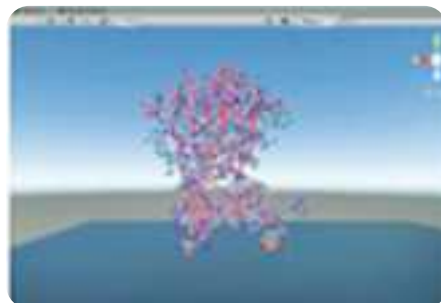
Projects
VR Based Drug Design

The project targets the development of a Virtual Reality (VR) based platform where users can see the interactions between a drug and a protein in 3D. This helps in designing new drugs faster than traditional automated docking based systems.

Precision Medicine Lab

The Precision Medicine Lab is a first of its kind cross-disciplinary effort in Pakistan that allows data analysts and deep learning experts to work very closely with biologists, geneticists and clinicians. The Lab aims to produce novel software tools that will help in side-effects prediction of drugs, drug repurposing that may lead to drug discovery for challenging and traditionally neglected diseases (like Dengue, Tuberculosis, Hepatitis, etc.) and literature mining to help oncologists.
Funding Agency: Higher Education Commission of Pakistan, Ministry of Planning and Reforms
Funding Amount: PKR 32 Million

Breast Cancer Diagnosis from Histopathology Images using Deep Learning

Early detection of cancer is important to improve the patient survival rate. This project targets developing state-of-the-art deep learning models to classify breast cancer in four classes, Normal, Benign, InSitu Carcinoma and Invasive Carcinoma.
Funding Agency: Higher Education Commission of Pakistan, Ministry of Planning and Reforms
Funding Amount: PKR 13.68 Million
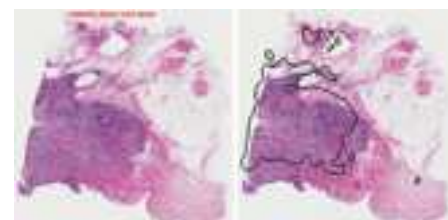
Predicting Enzyme Function from Sequence using Deep Learning

The project aims to develop novel deep learning techniques to predict the function of enzymes up to 4th level of the Enzyme Classification number. This is a traditional Computer Science Hierarchical Classification Problem. This can ensure discovery of cheaper enzymes being used in the poultry, textile and food industry.

Funding Agency: Higher Education Commission of Pakistan
Funding Amount: PKR 8.3 Million

Global Protein-Protein Interaction Network Alignment

This project involves designing algorithms to find conserved regions between protein-protein interaction networks of a pair of species. Such algorithms help in progressing the understanding of biological systems and in drug design.

Lab Home Page: cbrlab.org

Optical Wireless Research Centre (OWRC)

The Optical Wireless Research Centre (OWRC) has been established to stream-line, the on-going research in the domain for the last decade at the Department of Electrical Engineering. The Department of Electrical Engineering has graduated around a dozen MS thesis students and a doctoral candidate in the domain and has actively participated in theoretical investigations in Visible Light Communications (VLC), LiFi, Optical MIMO systems and Shannon capacity evaluations for Optical Wireless Relay channels. The Centre aims at further theoretical studies in the domain of Communications Engineering in general and optical wireless communications in particular and is also active in pursuing research grants for the same.

Current and Past Projects

- Signal beam intensity estimation for optical detector array
- Outage probability for MISO optical wireless links
- Self-synchronized RS encoded PPM for terrestrial FSO links

Energy Research Lab

The Energy Research Lab has been established within the Electrical Engineering Department. The theme of the research at Energy Lab is to discover the right approach and technologies for a "Smart Power Grid" that integrates distributed renewable generation, energy storage systems, and electric vehicles and solves power quality issues specific to the developing nations. PhD faculty members are actively involved in supervising the on-going MS and PhD research theses being investigated at the Energy Research Centre.

