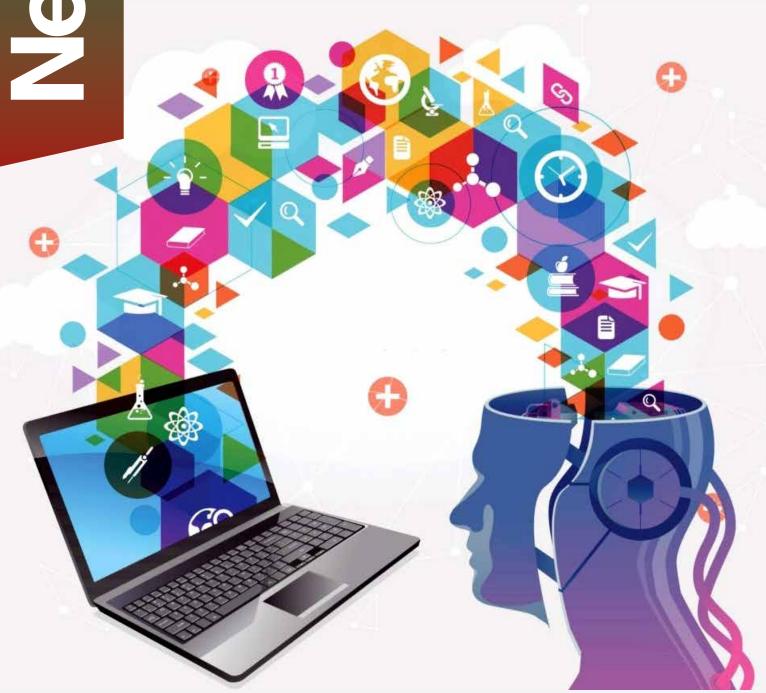


Sino-Pak Center for Artificial Intelligence











#### Welcome to the latest edition of the SPCAI quarterly newsletter!

In this edition, you will know about different events and activities organized by SPCAI. We have had a great response to our first edition and want to thank all of you who have taken time to write or talk to us about it. We really appreciate your opinion about SPCAI, so please get in touch if you have comments aspect of our labs service. info@spcai.paf-iast.edu.pk

#### Kickoff Meeting between Sybrid and SPCAI

A kickoff meeting happened between the Sybrid team led by Mr. Athar Imran Nawaz, Chief Executive Officer, Sybrid (Pvt) Limited, and Prof. Dr. Nasser Ali Khan, Project Director, PAF-IAST. Mr. Athar shared his vision regarding potential areas of collaboration in smart agriculture regarding crop monitoring, AI-based call center solutions, and text recognition. Dr. Sohail suggested that SPCAI shall work on the areas of mutual interest where innovation can lead to products at a commercial scale. He said that possible areas can be activity detection from audio and video data, condition monitoring of roads, smart agriculture, energy forecasting, biomedical applications, and feature detection from sound data. Sybrid is also interested to establish its presence at Associated Technology Park as the joint projects and initiatives materialize and establishing a physical presence is beneficial for the collaboration.



# Sybrid entered into a strategic partnership with PAF-IAST

to collaborate in areas of mutual interests













#### **SPCAI** Website and Social Media Launch

SPCAI official website has been launched in January 2021. Similarly, the social media accounts have been created and can be accessed at:



https://www.facebook.com/OfficialSPCAI



https://twitter.com/Official\_SPCAI



https://www.linkedin.com/company/sino-pak-center-for-ai



SPCAI, PAF-IAST





Welcome to Sino-Pak Center for Artificial Intelligence

#### **Artificial Intelligence Research Labs**



After consistent hard work of 3 months, SPCAI finally launched its official website. We endeavor to provide our partners, students, and general users with the most accurate, up-to-date information and share our knowledge and expertise in the field of artificial intelligence. Our goal with this website is to provide our visitors an easier way to learn about SPCAI and to browse information as per their

needs. The website gives access to SPCAI, its team, research laboratories, news and events, research articles, blogs, and much more. We will be constantly updating our content with helpful information, cutting-edge research, leadership, SPCAI's announcements, and achievements in the Blog and News. For more details visit us at www.spcai.paf-iast.edu.pk









