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Muhammad Asif **Khan**

Research Scientist

Research Interest

- Deep learning optimization for computer vision
- Distributed machine learning and federated learning
- Mobile edge computing and edge intelligence in B5G/6G, and IoT

Education

2014–2019 **Ph.D. in Electrical Engineering**, *Qatar University*, Doha, Qatar

2010–2013 **M.Sc. in Telecommunication Engineering**, *University of Engineering and Technology*, Taxila, Pakistan

2005–2009 **B.Sc. in Telecommunication Engineering**, *University of Engineering and Technology*, Peshawar, Pakistan

Research Experience

2024–Now **Research Scientist**, *Qatar Mobility Innovations Center*, Doha, Qatar
Research Project 1: Smart, Connected, and Autonomous Vehicle and Energy systems for efficient, safe, secure, and sustainable transportation in metropolitan cities.

2021–Now **Postdoctoral Research Fellow**, *Qatar Mobility Innovations Center, Qatar University*, Doha, Qatar
Research Project 1: Context recognition in crowd monitoring using crowdsourced data.
Research Project 2: DroneCMS: Flying Infrastructure for Intelligent Crowd Management and Security for Mega Events.

2020–2021 **Postdoctoral Research Fellow**, *College of Engineering (CENG), Qatar University*, Doha, Qatar
Research Project: Predictive QoE-Aware and ML for Secure Live Streaming Over the Edge.

2016–2017 **Research Assistant**, *Qatar Mobility Innovations Center*, Doha, Qatar
Research Project: D-COCODI: Scalable Multimedia Multicasting Mobile Solutions for Smartphone Users in Dense Environments.

2014–2015 **Graduate Assistant**, *Qatar Transportation and Traffic Safety Center (QTTSC), Qatar University*, Doha, Qatar
Research Project: Traffic congestion mitigation on Doha Expressway.

Industry Experience

2009–2013 **IT Engineer**, *NGO*, Pakistan

Teaching

- Signal and Systems
- Probability and Statistics
- Advanced Machine Learning

Supervision and Mentoring

2023–Now **Co-Advisor**, *of Mr. Samiullah, M.Phil thesis, Abdul Wali Khan University*, Mardan, Pakistan
2023–23 **Research Mentor**, *Qatar University Young Scientists Center (QUYSC)*, Doha, Qatar
2022–23 **Summer Internship Supervisor**, *Qatar Mobility Innovations Center (QMIC)*, Doha, Qatar
2015–16 **Community Mentor**, *Deeplearning.ai on Cousera*, Online

Fellowships/Grants/Awards

2022 Certification of Appreciation / Spot Award, Qatar Mobility Innovations Center
2021 Post Doctoral Research Award (PDRA), Qatar National Research Fund, USD. 200,000
2014 Graduate Assistant Award, Qatar University, USD. 40,000
2009 Best Undergraduate Final Year Project, University of Engineering and Technology Peshawar

Publications

For an updated list of publications, please visit my Google Scholar profile: `https://scholar.google.com/citations?user=BgUrPm8AAAAJ&hl=en`.

Journal Papers

[1] M. A. Khan, H. Menouar, and R. Hamila, "Accelerating Learning with Fixed Time Budget," *Neural Processing Letters*, 2023. **[Submitted]**.

[2] M. Ishtiaq, N. Saeed, and M. A. Khan, "Edge Computing in IoT: A 6G Perspective," *IT Professional*, 2023. **[Submitted]**.

[3] M. A. K. Layth Hamad and A. Mohamed, "Object Depth and Size Estimation using Stereo-vision and Integration with SLAM," *IEEE Sensors Letters*, 2023. **[Submitted]**.

[4] N. Faiz, A. K. Gardiwal, M. A. Khan, and S. Iftikhar, "Dynamic prediction of survival via landmark method using the asthma prevention trial in young children," *Plos one*, vol. 18, no. 11, p. e0293796, 2023. **(IF: 3.7)**.

[5] M. A. Khan, H. Menouar, and R. Hamila, "Visual Crowd Analysis: Open Research Problems," *AI Magazine*, 2023. **(IF: 2.52)**.

[6] M. A. Khan, H. Menouar, and R. Hamila, "LCDnet: a Lightweight Crowd Density Estimation Model for Real-time Video Surveillance," *Journal of Real-Time Image Processing*, vol. 20, no. 2, p. 29, 2023. **(IF: 3.0)**.

[7] M. A. Khan, H. Menouar, and R. Hamila, "Revisiting crowd counting: State-of-the-art, trends, and future perspectives," *Image and Vision Computing*, p. 104597, 2022. **(IF: 4.7)**.