Current and Past Projects

- Solar Energy Integration and Energy Efficiency Dynamics of Urban Water Consumption System
- Single Phase Variable Frequency Drive
- System Performance Dynamics of Hybrid PV System
- A Load Management Strategy for Overloaded Generator Operation
- Feasibility of a Variable Frequency based Solar Mini Grid in Rural Areas
- Statistical Characterization of End User Loads
- Large Scale Adoption of Solar Nano Grids & its Implications on Power Distribution System
- Understanding Energy Consumption Mechanisms of Standalone Split Type Air Conditioning Systems
- Power Flow Considerations of a Distributed Nano Grid with AC Coupled PV & Battery
- An Energy Management System for a Load Managed Rural Solar Mini Grid
- A Load Shaping Smart Solar Mini Grid with Storage
- Optimization Consideration for a Solar Power Plant Implementation
- Dynamic Load Management for Islanded Overloaded Generator Operation
- Experimental performance analysis of floating and ground-mounted photovoltaics

Smart Networking Research Group (SNRG)

The Smart Networking Research Group (SNRG) is led by Dr. Saima Zafar. The SNRG offers opportunities to project enthusiasts and researchers to investigate and employ revolutionary technologies such as the Internet of Things, Internet of Everything, Cloud Computing, Wireless Networking, Mobile Computing, Artificial Intelligence, and Data Science to solve real world problems and to propose innovative research solutions. A number of projects have been successfully completed in the above-mentioned areas and a number of projects at the intersection of these fields are in progress. The research team comprising of final year undergrad students, and graduate, and PhD students has undertaken projects in the domains of vehicular networks (VANETs), blockchain in supply chain management and Internet of Medical Things (IoMT), energy management and demand side management in Smart Grid, IoT based pandemic management, algorithms, protocols, hierarchical clustering and layout optimization in Wireless Sensor Networks (WSNs), and IPv6-based Low-power Personal Area Networks (6LoWPANs). In the future, we aim to target research at the cross-roads of networking, and computational intelligence.

Current and Past Projects

- Demand Side Management in Smart Grid using Deep Learning algorithms
- Artificial intelligence powered digital assistant for home
- Smart car parking management system
- Hand gesture control system
- Non-invasive glucose monitoring
- IoT and cloud computing based Smart Farming System
- Vehicle tracking and monitoring system

- SHA algorithm based authentication scheme for VANETs
- Smart Luggage System
- IoT based Covid-19 management system
- eDRX and PSM for Narrow-Band (NB-IoT)
- Layout optimization of WSN using meta-heuristic algorithms
- Blockchain application in IoMT
- Propagation channel characterization for millimetre wave 5G frequency band
- Energy management system for Smart Grid

Engineering Cybernetics Research Group (ECRG)

The Engineering Cybernetics Research Group (ECRG) offers a platform for conducting research in the field of Cybernetics focussed on its applications in Control Engineering and Robotics. The group, headed by Dr. Omer Saleem, is involved in undertaking research and senior-year project work in developing robust-optimal and self-adaptive control procedures for under-actuated mechatronic systems, robots, and energy-conversion systems. The designed control systems are rigorously tested and validated by using experimental platforms; such as, mobile robots, self-balancing robots, ball-on-a-beam system, ball-a-plate balancing system, rotary-inverted pendulum, DC motor setup, DC-DC converters, aero-pendulums, CNC manufacturing machines, and robotic manipulators etc. The group also works in the domain of intelligent control system design and its application in robotics, bio-mechatronics, and wireless sensor/actuator networks. The research team consists of FYP, MS and PhD Thesis students, along with faculty members.

Current and Past Projects

- Fully Automated Central Lathe Machine
- DoF Ball-on-Plate Balancing Control System
- Feedback Control of ZVS Induction Heating Machine
- Stabilization & Steering Control of a Self-balancing Bicycle
- Autonomous Lawn Mower (Ignite Funded)
- Anti-Dozing Device for Drivers (Cliented by: NHMP, Pakistan)
- Retrofitting Level-3 Autonomy to Older Cars
- Smart Self-Adaptive Portable Ventilator Machine
- IoT-based Hospital Bed Occupancy Management System
- SLAM-based Autonomous Robot for Industrial Workspaces
- COVID-19 SOPs Monitoring & Management System using AI-managed Embedded Computer Vision
- Nonlinear-Type Hierarchical Self-Adaptive State-Feedback Control Strategies for Under-actuated Mechatronic Systems