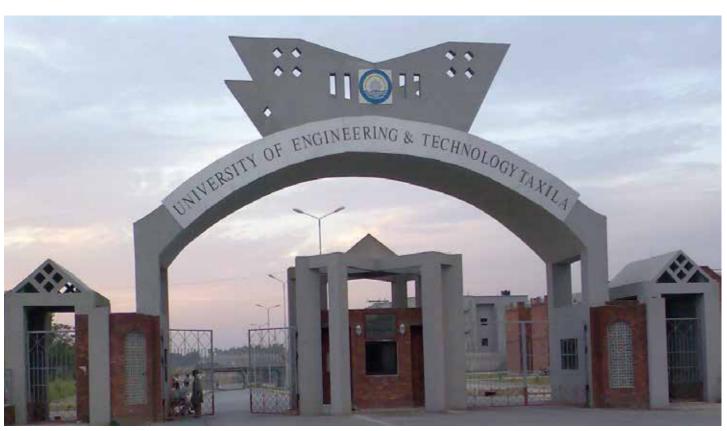
## Visit of SPCAI to **Swarm Robotics** Lab, University of **Engineering and Technology (UET) Taxila**



Visit to Swarm Robotics Lab UET Taxila was held on January 2021 with the following objectives:

- To seek collaboration with Swarm Robotics Lab.
- To understand the equipment, machines, and
- software being used in the Swarm Robotic Lab.
- To discuss the ongoing research projects/
- proposals and other activities regardi Robotics/ Computer Vision and their applications in different sectors in Pakistan.

The area of Intelligent Field Robotics and Computer Vision is one of the focal areas of SPCAI and it has significant potential in contributing to different sectors in Pakistan. To realize this vision, SPCAI has been working to establish collaboration with the National Centre of Robotics and Automation (NCRA). The NCRA is a consortium of 11 labs over 13 universities of Pakistan with its center headquarter at NUST College of E&ME. Swarm Robotics, University of Engineering and Technology (UET), Taxila is one of these labs which is composed of three sub-labs, i.e., Swarm Intelligence Lab, Computer Vision, and AI Lab and Decentralized Communications Lab. Prof. Muhammad Haroon Yousaf is the Principal Investigator of this lab.











### **SPCAI** visited ICCBS, Karachi

SPCAI faculty visited the International Center for Chemical and Biological Sciences (ICCBS). The ICCBS is a federally funded national research institute and national laboratory site managed by the University of Karachi for the Ministry of Energy (MoE) of the Government of Pakistan. SPCAI team met with Dr. Reaz Uddin and his team. Dr. Reaz is an associate professor at the Center for Artificial Intelligence (AI) in Health Sciences, ICCBS. These meetings involved two-day sessions which led to the identification of topics of mutual interest, which are:

Al-enabled ECG database that can help in early diagnosis of rare heart diseases,

- Abnormalities detection from Chest X-Rays,
- Patient support sign language with the objective to assist people with disability in communicating in the local language,
- Diagnosis of pneumonia patients,
- Physio-Support (A recommender system to support physiotherapy),
- Artificial intelligence applications related to genome-based studies.

It was agreed that both sides shall jointly write research proposals in the above-mentioned areas and other areas of interest. SPCAI team also met Prof. Dr. M. Igbal Choudhary, distinguished national Professor, and Director ICCBS.









### **SPCAI** visited the National **Center for Artificial** Intelligence

SPCAI team visited the Smart City Neuro-Computation laboratories the National Center for Artificial Intelligence (NCAI) NED University of Engineering Technology, Karachi. SPCAI team met the Principal Investigator of both labs, Prof. Dr. Muhammad Khurram and Prof. Dr. Saad Ahmed Qazi, respectively. SPCAI team keenly observed the products developed by both labs and met researchers. Both sides exchanged discussions about the topics of mutual interest and agreed to strengthen the research collaborations including work on the joint projects/products. SPCAI team also met Prof. Dr. Sarosh Hashmat Lodi, Vice-Chancellor, NED University of Engineering and Technology. SPCAI invited Dr. Lodi to visit PAF-IAST and SPCAI, to which he warmly accepted.















