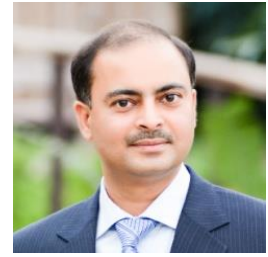


Dr. Sana Ul Haq

Chairman & Associate Professor,
Department of Electronics, University of Peshawar



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Research Statement

My research agenda focuses on the interdisciplinary areas of Human-Computer Interaction, Machine Learning, and Speech and Image Processing. I am particularly interested in developing innovative assistive technologies that bridge the gap between advanced computational methods and real-world applications. The primary goal of my work is to create impactful solutions that enhance human capabilities and improve quality of life.

Education

Ph.D. Electronic Engineering (*Machine Learning and Artificial Intelligence*)

University of Surrey, UK (2006 – 2011)

Research thesis title: "Audio-Visual Expressed Emotion Classification"

B.Sc. Electrical Engineering

University of Engineering and Technology (UET) Peshawar, Pakistan (1997 – 2002)

Professional Registration

Registered as a **Professional Engineer** with the Pakistan Engineering Council.

Registration No: ELECT/18540

Employment History

Department of Electronics, University of Peshawar, Pakistan

- **Associate Professor** (10 May 2022 – Present)
- **Assistant Professor** (19 Dec 2011 – 09 May 2022)
- **Lecturer** (08 Nov 2006 – 18 Dec 2011)

Administrative Experience

Chairman, Department of Electronics

- Directly responsible for the oversight of all departmental administrative and academic affairs.
- Spearheads strategic planning and faculty support to enhance the quality of BS, MPhil, and PhD programs.
- Drives continuous improvement through curriculum development and quality assurance initiatives.

Member/Convener, Graduate Studies Committee

- Strengthens the departmental research culture through the rigorous evaluation of research synopses and theses.
- Provides structured, actionable feedback to graduate researchers.
- Coordinates MPhil/PhD admission testing and comprehensive examinations.

Member/Convener, Departmental Board of Studies

- Led the comprehensive 2015 revision of MPhil and PhD curricula to address deficiencies and integrate emerging research areas.
- Revised the BS Electronics curriculum to ensure alignment with modern industry needs and pedagogical standards.

Focal Person, HEC Graduate Programs Review

- Serves as the primary liaison for the Higher Education Commission (HEC) regarding the review of MPhil and PhD programs.
- Manages all academic records and compiles documentation for the Quality Enhancement Cell (QEC).

Member, Board of Studies, FATA University

- Contributed to the structural design and development of Associate Degree and BS Electronics curricula.
- Ensured academic offerings remained relevant to evolving market demands.

Member, Board of Studies, University of Buner

- Participated in curriculum design for the BS Electronics program.
- Integrated dual perspectives from industry and academia to maximize program effectiveness.

Teaching and Research Experience

Taught Courses

Postgraduate Level: Advanced Digital Signal Processing, Probability and Stochastic Processes, Digital Image Processing, Advanced Mathematical Techniques for Scientists and Engineers, Statistical Signal Processing, Pattern Recognition and Analysis, MATLAB Programming.

Undergraduate Level: Digital Signal Processing, Probability and Statistics, Digital Logic Design, Analog Electronics, Microwave Communication.

Research Supervision

- **Supervised**
Number of MPhil Students: 12
Number of PhD Students: 01
- **Co-Supervised**
Number of MPhil Students: 05
- **In Progress**
Number of PhD students: 03

Research and Thesis Evaluation

- **MS Thesis Evaluation:** Evaluated over 80 MS theses at UET Peshawar.
- **PhD Research Evaluation Committee Service:** Serves on multiple PhD research evaluation committees.
- **Project Review:** Evaluated research projects funded by the **BOASAR initiative** at UET Peshawar.