[8] M. A. Khan, H. Menouar, A. Eldeeb, A. Abu-Dayya, and F. D. Salim, "On the detection of unauthorized drones—Techniques and future perspectives: A review," *IEEE Sensors Journal*, vol. 22, no. 12, pp. 11439–11455, 2022. **(IF: 4.3)**.

[9] M. A. Khan, R. Hamila, A. Gastli, S. Kiranyaz, and N. A. Al-Emadi, "ML-Based Handover Prediction and AP Selection in Cognitive Wi-Fi Networks," *Journal of Network and Systems Management*, vol. 30, no. 4, p. 72, 2022. **(IF: 3.6)**.

[10] M. A. Khan, R. Hamila, A. Erbad, and M. Gabbouj, "Distributed Inference in Resource-Constrained IoT for Real-Time Video Surveillance," *IEEE Systems Journal*, vol. 17, no. 1, pp. 1512–1523, 2022. **(IF: 4.4)**.

[11] M. A. Khan, E. Baccour, Z. Chkirbene, A. Erbad, R. Hamila, M. Hamdi, and M. Gabbouj, "A Survey on Mobile Edge Computing for Video Streaming: Opportunities and Challenges," *IEEE Access*, 2022. **(IF: 3.47)**.

[12] M. A. Khan, E. Baccour, A. Erbad, R. Hamila, and M. Hamdi, "CODE: Computation Offloading in D2D-Edge System for Video Streaming," *IEEE Systems Journal*, 2022. **(IF: 4.4)**.

[13] D. Unal, M. Hammoudeh, M. A. Khan, A. Abuarqoub, G. Epiphaniou, and R. Hamila, "Integration of Federated Machine Learning and Blockchain for the Provision of Secure Big Data Analytics for Internet of Things," *Computers & Security*, vol. 109, p. 102393, 2021. **(IF: 5.6)**.

[14] M. A. Khan, R. Hamila, N. A. Al-Emadi, S. Kiranyaz, and M. Gabbouj, "Real-time Throughput Prediction For Cognitive Wi-Fi Networks," *Journal of Network and Computer Applications*, vol. 150, p. 102499, 2020. **(IF: 8.7)**.

[15] K. Shaaban, M. A. Khan, I. Kim, and R. Hamila, "Queue discharge at freeway on-ramps using coordinated operation of a ramp meter and an upstream traffic signal," *Procedia Computer Science*, vol. 170, pp. 347–353, 2020.

[16] K. Shaaban, M. A. Khan, and R. Hamila, "Effect of Distance between Ramp and Upstream Signal on Ramp Meter Operation," *Journal of Traffic and Transportation Management*, vol. 1, no. 2, pp. 43–49, 2020.

[17] M. A. Khan, R. Hamila, M. S. Kiranyaz, and M. Gabbouj, "A Novel UAV-aided Network Architecture using Wi-Fi Direct," *IEEE Access*, vol. 7, pp. 67305–67318, 2019. **(IF: 3.47)**.

[18] M. A. Khan, R. Hamila, and M. O. Hasna, "Optimal Group Formation in Dense Wi-Fi Direct Networks for Content Distribution," *IEEE Access*, vol. 7, pp. 161231–161245, 2019. **(IF: 3.47)**.

[19] K. Shaaban, M. A. Khan, R. Hamila, and M. Ghanim, "A strategy for Emergency Vehicle Preemption and Route Selection," *Arabian Journal for Science and Engineering*, vol. 44, pp. 8905–8913, 2019. **(IF: 2.9)**.

[20] M. A. Khan, W. Cherif, F. Filali, and R. Hamila, "Wi-Fi Direct Research - Current Status and Future Perspectives," *Journal of Network and Computer Applications*, vol. 93, pp. 245–258, 2017. **(IF: 8.7)**.

[21] K. Shaaban, M. A. Khan, and R. Hamila, "Literature Review of Advancements in Adaptive Ramp Metering," *Procedia Computer Science*, vol. 83, pp. 203–211, 2016.

Conference Papers

[22] M. A. Khan, H. Menouar, and R. Hamila, "Multimodal Crowd Counting with Pix2Pix GANs," in *19th International Conference on Computer Vision Theory and Applications (VISAPP 2024)*, 2024. **[Accepted]**.

[23] L. Hamad, M. A. Khan, H. Menouar, F. Filali, and A. Mohamed, "Haris: an advanced autonomous mobile robot for smart parking assistance," in *2023 IEEE International Conference on Consumer Electronics (ICCE)*, 2024. **[Accepted]**.

[24] M. A. Khan, H. Menouar, and R. Hamila, "Curriculum for crowd counting - is it worthy?," in *19th International Conference on Computer Vision Theory and Applications (VISAPP 2024)*, 2024. **[Accepted]**.