## Lenovo.

## **High-Performance Computing** (HPC) solution

SPCAI received the High-Performance Computing (HPC) in January 2021 along with the 8 high-performance workstations with a total worth of 190 million PKR manufactured by Lenovo and supplied by Commtel. The HPC cluster includes 34 compute nodes, 10 GPU accelerated compute nodes powered by award-winning NVIDIA Tesla V100S, three large memory nodes for memory-intensive applications, 400 Terabyte's of RAID storage with the estimated performance of 91 Tera FLOPs and 8 High-Performance GPU accelerated Lenovo workstations. The deployment of GPU accelerated HPC cluster will not only provide computational strength to the SPCAI, PAF-IAST but to other research labs in Pakistan as well. The HPC will immensely facilitate the research community at SPCAI while addressing complex problems such as climate change, global food security, COVID-19, run complex deep learning models related and simulations related to different applications of Al where large data sets are processed which require massive computation resources.



### **Short courses designed by SPCAI under National Vocational and Technical Training Commission** (NAVTTC) program

Following two short courses were designed by the SPCAI team and submitted to NAVTTC for acceptance in January 2021:

- Introduction to AI & **Machine Learning**
- Statistical Package for the Social Sciences (SPSS)











#### **SPCAI Research Grant, Phase 1, 2021**



# capacity to carry out research and development in artificial

## EY FEATURES

The SPCAI research grant phase I (SPCAI-RG-I) is one of the key components of financial assistance from Ministry of Information Technology and Telecommunication (MoITT) in establishing the center. It aims to foster academic and industrial collaborations in the development of research competences at SPCAI and to propose solutions that support industrial development. This grant anticipates faculty members to actively engage in research partnerships in specific thematic areas of national interest. The SPCAI-RG-1 awards will be selected competitively using a merit-based, independent and transparent evaluation and selection criteria based upon internal standards. The amount of SPCAI-RG-1 awards can be up to PKR 7 Million with maximum project duration of 1 year.

or industries in Pakistan. The project team may include researchers from one or more universities and must include at least one Co-PI from the industry of the proposed project.

#### PROPOSAL SUBMISSION PROCEDURE

Applications on prescribed template along with requisite documents must be submitted by email to info@spcai.paf-iast.edu.pk

For further information regarding proposals submission requirements and evaluation process, please see Call for Proposals Guidance available on: https://spcai.paf-iast.edu.pk/researchproposalcall

Deadline for Full Project Proposal Submission:

Monday, March 15, 2021

Queries regarding SPCAI Research Grant Phase 1 may be directed to email: info@spcai.paf-iast.edu.pk

Pak-Austria Fachhochschule: Institute of Applied Sciences and Technology Khanpur Roard, Mang, Haripur, Khyber Pakhtunkhwa









## **Virtual Visit of RISE Research Center** with Dr. Yasar Ayaz

Dr. Yasar gave a presentation about the research profile of the Robotics and Intelligent Systems Engineering Both (RISE) Laboratory. exchanged discussions on topics of mutual interest including robotics, artificial intelligence, and computer vision-related applications. SPCAI is

looking forward to building effective collaboration with the RISE center based on mutual research projects, faculty/students exchange, and expertise sharing. Dr. Yasar is also a member of the SPCAI international advisory board.



## Collaboration of **SPCAI** and **Al-Khwarizmi** Institute of Computer Science, **UET** Lahore

Al-Khwarizmi Institute of Computer Science, UET Lahore has actively participated in proposal preparation against SPCAI-RG-1. Dr. Sohail Khan, Associate Professor, SPCAI has worked on thirteen tentative ideas with Dr. Usman Ghani, Manager Research, KICS. Out of which 1 proposal was selected and refined by Dr. Sohail Khan with support from KICS. The project proposal was submitted and passed the different stages of the evaluation and is planned to start from 1st August 2021. The project is titled, "design of a computation multi-regional solar power forecasting framework for Pakistan". Both institutes are committed to effective collaboration based on the research projects, faculty/students exchange, and expertise sharing.