Center for Research on Management and Governance (CRMG)

Effective business management requires keeping up with complex changes in the economic, legal, political, technological, demographic and cultural sphere while coping up with the increasing scarcity of financial resource. To deal with the changes in business environment effectively, managers require constant input from consultants, academic and professional researchers. The Center for Research on Management and Governance (CRMG) at FAST School of Management, Lahore was established with a view to bridge academic and professional knowledge on management and governance and its adaptation to suit the indigenous business environment.

Jointly supervised by Dr. Hamid Hassan, Dr. Mian Muhammad Atif, Dr. Zia Khan, Dr. Asif Saeed and Dr. Akbar Azam, the center is a hub for motivating research on the art and practice of management and governance in Pakistan. The findings from the theoretical and empirical research conducted at CRMG provide guidelines to deal with the management and governance challenges of public and private sector organizations in Pakistan.

In general, the center's research efforts are characterized by an ambition to critically and constructively study, describe and analyse the emergence and development of management & governance practices in the country. Researchers at the center aim to uphold a recognized presence in the on-going academic discourses in crucial parts of management & governance areas. The center also undertakes consultancy projects with a number of governmental and private organizations and collaborates with other national and international universities in advancing the research.

Activities

Seminars and discussions with business leaders and national & international academics are designed to facilitate sharing of ideas and providing updates on trends are a constant feature of the center. Thus output is not just defined by producing papers, but serves as the core for producing local content for inclusion in curriculum at both graduate and undergraduate levels.

Areas of Expertise

Our empirical studies focus on Marketing, Motivation, Leadership, Finance, Green Finance, Corporate Social Responsibility and Real Time Business plans and a range of other topics related to Management Sciences.

Case Research Center

The Case Research Center (CRC) has been instituted at the FAST School of Management (FSM), Lahore to encourage both faculty and students to engage in solid case research. There is a dearth of business cases related to Pakistan and that is the reason our business schools have to rely on foreign cases for teaching.

The facilities that would be provided at the center will be instrumental in bridging the gap between foreign and local cases. The center is a forum for interaction between students, faculty and the industry, and will provide turnkey consultancy solutions to the local industry.

The mission of CRC is to motivate researchers to publish business cases and to subsequently increase both the quality and the quantity of case research and teaching in Pakistan. Patriotism, being the first core value of the business school, the center especially encourages case research related to Pakistan. The center aims at increasing awareness about the local business culture, and decision making by Pakistani business leaders, for dealing with the complexities of an extremely dynamic environment, this is achieved through collaborating with local industries and arranging industrial visits.

The activities of the center include emphasizing the importance of case teaching in the curriculum for business studies and equipping faculty members with the abilities to effectively instruct students using the case method. Mr. Hassan Mahmood (Asst. Professor) is coordinating the academic activities related to the center.

Areas of expertise

- Corporate strategy
- Regulation
- Marketing

Research Seminars and Industrial Visits

- The Case Method: Converting Research into Publications
- A Theoretical and a Practical Solution to a Mathematical Conundrum: Implications for Academia
- The Case Method in Theory and Practice
- Industrial Tour to PSX Regional Office Lahore.
- Industrial Tour to HRSG
- Industrial Tour to Tetra Pak, Pakistan
- Industrial Tour to Lahore Chamber of Commerce
- Industrial Production Plant of Atlas Honda (Motorbike)
- Industrial Tour of Metro Cash and Carry
- Industrial Tour to Cougar Knitwear Gajumata, Lahore.
- Industrial Tour to Menu Foods GajjuMatta, Lahore.

Centre for English Language Communication (CELC)

The Centre provides support to students in improving their English language communication skills. To realize the individual needs of a student, the Centre facilitates through individual tutorials, by providing self-study material, by conducting workshops and intensive English classes, to enable a student to improve grasp, make progress, and even excel in the language. The main thrust is on capacity-building for learning and expressing. The aim is that students who are otherwise capable of doing well but for the weak communication skills should not suffer because of their previous insufficient training.