Research Publications

Journal Articles

- Noor Gul, Jehad Ali, **Sana UI Haq**, Junsu Kim, Su Min Kim, "A hybrid ensembling and autoencoder scheme for improving sensing reliability in cognitive radio networks", *PLOS One* , 20(12): e0338915, (2025).
- Sarfaraz Khan Khalil, Noor Gul, **Sana UI Haq**, Muhammad Wasimuddin, Mohammad Haseeb Zafar, "A Deep Learning Approach to Weed Eradication in Precision Agriculture", *The Journal of Engineering* , 2025(1): e70138, (2025).
- Momin Nadeem, **Sana UI Haq** , Noor Gul, Muhammad Wasimuddin, Imtiaz Rasool, "Mitigating Primary User Emulation Attacks in Cooperative Spectrum Sensing", *The Sciencetech* , 5(4): 1-12, (2024).
- Muhammad Kamran, Imtiaz Rasool, Shafi Ullah, Faiz Ullah, Muhammad Wasimuddin, Muhammad Noman Khan, **Sanaul Haq** , "A Study of Diverse Modifications in Particle Swarm Optimization", *Power System Technology* , 48(4): 95-110 (2024).
- Imran Khan, **Sana UI Haq** , Muhammad Imran Majid, Imtiaz Rasool, Muhammad Saeed Shah, "Audio-visual Human Emotion Recognition Using Hierarchical Approach", *Pakistan Journal of Scientific and Industrial Research Series A: Physical Sciences* , 67(3): 261-267, (2024).
- Faiza Imdad, **Sana UI Haq** , Imtiaz Rasool, Muhammad Wasimuddin, Mohammad Omer Farooq, "Content-Based Image Retrieval Established on Deep and Handcrafted Features", *The Sciencetech* , 5(2): 1-12, (2024).
- Syed Asghar Ali Shah, Tariquallah Jan, Syed Muslim Shah, Muhammad Asif Zahoor Raja, Mohammad Haseeb Zafar, **Sana UI Haq** , "Self correction fractional least mean square algorithm for application in digital beamforming", *PLoS ONE* 19(6): e0304018 (2024).

- Muhammad Rizwan, Samina Bibi, **Sana Ul Haq** , Muhammad Asif, Tariqullah Jan, Mohammad Haseeb Zafar, “Automatic plant disease detection using computationally efficient convolutional neural network”, *Engineering Reports* , e12944 (2024).
- Abrar Adil, **Sana Ul Haq** , Muhammad Saeed Shah, Imtiaz Rasool, Muhammad Kamran, “Speech Emotion Recognition Using Hierarchical Approach Based On Bhattacharyya Distance”, *The Sciencetech* , 5(1): 1-14, (2024).
- Muhammad Shoaib, **Sana Ul Haq** , Muhammad Saeed Shah, Imtiaz Rasool, Mohammad Omer Farooq, “Audio-Visual Emotion Recognition Using Multilevel Fusion”, *The Sciencetech* , 5(1): 39-51, (2024).
- Muhammad Kamran, Inam Ullah, **Sanaul Haq** , Imtiaz Rasool, Faiz Ullah, Aman Khan, “A Novel and Hybrid MPPT Algorithm for Photovoltaic Electronic System”, *International Journal of Applied Engineering & Technology* , 6(1): 1579-1589, (2024).
- Saeeda Begum, **Sana Ul Haq** , Muhammad Saeed Shah, Muhammad Kamran, Imtiaz Rasool, “Audio Features Analysis for Speech Emotion Recognition”, *The Sciencetech* , 4(4): 32-43, (2023).
- Abdul Mudassar, **Sana Ul Haq** , Muhammad Imran Majid, Imtiaz Rasool, Muhammad Kamran, “Audio-Based Emotion Classification Using Ensemble Classifier”, *Pakistan Journal of Engineering Technology and Science (PJETS)* , 11(2): 11-21, (2023).
- Abdul Kaleem, Noor Gul, Atif Elahi, **Sana Ul Haq** , Su Min Kim, Junsu Kim, “Multiple Generalized Sidelobe Cancellers for Minimization of Interference in Cognitive Radio System”, *Wireless Personal Communications* , 133: 641–666, (2023).
- Muhammad Rizwan, **Sana Ul Haq** , Noor Gul, Muhammad Asif, Syed Muslim Shah, Tariqullah Jan, Naveed Ahmad, “Appearance Based Dynamic Hand Gesture Recognition Using 3D Separable Convolutional Neural Network”, *Computers, Materials & Continue* , 76(1): 1213-1247, (2023).
- M. Arshad, N.U. Saqib, G. Rooh, N. Chanithima, F. Zaman, M. Asif, H. J. Kim, S. Kothan, **Sana Ul Haq** , J. Kaewkhao, “Spectroscopic and photoluminescence properties of praseodymium doped potassium aluminum phosphate (P2O5-K2O-Al2O3) glasses for optoelectronics applications”, *Journal of Non-Crystalline Solids* , 586: 121570, (2022).
- Muhammad Amin, Khalil Ullah, Muhammad Asif, Abdul Waheed, **Sana Ul Haq** , Mahdi Zareei, R. R. Biswal, “ECG-Based Driver's Stress Detection Using Deep Transfer Learning and Fuzzy Logic Approaches”, *IEEE Access* , 10, (2022).
- Mujadad Ul Haq, Majid Ashraf, **Sana ul Haq** , Fazal Qudus Khan, “Managing Internet of Things Based Traffic Using Software Defined Networking”, *Journal of Information Communication Technologies and Robotic Applications* , 11(2): 37-45, (2020).