[25] M. A. Khan, H. Menouar, and R. Hamila, "Crowd counting in harsh weather using image denoising with pix2pix gans," in *2023 38th International Conference on Image and Vision Computing New Zealand (IVCNZ)*, pp. 1–6, 2023.

[26] I. Mrad, E. Baccour, R. Hamila, M. A. Khan, A. Erbad, and M. Hamdi, "RL-CEALS: Reinforcement Learning for Collaborative Edge Assisted Live Streaming," in *2023 IEEE Symposium on Computers and Communications (ISCC)*, pp. 193–199, 2023.

[27] M. A. Khan, H. Menouar, and R. Hamila, "DroneNet: Crowd Density Estimation using Self-ONNs for Drones," in *2023 IEEE 20th Consumer Communications & Networking Conference (CCNC)*, pp. 455–460, IEEE, 2023.

[28] M. A. Khan, R. Hamila, and H. Menouar, "CLIP: Train Faster with Less Data," in *2023 IEEE International Conference on Big Data and Smart Computing (BigComp)*, pp. 34–39, IEEE, 2023.

[29] M. A. Khan, H. Menouar, and R. Hamila, "Crowd Density Estimation using Imperfect Labels," in *2023 IEEE International Conference on Consumer Electronics (ICCE)*, pp. 1–6, IEEE, 2023.

[30] M. A. Khan, H. Menouar, and R. Hamila, "Drones-aided Asset Maintenance in Hospitals," in *2022 2nd International Conference on Computers and Automation (CompAuto)*, pp. 1–5, IEEE, 2022.

[31] M. A. Khan, H. Menouar, O. M. Khalid, and A. Abu-Dayya, "Unauthorized Drone Detection: Experiments and Prototypes," in *2022 IEEE International Conference on Industrial Technology (ICIT)*, pp. 1–6, IEEE, 2022.

[32] K. Rahman, S. Mallick, and M. Asif, "Travel Time Estimation using Multivariate Regression Model," in *Qatar Foundation Annual Research Conference Proceedings*, vol. 2018, p. EEPD1051, HBKU Press Qatar, 2018.

[33] M. A. Khan, R. Hamila, and K. S. Shaaban, "Mitigation of Traffic Congestion Using Ramp Metering on Doha Expressway," in *Qatar Foundation Annual Research Conference Proceedings*, vol. 2016, p. ICTSP2224, HBKU Press Qatar, 2016.

[34] M. A. Khan, W. Cherif, and F. Filali, "Group Owner Election in Wi-Fi Direct," in *2016 IEEE 7th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON)*, pp. 1–9, IEEE, 2016.

[35] M. A. Khan, W. Cherif, F. Filali, and R. Hamila, "Realization of Dual-Hop Networks in Wi-Fi Direct and Performance Evaluation," in *2017 IEEE International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData)*, pp. 552–559, IEEE, 2017.

[36] M. Shah, M. A. Khan, T. Mahmood, K. Islam, and J. Akbar, "Generation of orthogonally polarized chaotic waveforms for secure optical communication," in *2013 IEEE 9th International Conference on Emerging Technologies (ICET)*, pp. 1–5, IEEE, 2013.

[37] M. A. Khan and S. Zakiuddin, "Research review of development of novel routing algorithms for mobile ad-hoc networks," in *Eighth International Conference on Digital Information Management (ICDIM 2013)*, pp. 61–66, IEEE, 2013.

[38] W. Cherif, M. A. Khan, F. Filali, S. Sharafeddine, and Z. Dawy, "P2P Group Formation Enhancement for Opportunistic Networks with Wi-Fi Direct," in *2017 IEEE wireless communications and networking conference (WCNC)*, pp. 1–6, IEEE, 2017.

[39] M. A. Khan, S. Zakiuddin, and J. Ahmad, "Cross Layer Optimization of Dynamic Source Routing Protocol using IEEE 802.11e-based Medium Awareness," in *2013 3rd IEEE International Conference on Computer, Control and Communication (IC4)*, pp. 1–6, IEEE, 2013.

Book Chapters

[40] M. A. Khan and M. A. Ahmadon, "Trends and challenges in mobile edge computing for the next generation massive internet of things." 2023.

[41] M. A. Khan, M. A. Ahmadon, N. A. A. Rauf, A. M. Zaid, A. K. Mahamad, S. Saon, N. S. A. M. Taujuddin, and A. Jamil, "Implementation and simulation of udp client-server environment using contiki cooja simulator." 2023.

