ARIF HUSSAIN

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CAREER OBJECTIVE & SUMMARY

Prospective Ph.D. Candidate with 6+ years of research and teaching experience, interested in Sustainable Environmental Sensing and Monitoring with Edge AI and sustainable IoT solutions. Building upon my inter-disciplinary research experience and technical expertise, I aspire to contribute to more healthier, environmentally conscious and sustainable future by developing equitable solutions.

RESEARCH INTEREST(s)

- Sustainable Environmental Sensing
- Digital Signal Processing
- Pollution Monitoring & Control
- IoT and Machine Intelligence
- ML & Data-Driven Modeling
- Geospatial Intelligence

EDUCATION

Sukkur IBA University, Pakistan **2018 – 2020**

Masters' in Electrical Engineering *CGPA: 3.71/4.00 (**Gold Medalist**)*

Thesis Title: Adaptive GNSS Receiver Design Based on Environment Context Detection.

Sukkur IBA University, Pakistan **2013 – 2017**

Bachelors' in Electrical Engineering *CGPA: 3.50/4.00 (**Silver Medalist**)*

Thesis Title: Design & Development of Mini Rover – The Object Detecting Ground Vehicle

RESEARCH EXPERIENCE

Sukkur IBA Univeristy **Jan 03, 2018 – Feb 07, 2022**

Research Associate *- GNSS and Space Weather Lab* *Sukkur, Pakistan*

- Actively contributed to a 3-year research project funded by the Higher Education Commission of Pakistan (HEC Grant No. 6250/Sindh/NRPU) focused on investigation potential of vulnerabilities of satellite-based navigation systems in diverse range of environments and development of adaptive mitigation algorithms for improved navigation accuracy in urban contexts. Video Link.
- **Adaptive Environment Navigation (AEN)**: Developed & experimentally validated an efficient AEN Algorithm and proposed novel Adaptive GNSS Receiver Design for improved navigation performance in dynamic environments. Link.
- **Context-Aware Navigation (CAN)**: Developed an adaptive CAN algorithm using anomaly detection and a data-driven approach to detect, characterize, and classify operating environments via GNSS signals without requiring additional sensors and adaptively selects and applies appropriate mitigation technique. Link.

BBS University of Technology and Skill Development **March 08, 2024 – Present**

Researcher *- Climate Change and Environmental Sustainability Center* *Khairpur Mirs, Pakistan*

- Collaborating with an interdisciplinary research team to address localized environmental challenges & develop sustainable solutions.
- **Current Project:** SINDH AIRQ: Smart Air Quality Monitoring —A Data-driven & multi-disciplinary approach to Protect Public Health and the Environment in Rural areas of Sindh. RESEARCH SEED GRANT 2024

TEACHING EXPERIENCE

BBS University of Technology and Skill Development **Feb 08, 2022 – Present**

Lecturer *- Electronics Engineering* *Khairpur Mirs, Pakistan*

- Teaching Bachelors' courses, mentoring student projects, and conducting experimental research.
- **Courses Taught:** Embedded Systems (EST-321), Artificial Intelligence (EST-411), Instrumentation and Control (MET-311), Digital Signal Processing (EST - 413), Sensors and Microcontrollers (EST-222).
- **Final Year Projects Supervision and IGNITE National Technology Fund Awarded (0.25 Million PKR)**
  - Intelligent River Pollution Monitoring (2024 – 25)
  - Design & Development of Smart Air Quality Monitring System (NGIRI-2024-28181)
  - Smart Therapeutic Glove for Stroke Rehabilitation (NGIRI-2023-19673)
  - Dual Syringe Smart Infusion Pump with Real-Time Health Monitoring (NGIRI-2022-13176)

SELECTED RESEARCH PUBLICATIONS

1. **Hussain, A., et al.** (2022). Mitigating the effects of Multipath on GNSS Using Environmental Context Detection. Applied Sciences, 12(23), 12389. Link.

2. **Hussain, A., et al.**. (2021). Adaptive Data Length Method for GPS Signal Acquisition in weak to strong fading conditions. Electronics, 10(14), 1735. Link.

3. **Hussain, A.**, Ahmed, A., Magsi, H., & Tiwari, R. (2020). Adaptive GNSS Receiver Design for Highly Dynamic Multipath Environments. IEEE Access, 8, 172481-172497. Link.