- Muhammad Saeed Shah, Fazal Nasir, **Sana Ul Haq** , Muhammad Tahir Khan, “Cooperative Multi-Robot Framework Using Artificial Immune System and Fuzzy Logic”, *Journal of Engineering and Applied Sciences* , 39(1): 01-13, (2020).
- Fazli Amin Khalil, Shahzad Anwar, Muhammad Asif, **Sana Ul Haq** , Naveed Ahmad, Majid Ashraf, Muhammad Kamran, Atif Khan, and Muhammad Arshad, “Energy management strategy for integrating photovoltaic energy in AC microgrid”, *Journal of Renewable and Sustainable Energy* , 10: 065102, (2018).
- Fazli A. Khalil, Muhammad Asif, Shahzad Anwar, **Sana Ul Haq** , Farman Illahi, “Solar Tracking Techniques and Implementation in Photovoltaic Power Plants: a Review”, *Proceedings of the Pakistan Academy of Sciences: A. Physical and Computational Sciences* , 54(3): 231–241, (2017).
- Taimur Khan, Naveed Ahmad, Yue Cao, Syed Asim Jalal, Muhammad Asif, **Sana Ul Haq** , Haitham Cruickshank, “Certificate Revocation in Vehicular Ad hoc Networks Techniques and Protocols: A Survey”, *SCIENCE CHINA Information Sciences* , 60(10): 100301, (2017).
- M. A. Nisar, M. Ashraf, H. Zafar, **S. Haq** , “Analysis and Improvement of Throughput for Open Flow Networks”, *Sindh University Research Journal (Science Series)* , 49(1): 37–42, (2017).
- I. Hassan, A. Ali, F. Khan, S. Khan, S. Rahim, **S. U. Haq** , T. Jan, M. Asif, “Using Series Capacitors for the Improvement and Evaluation of Transmission Line Utilization”, *Sindh University Research Journal (Science Series)* , 48(2): 257–260, (2016).
- Muhammad Amin, Ajmal Khan, Muhammad Asif, **Sana Ul Haq** , Imtiaz Rasool, “A Survey of Routing Protocols for Delay Tolerant Networks in VANETS”, *Science International (Lahore)* , 28(2): 1137-1143, (2016).
- Muhammad Asif, Muhammad Ali, Naveed Ahmad, **Sana Ul Haq** , Tariqullah Jan, and Muhammad Arshad, “Design and Development of a Data Logger Based on IEEE 802.15.4/ZigBee and GSM”, *Proceedings of the Pakistan Academy of Sciences: A. Physical and Computational Sciences* , 53(1): 37–48, (2016).
- M. Asif, **S. Haq** , M. Arshad, T. Jan, N. Ahmad, M. Kamran, and M. Zubair, “Analysis of Solar Maximum Power Point Tracking Algorithms and Hardware Architectures”, *Sindh University Research Journal (Science Series)* , 48(1): 61–66, (2016).
- M. Asif, S. Ahmad, **S. Haq** , T. Jan, N. Ahmad, and S. M. Shah, “Improved OLSR Protocol for VANETs and Comparison with State of Art DSR and AODV Protocols”, *Sindh University Research Journal (Science Series)* , 47(4): 835–838, (2015).
- Muhammad Asif, **Sana Ul Haq** , Naveed Ahmad, Tariqullah Jan, and Muhammad Wasimuddin, “QoS Assurance in Higher Mobility Mobile Ad Hoc Networks using Multipath Admission Control Protocol”, *Proceedings of the Pakistan Academy of Sciences* , 52(3): 201–214, (2015).
- Waqar Uddin, Kamran Zeb, Zunaib Ali, Syed Riazul Hussnain, Shahid Qamar, Tariqullah Jan, and **Sanaul Haq** , “A Neuro-Fuzzy based Non-linear Control

Technique for Steam Boiler using Levenberg-Marquardt Algorithm”, *Proceedings of the Pakistan Academy of Sciences: A. Physical and Computational Sciences* , 52(3): 215–225, (2015).

