

Anwar Khan

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EDUCATION

- **PhD Electronics**, Quaid-i-Azam University (1st position in Pakistan and 354th position in QS 2026 World University Rankings), Islamabad, Pakistan, 2018.
- **MPhil Electronics (Grade A)**, Quaid-i-Azam University, Islamabad, Pakistan, 2007-2009.
- **MSc Electronics (Grade A)**, University of Peshawar, Peshawar, Pakistan, 2004-2006.
- **BSc (Grade B+)**, University of Peshawar, Peshawar, Pakistan, 2003.

EMPLOYMENT

- Senior lecturer at the Department of Electronics, University of Peshawar, KPK, Pakistan, December 2009 till date.

JOURNAL PUBLICATIONS (Total Impact Factor = 69.539)

1. Hamza Murad Khan, Shakila Basheer, Mohammad Tabrez Quasim, Raja'a Al-Naimi, vijaykumar Varadarajan and **Anwar Khan**, "A transformer-based deep learning framework with semantic encoding and syntax-aware LSTM for fake electronic news detection," *CMC-Computers, Materials & Continua*, Vol. 86, No. 1, November 10, 2025 (**IF: 1.7**).
2. Hamza Murad Khan, **Anwar Khan**, Santos Gracia Villar, Luis Alonso Dzul Lopez, Abdulaziz Almaleh and Abdullah M. Alqahtani, "A comparative study of optimized-LSTM models using tree-structured parzen estimator for traffic flow forecasting in intelligent transportation," *CMC-Computers, Materials & Continua*, Vol. 83, No. 2, April 07, 2025 (**IF: 2.1**).
3. **Anwar Khan**, Santos Gracia Villar, Luis Alonso Dzul Lopez, Abdulaziz Almaleh, Abdullah M. Alqahtani, and Raja'a Alnaimi, "Underwater thermal energy harvesting: frameworks, challenges, applications, and future investigation," *IEEE Access*, Vol. 12, pp. 174371-174386, November 12, 2024. (**IF: 3.4**).
4. Muhammad Farooq, **Anwar Khan**, Musaed Alhussein, Hasan Mahmood, Khursheed Aurangzeb, and Surbhi Bhatia Khan, "Outage analysis of a cognitive radio system with Nakagami-m fading and cooperative decode and forward relaying," *IEEE Access*, Vol. 12, pp. 144565-144578, October 03, 2024. (**IF: 3.4**).

5. **Anwar Khan**, Mostafa M. Fouda, Dinh-Thuan Do, Abdulaziz Almaleh, Abdullah M. Alqahtani, and Atiq Ur Rahman, "Underwater target detection using deep learning: methodologies, challenges, applications, and future evolution," *IEEE Access*, Vol. 12, pp. 12618-12635, January 12, 2024. (IF: 3.476).
6. **Anwar Khan**, Mostafa M. Fouda, Dinh-Thuan Do, A. Almaleh, and Atiq Ur Rahman, "Short-term traffic prediction using deep learning long short-term memory: taxonomy, applications, challenges, and future trends," *IEEE Access*, Vol. 11, No. 535244, pp. 94371-94391, August 29, 2023. (IF: 3.476).
7. **Anwar Khan**, Muhammad Imran, Abdulllah Alharbi, Ehab Mahmoud Mohamed, and Mostafa M. Fouda, "Energy harvesting in underwater wireless sensor networks: design, taxonomy, applications, challenges and future directions," *IEEE Access*, Vol. 10, No. 535244, pp. 134606-134622, December 19, 2022. (IF: 3.367).
8. Munsif Ali, **Anwar Khan**, Massimo Bertozzi, Ubaidullah, Saleh M. Altowaijri, Ihsan Ali, and Salman Iqbal, "Energy and path-aware-reliable routing in underwater acoustic wireless sensor networks," *Wireless Communications and Mobile Computing*, Vol. 2022, No. 535244, pp. 1-17, September 06, 2022. (IF: 2.146).
9. **Anwar Khan**, Muhammad Imran, Muhammad Shoaib, Atiq-Ur-Rahman, and Najm Us Sama, "Link and stability-aware adaptive cooperative routing with restricted packets transmission and void-avoidance for underwater acoustic wireless sensor networks," *Computer Communications*, Vol. 181, No. 1, pp. 428-437, October 24, 2021. (IF: 3.167).
10. Waqas Gular, Abdullah Waqas, Hammad Dilpazir, **Anwar Khan**, Ashfaq Alam, and Hasan Mahmood, "Power control for cognitive radio networks: a game theoretic approach," *Wireless Personal Communications*, 123, pp.745-759, October 21, 2021. (IF: 1.671).
11. Ihsan Ali, Abdelmuttlib Ibrahim Abdalla Ahmed, Ahmad Almorger, Muhammad Ahsan Raza, Syed Attique Shah, **Anwar Khan**, and Abdullah Gani, "Systematic literature review on Iot-based botnet attack," *IEEE Access*, Vol. 8, No. 1, pp. 212220-212232, November 24, 2020. (IF: 3.367).
12. J. Qadar, B. S-D.-Abajo, **Anwar Khan**, B. G. Zahirain, I. D. L. T.-Tierz, and H. Mahmood, "Towards mobile edge computing: taxonomy, challenges, applications and future realms," *IEEE Access*, Vol. 8, pp. 189129-189162, September 25, 2020. (IF: 3.745).
13. **Anwar Khan**, Atiq Ur Rahman, Mahdi Zareei, Najm Us Sama, Cesar Vargas-Rosales, Junaid Qadar, and Ehab Mahmoud Mohamed, "Modem design for underwater acoustic networks: taxonomy, capabilities, challenges, applications and future trends," *Journal of Intelligent and Fuzzy Systems*, Vol. 10, No. 1, pp. 1-18, August 11, 2020. (IF: 1.840).