4. Magsi, H., **Hussain, A.**, Shah, S.H.H., Shah, M.A., Abro, S.A., Ahmed, J. (2024). Accurate Monitoring and Timely Prediction of Ionospheric Scintillation Using Support Vector Machine. In: MedGU 2022. Advances in Science, Technology & Innovation. Springer, Cham. Link.

5. Ahmed, B., Ali, G., **Hussain, A.** & Baseer, A.(2021). Analysis of Text Feature Extractors Using Deep Learning on Fake News. Engineering, Technology & Applied Science Research, 11(2), 7001-7005. Link.

6. **Hussain, A.**, Ali, G., Akhtar, F., Khand, Z. H., & Ali, A. (2020). Design and Analysis of NEWS Category Predictor. Engineering, Technology & Applied Science Research, 10(5), 6380-6385. Link.

7. Magsi, H., Ahmed, A., & **Hussain, A.** (2019, November). Real-Time Monitoring and Logging of Ionospheric Scintillation and Total Electron Content. In 2019 Sixth International Conference on Aerospace Science and Engineering (ICASE) (pp. 1-6). IEEE. Link.

KEY STRENGTHS & TECHNICAL EXPERTISE

- Field Experimentation & Signal/Data Acquisition (In-situ sensors, Satellite /Remote Sensing.)
- Sensor Fusion, Complex Data Handling & Visualization
- Advanced Signal Processing & Multivariate Analysis (Spatio-temproal Analysis, Anamoly Detection, Pattern Analysis.)
- Data-Driven Modeling and Machine Learning (Data-driven Assessments, Feature engineering, Predictive modeling, and deploying machine learning algorithms).
- IoT-Based Intelligent System Design & Interactive Dashboard Development
- Programming Languages and Software (Python - TensorFlow, Scikit-lear, Dash/Plotly - , C++, MATLAB, LabVIEW, Atmel/Microchip Studio Programming, Arduino IDE, Tableau and ArcGIS.)
- Physical Computing Devices and Hardware (NodeMCU, Raspberry Pi, Mircocontrollers, NI myRIO and FPGA.)
- Scientific Writing and Research Communication (Research papers, Annual reports, News Letters & Grant proposals

HONORS & AWARDS

- Munich Aerospace Research Fellowship, Germany — March 31, 2022
- Awarded with **Gold Medal** in Masters' Degree on securing top-rank — March 26, 2022
- Outstanding Research Award for Publishing 6 Research Papers from Thesis work — January 23, 2021
- Awarded with Institutional Merit Scholarship for outstanding academic performance — February 03, 2020
- Awarded with **Silver Medal** on achieving 2ND Rank in Bachelor's Degree — March 10, 2018
- Championed Robosprint'15 – National Robotics Competition — November 08, 2015
- Achieved 3RD Position in Pakistan in IEEEXtreme 8.0 Programming Competition — November 08, 2015
- Awarded with 4-Year Talent Hunt Scholarship for Bachelor's Degree — August 15, 2013

RELEVANT WORKSHOP(s), TRAINING(s) & CERTIFICATION(s)

- Climate Change AI (CCAI) Virtual Summer School 2024 — June 17 – August 01, 2024
- Winter School on Deep Learning - Sukkur IBA University — Dec 25-29 , 2023
- Summer School on Remote Sensing & GIS - Institute of Space Technology, Islamabad — June 19-23, 2023
- Capacity Building of Academic Leadership in Research, Teaching and Services — June 13 –August 31, 2022
- Introduction to the Internet of Things and Embedded Systems - COURSERA (UCI) — April 05, 2020
- Embedded Control and Monitoring using LabVIEW - National Instruments — April 19, 2020
- 1ST PPRS Autumn School on Deep Learning - Pakistan Pattern Recognition Society — October 06 – 08, 2018

REFERENCES

Professor Dr. Rasool Bux Mahar
Vice Chancellor, BBS University of Technology and Skill Development, Khairpur Mirs, Pakistan
Director, Climate Change and Sustainability Center, BBSUTSD
Meritorious Professor, U.S.-Pakistan Center for Advanced Studies in Water
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Dr. Arslan Ahmed - Academic Supervisor
Senior Research Engineer, Nuclear Advanced Manufacturing Research Center, University of Sheffield, UK
Former Project Director, GNSS and Space Weather Lab Sukkur IBA University, Pakistan
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