#### **DEXA Conference**

The International Conference on Database and Expert Systems Applications (DEXA) conference has been an annual international conference that showcases state-of-the-art research activities in the database. information, and knowledge systems. DEXA provides a forum to present research results and examine advanced applications in the field. The conference and its associated workshops offer an opportunity for developers, scientists, and users to extensively discuss requirements, problems, and solutions in the database, information, and knowledge systems. The 32nd DEXA

Conferences and Workshops will be held as a virtual conference during September 27 - 30, 2021. SPCAI has arranged two international workshops at this conference:

- International Workshop on Artificial Intelligence for Clean, Affordable and Reliable Energy Supply (AI-CARES)
- 1st International Workshop on Al System Engineering: Math, Modelling and Software (AlSys 2021)



#### **AI-CARES Workshop**



The purpose of the International Workshop on Artificial Intelligence for Clean, Affordable and Reliable Energy Supply (AI-CARES 2021) is to bring together researchers from multiple disciplines to present their proposed and ongoing work regarding the application of machine learning in energy supply systems including smart cities, smart grids and transport systems suggesting state-of-the-art Al-based solutions to improve energy systems' reliability, efficiency, affordability, and resilience.

#### AISys 2021 Workshop

This first DEXA workshop on AI system engineering (AISys) aims at a holistic view addressing the increasing need of interconnecting traditionally separated disciplines such as data analysis, model building and selection, software engineering, deployment, legal aspects, and standards. With this workshop, we would like to stimulate the interdisciplinary discourse between the involved science and engineering disciplines.





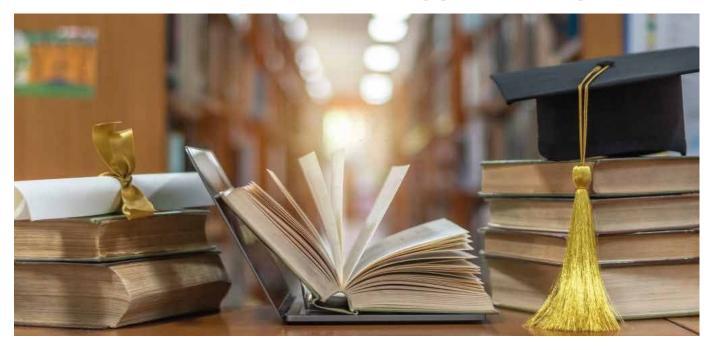


#### **Research Publications**

- The research paper of **Dr. Ehatisham-ul-Haq** with the title "Expert-novice classification of mobile game player using smartphone inertial sensors" has been accepted on 6 February 2021 and published in Expert Systems with Applications journal.
- The research paper of Dr. Ehatisham-ul-Haq and Dr. Fiza Murtaza with the title "S-THAD: a framework for sensor-based temporal human activity detection from continuous data streams" has been accepted on 26 February 2021 and published in the Journal of Ambient Intelligence and Humanized Computing journal.



## Dr. Fiza Murtaza is now HEC Approved Supervisor











### **Meeting with NESCOM AI Team**

A delegation from the National Engineering & Scientific Commission (NESCOM) visited PAF-IAST to tour the facility and exchange ideas. During their visit, the delegation showed interest in our Al-based research labs, in particular those related to robotics and deep learning. They also pledged to provide support to our MS students in completing their future theses and studies. The visit also included a preliminary discussion on NESCOM Academia Grant – a programme under which NESCOM provides projects to academic institutions. The tour will be followed up with the signing of an MoU between PAF-IAST and NESCOM to propel partnerships collaborations between both organizations in strategic areas and academic interests.