14. **Anwar Khan**, Khursheed Aurangzeb, Emad-ul-Haq Qazi, and Atiq Ur Rahman, "Energy-aware scalable reliable and void-hole mitigation routing for sparsely deployed underwater acoustic networks," *Applied Sciences*, Vol. 10, No. 1, pp. 1-18, December 25, 2019. (IF: 2.217).
15. Junaid Qadar, **Anwar Khan**, Mahdi Zareei, and Cesar Vargas-Rosales, "Energy balanced localization-free cooperative noise-aware routing protocols for underwater wireless sensor networks," *Energies*, Vol. 12, No. 22, pp. 1-24, November 8, 2019. (IF: 2.707).
16. Ubaid Ullah, **Anwar Khan**, Mahdi Zareei, Ihsan Ali, Hasan Ali Khattak, and Ikram Ud Din, "Energy-effective cooperative and reliable delivery routing protocols for underwater wireless sensor networks," *Energies*, Vol. 12, No. 13, pp. 1-22, July 9, 2019. (IF: 2.707).
17. Munsif Ali, **Anwar Khan**, Hasan Mahmood, and Naeem Bhatti, "Cooperative, reliable, and stability-aware routing for underwater wireless sensor networks," *International Journal of Distributed Sensor Networks*, Vol. 15, No. 6, pp. 1-11, June 11, 2019. (IF: 1.787).
18. Manazar Ahsan, Ihsan Ali, Muhammad Imran, Idna Idris, Suleman Khan, and **Anwar Khan**, "A fog-centric secure cloud storage scheme," *IEEE Transactions on Sustainable Computing*, Vol. 10, No. 2, pp. 250-262, May 06, 2019. (IF: 1.787).
19. **Anwar Khan**, Saleh. M. Altowaijri, Ihsan Ali, and Atiq Ur Rahman, "Reliability-aware cooperative routing with adaptive amplification for underwater acoustic wireless sensor networks," *Symmetry*, Vol. 11, No.3, pp. 1-14, March 22, 2019. (IF: 1.256).
20. Munsif Ali, **Anwar Khan**, Khursheed Aurangzeb, Ihsan Ali, Hasan Mahmood, Syed Irtaza Haider, and Naeem Bhatti, "CoSiM-RPO: Cooperative routing with sink mobility for reliable and persistent operation in underwater acoustic wireless sensor networks," *Sensors*, Vol. 19, No. 5, pp. 1-21, March 04, 2019. (IF: 2.475).
21. Ubaidullah, **Anwar Khan**, Saleh M. Altowaijri, Ihsan Ali, Atiq Ur Rahman, Vijay Kumar, Munsif Ali, and Hasan Mahmood, "Cooperative and delay minimization routing schemes for dense underwater wireless sensor networks," *Symmetry*, Vol. 11, No. 2, pp. 1-20, February 11, 2019. (IF: 1.256).
22. Rahim Khan, Ihsan Ali, Saleh M. Altowaijri, Muhammad Zakarya, Atiq-Ur-Rahman, Ismail Ahmedy, **Anwar Khan**, and Abdullah Gani, "LCSS-based algorithm for computing multivariate data set similarity: A case study of real time WSN data," *Sensors*, Vol. 19, No. 1, pp. 1-15, January 2018. (IF: 2.475).
23. Sahar shah, **Anwar Khan**, Ihsan Ali, Kwang-Man Ko, and Hasan Mahmood, "Localization free energy efficient and cooperative routing protocols for underwater wireless sensor networks," *Symmetry*, Vol. 10, No. 10, pp. 1-20, October 15, 2018. (IF: 1.256).