The Centre focuses on improving proficiency in communicative English, written as well as spoken. For this purpose, the Centre provides students with the Computer Assisted Language Learning framework fully equipped with e-learning resources and digital multimedia. The communicative approach followed in the Centre is learner-Centred based which allows students to develop language skills at their own pace. Interactive digital tools, self-assessment and hand-on practice are the hallmarks of the Centre. The Centre serves as forum for organizing research activities/conferences on issues related to language teaching and learning.

E-Learning Project

Tool for Improvement of Cohesiveness in Emotive Writing, funded by ICT R &D.

Training Activities

For professional development, the centre caters to the in-service teachers training on regular basis. It also offers English language communication skills training to the government/industry professionals.

Generative AI, Imaging & IoT (GAIT)

The aim of Generative AI, Imaging & IoT (GAIT) research group is to explore and solve data-related challenges and problems that fall under the domain of Imaging, IoT and machine learning. Due to increasing interest among graduate and post-graduate students to pursue research in Imaging, machine learning and IoT, one of the focus of this group is to maintain a sound research base. Our group is currently working on problems related to generative AI, medical imaging, IoT, NLP, and time series analysis covering activity recognition, imaging, sign language recognition, EEG and ECG classification.

The GAIT research group is led by Dr. Asma Naseer. The core team also includes Dr. Asma Ahmad and Dr. Aamir Wali.

Recent Projects

1. Occupancy detection via thermal sensors for energy consumption reduction
2. Smart activity tracking
3. Technical content summarization using deep learning techniques
4. Brain-computer interface to control object movement using EEG headset
5. Medical images augmentation using a new GAN model for improved diagnosis of diseases
6. Computer-Aided brain tumor diagnosis: Performance evaluation of deep learner CNN using augmented brain MRI
7. Computer-aided COVID-19 diagnosis and a comparison of deep learners using augmented CXRs.
8. Generative adversarial networks for speech synthesis.
9. Revolutionizing Scoliosis assessment: U-Net empowered automated Cobb's angle estimation
10. Entropy and memory aware active transfer learning in smart sensing systems
11. Unobtrusive smartphone authentication
12. Skin Lesion Segmentation with Generative AI
13. Skin Cancer Classification
14. Weed Detection and Classification
15. 3D Avatar Construction using Generative AI and Deep Learning

Research Laboratory: Environment and Health Data Science (EH – DS) Lab

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The Environment and Health Data Science Laboratory's mission is to apply data science and sophisticated analytical approaches to key challenges at the confluence of the environment and human health. Our major purpose is to provide practical insights and evidence-based solutions that help to identify, mitigate, and avoid ecological hazards and their effects on human well-being. We strive to contribute to the development of evidence-based policies, interventions, and strategies that promote sustainable environments and safeguard human health for present and future generations. Through simulations and modeling, artificial intelligence, statistical analyses, bioinformatics, sensors, specialized software, and engineering designs, the laboratory aims to study, report, analyze, develop, predict, and promote health and safety resulting from natural or built environmental impacts. The team included research assistants, MS students, and faculty members. They have published around 20+ international articles and conferences. The focus of data science and models in health is to revolutionize healthcare by harnessing the power of artificial intelligence to improve patient outcomes, enhance diagnostics, optimize treatments, and advance medical research. AI models are developed and deployed with the goal of transforming healthcare delivery and addressing the complex challenges faced by the healthcare industry. Data science plays a crucial role in addressing environmental hazards and promoting sustainability. By harnessing the power of data analysis, modeling, and predictive analytics, data science can contribute to understanding, mitigating, and managing environmental risks.

AI Health specific goals:

- Precision Medicine
- Disease Diagnosis, Treatment, and Prognosis
- Clinical Decision Support
- Public Health Management
- Medical Images Processing

Data Science for Environment & Sustainability:

- Risk Assessment and Prediction
- Environmental Monitoring
- Sustainable Resource Management
- Climate Change Modeling
- Water Management
- Natural Hazards
- Agriculture