#### **Meeting with Cavalier Group of Companies**

A delegation from the Cavalier group of companies visited SPCAI on 2 March 2021. Cavalier is an agile innovator and leading provider in the Defence and Information Technology markets. It is primarily engaged in research, design, development, manufacture, and integration of combat vehicles, personal protection, and allied technology systems. The Cavalier team showed interest in working with the SPCAI team in different Computer Vision related problems, multi-sensor fusion for autonomous vehicles, Natural Language Processing, and automated interviewee assessment. The visit will be followed up with the collaboration in research and development projects.

#### **Research Proposal Review**

The for SPCAI-RG-1 attracted call nationwide interest in which several major research centers across the country partnered with the faculty of SPCAI to write 17 joint research proposals. These proposals will be reviewed by a panel of international experts with an approved grading scheme. The initial scrutiny will be led to the selection of top research proposals which will further defend their proposals in a 3-minute pitch.











# Faculty at SPCAI **Managing Director**



Dr. Atif Mashkoor Foreign Faculty / Managing Director

Dr. Mashkoor is the founding MD at SPCAI, a Foreign Faculty at PAF-IAST, and a Senior Research Scientist at JKU Linz, Austria. He is also an Adjunct Faculty at ICCBS - one of the premier research establishments in the developing world and a UNESCO center of excellence. He has extensively worked on European-level application-oriented research and development projects in Austria, France, and Portugal. He was the Scientific Head at SCCH, the Austrian center of excellence in data and software science, from 2012 - 2017. He holds Ph.D. from France, and M.S. from Sweden in Computer Science. Additionally, He has also studied Computational Linguistics in Spain.

Research Area:					
Al-Inspired Software Engineering	Logical Foundations of Cyber-Physical Systems				
Functional Safety & Cybersecurity	Logics, Formalisms & Rigorous Methods				
IoT	Model-Driven Engineering & Architecture				

#### Senior Faculty

Dr. Khan holds a Doctoral degree with distinction in the field of Electric Power Systems from Technical University of Vienna, Austria, obtained in 2016. He has been presently working as senior faculty at SPCAI at PAF-IAST, since October 2020. Before that he worked as Scientist from 2016 to 2020 in the leading applied research institute of Austria called Austrian Institute of Technology (AIT). There, he worked in the co-funded European and customer-oriented projects in the areas of renewable energy integration in medium and low voltage (MV, LV) distribution systems, frequency stability analysis of transmission systems, virtual inertia support from bulk energy storage systems and integrated energy systems (combining the district heating networks with power distribution networks). He is actively working on using AI for energy forecasting, machine learning for dealing with the uncertainty in energy systems and cross cutting applications using AI for decision support in urban planning, agriculture, transport, and security related areas. He is promoting Al for clean, affordable and reliable energy supply at the center of excellence.



Dr. Sohail Khan **Senior Faculty / Assistant Professor** 

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Active distribution networks	Energy management systems
Artificial intelligence	Power system design and control











Dr. Zafar Haider Senior Faculty / Associate Professor

Dr. Zaffar graduated from COMSATS University as Computer Engineer in 2005. He completed his MS in information and Intelligent systems from the University of Liverpool, UK in 2007 and PhD in Artificial intelligence from the University of Milan in 2016. He worked as a researcher and data scientist in different European research centers and has more than 7 years of working experience in artificial intelligence-related projects.

	Research Interest:	
Anomaly detection	Audio data analysis	Computer vision
Deep learning	Edge computing	Internet of Things
Knowledge engineering	Machine learning	Semantic reasoning
Smart hoalth		

### Support Faculty / Assistant Professor

Arshad Iqbal received the Ph.D. degree in electrical and computer engineering at Sungkyunkwan University, Suwon, Korea in Aug 2020 and the B.S. degree in electrical computer engineering from COMSATS (CIIT), Abbottabad, Pakistan in 2013. His research interests include wireless LANs, energy-harvesting networks, backscatter communication networks, Internet of Things, sensor networks, and resource allocation, Artificial Intelligence / Machine Learning / Reinforcement Learning, and medium access control of wireless communication networks and next-generation communication networks.