24. **Anwar Khan**, Ihsan Ali, Atiq-Ur-Rahman, Muhammad Imran, Fazal-e-Amin, and Hasan Mahmood, "Co-EEORS: Cooperative energy efficient optimal relay selection protocol for underwater wireless sensor networks," *IEEE Access*, Vol. 6, pp. 28777-28789, May 16, 2018. (IF: 3.244).
25. **Anwar Khan**, Ihsan Ali, Abdullah Ghani, Nawsher Khan, Mohammed Alsaqer, Atiq Ur Rahman, and Hasan Mahmood, "Routing protocols for underwater wireless sensor networks: Taxonomy, research challenges, routing strategies and future directions," *Sensors*, Vol. 18, No. 1619, pp. 1-30, May 18, 2018. (IF: 2.677).
26. **Anwar Khan**, Mohammad Hossein Anisi, Ihsan Ali, Nadeem Javaid, Mohammed Qaiser Azeem, and Hasan Mahmood, "An energy efficient interference and route aware protocol for underwater wireless sensor networks," *Ad Hoc & Sensor Wireless Networks*, Vol. 41, No. 1-2, pp. 31-53, May 20, 2018. (IF: 1.034).
27. Dalhatu Muhammad, Mohammed Hossein Anisi, Mehdi Zareei, Versales Rosales, and **Anwar Khan**, "Game theory-based cooperation for underwater acoustic sensor networks: Taxonomy, review, research challenges and directions," *Sensors*, Vol. 18, No. 2, pp. 1-29, February 1, 2018. (IF: 2.677).
28. **Anwar Khan**, Ismail Ahmedy, Mohammad Hossein Anisi, Nadeem Javaid, Ihsan Ali, Nawsher Khan, Mohammed Alsaqer, and Hasan Mahmood, "A localization-free interference and energy holes minimization routing for underwater wireless sensor networks," *Sensors*, Vol. 18, No. 165, pp. 1-17, January 9, 2018. (IF: 2.677).
29. **Anwar Khan**, Nadeem Javaid, Ihsan Ali, Mohammad Hossein Anisi, Atiq-Ur-Rahman, Naeem Bhatti, Muhammad Zia, and Hasan Mahmood, "An energy efficient interference-aware routing protocol for underwater WSNs," *KSII Transactions on Internet and Information Systems*, Vol. 11, No. 10, pp. 4844-4864, October 30, 2017. (IF: 0.452).

CONFERENCE PROCEEDINGS

- Junaid Qadar, **Anwar Khan**, and Hasan Mahmood, "DNAR: Depth and noise aware routing for underwater wireless sensor networks," in. *Proc. of 12th International Conference on Complex, Intelligent and Software Intensive Systems, (Published as Part of the Springer Advances in Intelligent Systems and Computing book series (AISC, volume 772), Matsue, Japan, July 2018.*
- **Anwar Khan**, Ihsan Ali, and Hasan Mahmood, "A localization free variable transmit power routing protocol for underwater wireless sensor networks," in. *Proc. of 20th International Conference on Network-based Information Systems, (Published as Part of the Springer book series (LNDECT, volume 7)) Canada, August 2017.*
- Mudassir Ejaz, **Anwar Khan**, Muhammad, Umar Qasim, Zahoor Ali Khan, and Nadeem Javaid, "Position aware mobility pattern of AUVs for avoiding void zone in underwater WSNs," in. *Proc. of IEEE 9th International Conference on Intelligent Networking and Collaborative Systems, Ostrava, Czech Republic, September 2016.*

- **Anwar Khan**, Mudassir Ejaz, Nadeem Javaid, Muhammad Qaisar Azeem, Umar Qasim, and Zahoor Ali Khan, “EEORS: Energy efficient optimal relay selection protocol for underwater WSNs,” in. *Proc. of IEEE 19th International Conference on Network-Based Information Systems*, Ostrava, Czech Republic, September 2016.
- **Anwar Khan**, Nadeem Javaid, Hasan Mahmood, Sangeen, Zahoor Ali Khan, and Umar Qasim, “EEIRA: An energy efficient interference and route aware routing protocol for underwater wireless sensor networks,” in. *Proc. of IEEE 10th International Conference on Complex, Intelligent and Software Intensive Systems*, Fukouka, Japan, July 2016.
- **Anwar Khan**, Hasan Mahmood, Zahoor Ali Khan, Umar Qasim, and Nadeem Javaid, “A transmit power efficient non-cooperative game design for wireless sensor networks based on the utility and cost functions,” in. *Proc. of IEEE 30th International Conference on Advanced Information Networking and Applications*, Crans-Montana, Switzerland, March 2016.