- **Sanaul Haq** , Tariqullah Jan, Asiya Jehangir, Muhammad Asif, Amjad Ali, and Naveed Ahmad, “Bimodal Human Emotion Classification in the Speaker-dependent Scenario”, *Proceedings of the Pakistan Academy of Sciences* , 52(1): 27–38, (2015).
- **Sanaul Haq** , Tariqullah Jan, Muhammad Asif, Amjad Ali, and Naveed Ahmad, “Speaker-dependent Human Emotion Recognition in Unimodal and Bimodal Scenarios”, *Proceedings of the Pakistan Academy of Sciences* , 52(1): 15–25, (2015).
- **S. Haq** , M. Asif, A. Ali, T. Jan, N. Ahmad, Y. Khan, “Audio-Visual Emotion Classification using Filter and Wrapper Feature Selection Approaches”, *Sindh University Research Journal (Science Series)* , 47(1): 67–72, (2015).
- **S. Haq** , A. Ali, M. Asif, T. Jan, Y. Khan, N. Ahmad, “Speaker-Independent Speech Emotion Recognition using Gaussian and SVM Classifiers”, *Sindh University Research Journal (Science Series)* , 47(1): 103–106, (2015).
- R. Ullah, A. Ali, T. Jan, **S. Haq** , “Proposing Grey Coded Direct Sequence Spread Spectrum (GC-DSSS)”, *Sindh University Research Journal (Science Series)* , 46(3): 357-362, (2014).
- T. Jan, A. Jehangir, A. Ali, **S. Haq** , S. R. Hassnain, “An Energy Efficient Routing Protocol for Wireless Sensor Networks Based on Two Relay Nodes”, *Sindh University Research Journal (Science Series)* , 46(2): 103-110, (2014).
- S. Imran, T.U. Jan, A. Jehangir, **S. Haq** , “A Novel Approach for Blind Separation of Convolutional Noisy Speech Mixtures Based on Block Thresholding”, *Sindh University Research Journal (Science Series)* , 46(1): 29-32, (2014).
- T. Jan, A. Jehangir, K. Haider, **S. Haq** , S. R. Hasnain, “A New and Effective Technique for Blind RT Estimation Via Laplacian Decay Model”, *Sindh University Research Journal (Science Series)* , 45(4): 697-702, (2013).

Book Chapter

- **S. Haq** and P. Jackson, “Machine Audition: Principles, Algorithms and Systems”, chapter *Multimodal Emotion Recognition* , Wang, W., editor, pages 398-423. IGI Global, USA (2011).

Conferences/Workshops

- M. N. Awan, **S. U. Haq** and S. Anwar, “An Improved Cooperative Spectrum Sensing Scheme for Emulation Attacker Detection in Cognitive Radio Network,” 2023 International Conference on Robotics and Automation in Industry (ICRAI), Peshawar, Pakistan, 2023, pp. 1-5, doi: 10.1109/ICRAI57502.2023.10089590.
- A. Kaleem, **S. Haq** , A. Elahi and N. Gul, "Minimization of OOB radiation in OFDM based cognitive radio system using multiple GSC," 2019 International

Conference on Electrical, Communication, and Computer Engineering (ICECCE), Swat, Pakistan, 2019, pp. 1-5, doi: 10.1109/ICECCE47252.2019.8940718.

- **S. Haq** and P. Jackson, "Speaker-Dependent Audio-Visual Emotion Recognition", One-day British Machine Vision Association Technical Meeting on Facial Analysis and Animation, Edinburgh, UK (2009).
- **S. Haq** and P. Jackson, "Speaker-Dependent Audio-Visual Emotion Recognition", pages 53-58. In Proc. Int'l Conf. on Auditory-Visual Speech Processing, Norwich, UK (2009).
- **S. Haq** , P. Jackson, and J. Edge, "Audiovisual Emotion Recognition in an English Database", One-day Meeting for Young Speech Researchers (UKSpeech'08), Guildford, UK (2008).
- **S. Haq** , P. Jackson and J. Edge, "Audio-Visual Feature Selection and Reduction for Emotion Classification", pages 185-190. In Proc. Int'l Conf. on Auditory-Visual Speech Processing, Tangalooma, Australia (2008).

Professional Referees

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