Dr. Arshad Iabal **Support Faculty / Assistant Professor** 

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Artificial Intelligence/Machine	Next-Generation	Power Saving
Learning/Reinforcement Learning	Communication Networks	
Resource Allocation	Sensors Networks	











Dr. M. Ehatisham-ul-Haa Support Faculty / Assistant Professor

Muhammad Ehatisham-ul-Haq received his BS degree in Computer Engineering from the University of Engineering and Technology (UET), Taxila, Pakistan, in 2014 and won Gold Medal. He acquired his MS and Ph.D. degrees in Computer Engineering as well from UET Taxila in 2017 and 2021, respectively, where he was awarded a fully-funded scholarship from the university. He won Chancellor's Gold Medal on completion of his MS degree (with specialization in Signal and Image Processing) and also got distinction in the Ph.D. degree (with specialization in Ubiquitous Computing). He is currently working as Faculty/Assistant Professor at Sino-Pak Center for Artificial Intelligence (SPCAI), Pakistan-Austria Fachhochschule: Institute of Applied Sciences and Technology (PAF: IAST) since January 2021.

	Research Area:	
Artificial intelligence	Biomedical signal processing	Internet of Things
Machine learning	Ubiquitous Computing	Information Security

Dr. Murtaza is currently serving as Support Faculty/Assistant Professor at SPCAI, PAF-IAST since August 2020. Before that she worked as Assistant Professor and Head of Computer Science Department at Women University Swabi from December 2019 to August 2020. She completed her PhD. in Computer Engineering with specialization in Computer Vision from UET, Taxila, Pakistan in October 2019. Her PhD research title is "Temporal human action detection in long and untrimmed videos". During her PhD studies she also worked as visiting research scholar at Multimedia & Vision Research Group, School of Electronic Engineering and Computer Science, Queen Mary University of London, United Kingdom and Cortexica Vision Systems Ltd., London, United Kingdom from March 2019 to August 2019. At SPCAI, she is currently working on the detection suspicious/targeted human actions inside campus environment which will be further extended to other environments including banks, hospitals etc.



Dr. Fiza Murtaza **Support Faculty / Assistant Professor** 

Research Area:				
Artificial intelligence	Machine learning			
Computer vision	Signal and Image Processing			









I am a passionate Software Engineer & Data Scientist with 4 years of research experience in Intelligent software engineering. Especially focused on recommendation system for pull requests in the GitHub platform. With our novel approach, we got better performance than the existing Experienced in extracting GitHub data, building prediction models using machine learning and deep learning techniques. Looking to use my Ph.D. in Software Engineering to build artificially intelligent tools using machine learning & deep learning techniques at your organization.



Dr. M. Ilvas Azeem Support Faculty / Assistant Professor

Research Area:				
Mining Software Repositories using machine learning and deep learning techniques	Natural language processing	Recommendati on Systems		
Software Refactoring and Code smell detection	Systematic literature reviews			

#### Post Doc. Researcher



Dr. Hafsah Ahmad Post Doc. Researcher Sino-Pak Center for Artificial Intelligence

**Neural Engineering** 

Dr. Hafsah Ahmad is currently serving as Postdoc Researcher/ Principal Engineer at Sino-Pakistan Center for Artificial Intelligence (SPCAI), Pak-Austria Fachhochschule: Institute of Applied Sciences and Technology (PAF-IAST) since January 2021. Before that, she served as Research Collaborator at the Unit for Visually Impaired People (UVIP), Italian Institute of Technology (IIT), Genoa, Italy from November 2019 till May 2020. Dr. Hafsah Ahmad completed her Ph.D. in Bioengineering Robotics (Cognitive Robotics, Interaction Rehabilitation Technologies) in joint collaboration with the University of Genoa, Genoa, Italy and Italian Institute of Technology, Genoa, Italy in April 2020. Her thesis title was THE SOUND OF SCOTOMA: A MULTISENSORY INTEGRATION APPROACH FOR **INDIVIDUALS** WITH **MACULAR** DEGENERATION. Currently, at SPCAI, she is working on the establishment of the Human Computer Interaction Laboratory.