UNDER REVIEW PUBLICATIONS

- H. Murad, **A. Khan**, et.al, “Underwater piezoelectric energy harvesting: challenges, applications, comparative analysis and future trends,” under review in IEEE Access, Manuscript ID Access-2025-51195.
- M. Murad, **A. Khan** et.al, “A gray wolf-optimized transformer-based deep learning framework for traffic prediction in intelligent transportation,” under review in CMC: Computers, Materials and Continua, Manuscript ID: 69327.

FUNDING

- DOST Welfare Foundation funding for the project: Voice and remote controlled drone for surveillance.
- A broad spectrum accident detection and rescue system.
- Seal of Excellence Mari Curie Postdoc Fellowship: Ocean energy prediction and harvesting using optimized deep learning models.

SCHOLARSHIPS/GRANTS

- Merit scholarship during MPhil at the Department of Electronics, Quaid-i-Azam University, Islamabad, Pakistan.
- University of Peshawar Faculty scholarship for completion of PhD from the Department of Electronics, Quaid-i-Azam University, Islamabad, Pakistan.
- HEC travel grant for *IEEE 30th International Conference on Advanced Information Networking and Applications*, Crans-Montana, Switzerland, March 2016, for

presentation of the paper: A transmit power efficient non-cooperative game design for wireless sensor networks based on the utility and cost functions.

- HEC travel grant for *IEEE 19th International Conference on Network-Based Information Systems*, Ostrava, Czech Republic, September 2016, for presentation of the paper: EEORS: Energy efficient optimal relay selection protocol for underwater WSNs.
- HEC travel grant for *20th International Conference on Network-based Information Systems*, Canada, August 2017, for presentation of the paper: A localization free variable transmit power routing protocol for underwater wireless sensor networks.

MEMBERSHIPS

- Member IEEE.

TAUGHT COURSES

- **Graduate & Postgraduate Level:** Adhoc & Sensor Wireless Networks, Wireless Sensor Networks Hardware, Probability Theory & Stochastic Processes, Mobile Communications, Prediction & Regression Analysis, Machine/Deep Learning, Statistical Signal Processing.
- **Undergraduate Level:** Electric Circuits, Digital Logic Design, Analog Electronics, Semiconductor Devices, Electromagnetic Field Theory, Applied Mathematics, C/C++, Computer Networking, Probability Theory.

SUPERVISION

- **MS Thesis:** An interpolated and follow-the-regularized leader optimized deep learning model for traffic prediction in intelligent transportation by Taimour Khan, March 2025
- **MS Thesis:** A comparative analysis of gated-recurrent unit and long short-term memory deep learning models for traffic prediction in intelligent transportation, by Muhammad Bilal, Department of Electronics, University of Peshawar, February 2025.
- **MS Thesis:** Deep learning-based car battery charging time prediction in intelligent transportation with adaptive learning rate and sparse data by Amanullah, Department of Electronics, University of Peshawar, November 2024.
- **MS Thesis:** Reliable and low latency data transfer using packet holding time for VANETS in intelligent transportation by Muhammad Salah Uddin, Department of Electronics, University of Peshawar, March 2024.
- **MS Thesis:** Long short-term memory model with Bayesian optimization for traffic prediction in intelligent transportation by Hamza Murad Khan, Department of Electronics, University of Peshawar, February 2024.

- **MS Thesis:** Adaptive relayed communications with load-based time-switching wireless energy harvesting for mobile edge computing by Khushbakht Rahat, Department of Electronics, University of Peshawar, January 2023.
- **MS Thesis:** Smart data collection using sink mobility in underwater wireless sensor networks, by Ahmad Zia, Department of Electronics, University of Peshawar, Pakistan, November 2022.
- **MS Thesis:** Delay, neighbors and destination-aware routing for underwater wireless sensor networks, by Mohid Taimour, Department of Electronics, University of Peshawar, Pakistan, September 2022.
- **MS Thesis:** Transmission range-based void-hole avoidance in underwater wireless sensor networks, by Ijaz Ahamd Khan, Department of Electronics, University of Peshawar, Pakistan, November 2021.
- Supervised 27 undergraduate students' final year projects and co-supervised 05 graduate students.

HOBBIES

- Swimming, travelling, exploration of nature and different cultures and their etiquettes.

REFERENCES

- Dr. Saeed Shah, Assistant Professor, Department of Electronics, University of Peshawar, KPK, Pakistan. Email: saeedshah@uop.edu.pk, Ph: +923085103418.
- Dr. Ihsan Ali, Assistant Professor, Department of Computer Science, University of Nebraska at Omaha, Nebraska, USA. Email: ihsanali@ieee.org, Ph: +14029056230.