Research Area:				
Brain Computer Interaction	Low-vision rehabilitation	Multisensory integration		
Noural Engineering				











Dr. Jawad Hussain Post Doc. Researcher Sino-Pak Center for Artificial Intelligence

Dr. Jawad received PhD degree from Universiti Teknikal Malaysia Melaka (UTeM) Malaysia with a specialization in Biomedical Engineering. His PhD research was related to the analysis of peripheral muscle fatigue in triceps brachii using surface electromyography. He got M.Sc degree in Electrical Engineering from the University of Engineering and Technology (UET) Lahore and BSc Electrical Engineering from COMSATS University, Lahore Campus, Pakistan. With over 4 years of teaching and 3 years of industrial experience, he has the passion to explore new horizons of research in his field. His current research interests include biomedical engineering and biological signal processing, fatigue analysis, and the use of AI for pathology detection.

	Research Area:	
Biomedical signal	Biostatistics	Mechanomyography
processing		
Muscle fatigue	Surface electromyography	

Dr. Ali holds a Doctoral degree with distinction in distributed systems from Gyeongsang National University, Jinju, South Korea, in the year 2020. He is holding bachelor and master's degrees from NWFP agricultural University Peshawar and Institute of Management Sciences, Hayatabad Peshawar, respectively. At the present, he has been working as Postdoc Researcher at SPCAI at PAF-IAST since August 2020.



Dr. Ihtisham Ali Post Doc. Researcher

#### Research Area:

Fuzzy logic and distributed systems. Smart cities, and Smart health applications development. Machine learning algorithms.









#### **Industrial Partners**

- Advanced Telecom Services (ATS), WA, USA
- Solartech
- IKS Services Pvt Limited
- Renzym (Pvt.) Ltd
- N-ovative Health Technologies (NHT) Pvt Ltd
- National Engineering & Scientific Commission (NESCOM), Islamabad













#### **Academic Partners**

- University of Engineering and Technology Taxila, Pakistan
- Al-Khawarizmi Institute of Computer Science, UET Lahore
- RIMMS, National University of Sciences and Technology (NUST), NUST
- SMME, National University of Sciences and Technology (NUST), NUST
- National Center for Physics, Pakistan



















#### **International Partners**



The Johannes Kepler University Linz (German: Johannes Kepler Universität Linz, short: JKU) is a public institution of higher education in Austria. It is located in Linz, the capital of Upper Austria. It offers bachelor's, master's, diploma and doctoral degrees in business, engineering, law, science, social sciences and medicine.



Software Competence Center Hagenberg (SCCH) is a non-university research center that has been driving excellence in applied research in the fields of data science and software science for over 20 years. This focus enables optimal implementation of projects in the fields of digitalization, Industry 4.0 (the smart factory) and artificial intelligence. SCCH serves as an interface between international research and domestic industry, and SCCH researchers conduct world-class research.



Guangdong University of Technology (GDUT) is a provincial university in Guangzhou, Guangdong, China. The university offers a range of courses in engineering, science, technology, management, liberal arts and law, with major emphasis on the study of engineering.



The Shenzhen Institutes of Advanced Technology (SIAT) of the Chinese Academy of Science (CAS) was jointly established by CAS, the Shenzhen municipal government and the Chinese University of Hong Kong in February 2006. SIAT aims to enhance the innovative capacity of the equipment manufacturing and service industries in the Guangdong-Hong Kong region, promote the development of emerging industries possessing their own proprietary intellectual property, and become a world-class industrial research institute.











#### **NAIF 2021**



#### Lab2Market





#### **Sino-Pak Center for Artificial Intelligence**

Pak-Austria Fachhochschule Institute of Applied Sciences and Technology Khanpur Road, Mang, Haripur, Khyber Pakhtunkhwa.