Invited Talks / Tutorials / Interviews

2023 **Tutorial**, *Mobile Edge Computing for Massive IoT (MIoT) Systems at 10th IEEE International Symposium on Networks, Computers, and Communications*, Doha, Qatar

2023 **Interview**, *Generative AI as an automatic assimilator, processor, and determiner of interactions with people - employees or end-users, in Facilitate, the official IWFM magazine*, UK

2021 **Interview**, *Artificial Intelligence in FM", in Facilitate, the official IWFM magazine, Mar 2021 Issue*

2020 **Invited Talk**, *Machine Learning in Mobile Edge Computing - Recent Trends, Opportunities, and Challenges" at The 2nd International Conference on Machine Learning and Intelligent Systems (MLIS2020), October 25-28, 2020*, UK

2020 **Magazine Article**, *ABC of AI" published in Facilitate, the official IWFM magazine, October 2020 Issue*, UK

2020 **Interview**, *Career Ladder" published in Facilities Management Journal, July 2020 Issue*

Examiner/Evaluator

2023 External examiner for the senior design project, Qatar University

2022 Judge at IET Presentin10 competition

Editorials and Technical Committees

All reviews and TPC memberships can be verified on Web of Science (WoS): `https://www.webofscience.com/wos/author/record/ITT-1012-2023`.

Journal Editorial
- IEEE Future Direction Newsletter
- Frontiers in Communication and Networks

Conference Organizing Committees
- Tutorial Chair at IEEE Gaming, Entertainment, and Media Conference (GEM) 2023
- Program Co-chair at the 3rd International Conference on Computers and Automation, Paris
- Workshop Co-chair at Sensing, Communication, and Localization in 6G at 6GIoTT 2022, Fuzhou
- Session chair at 2nd International Conference on Computers and Automation, Paris, France
- Session chair at IEEE Consumer Communications and Networking Conference 2023, Las Vegas

Journal Reviewer
- Nature Scientific Reports
- IEEE Transactions on Artificial Intelligence (TAI)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- IEEE Communication Magazine (COMMAG)
- IEEE Wireless Communication Magazine (WCM)
- IEEE Communication Standards Magazine (COMSTD)
- IEEE Transactions on Emerging Topics in Computing (TETC)
- IEEE Transactions on Systems, Man, and Cybernetics (SMC)
- IEEE Transactions on Consumer Electronics (TCE)
- IEEE Transactions on Microwave Theory and Techniques (T-MTT)
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
- IEEE Communications Surveys and Tutorials (COMST)
- IEEE Transactions on Machine Learning for Communication
- IEEE Internet of Things Journal (IOT)
- IEEE Internet of Things Magazine (IOTMAG)
- IEEE Networking Letters (NL)
- IEEE Communication Letters
- IEEE Wireless Communication Letters
- IEEE Systems Journal (ISJ)
- IEEE Sensors Letters (SENSL)
- IEEE Access
- IEEE Open Journal of the Communication Society (OJ-COMS)
- IEEE Open Journal of Vehicular Technology (OJVT)
- IEEE China Communications
- IET Communications
- Elsevier Future Generation Computer Systems (FGCC)
- Elsevier ICT Express (ICTE)
- Elsevier Computers and Electrical Engineering (COMPELECENG)
- Springer Wireless Personal Communication (WPC)
- IET Intelligent Transportation System
- KSII Transactions on Internet and Information Systems

Conference TPC
- IEEE International Conference on Communications (ICC 2021-2024)
- IEEE Vehicular Technology Conference (VTC2023-Fall)
- IEEE Consumer Communications and Networking Conference (CNCC 2021-2024)
- International Conference on Consumer Electronics (ICCE Berlin 2023)
- Asia Conference on Computer Vision, Image Processing, and Pattern Recognition (CVIPPR'24)
- IEEE BigData 2020
- IEEE Conference on Technologies for Sustainability (SusTech 2020-2024)
- IEEE Sensors 2020
- IEEE International Conference on Acoustics, Speech & Signal Processing (ICASSP 2020)
- International Conference on Machine Learning and Intelligent Systems (MLIS 2020-23)
- International Workshop on Signal Processing and Machine Learning (WSPML 2020)
- International Conference on Computing Science, Communication and Security.
- IEEE 4th World Forum on Internet of Things (WF-IoT 2018)
- ICTIS2020, CTISC2020, BDML2020.

Training/Certifications

- Chartered Engineer, EC UK
- TensorFlow Specialization, Deeplearning.ai
- Deep Learning Specialization, Deeplearning.ai
- Machine Learning, Stanford University at Coursera

- Fundamentals of Accelerated Computing with CUDA Python, Nvidia
- Getting Started with AI and Jetson Nano, Nvidia
- Machine Learning School 2019 organized by BigML and QCRI, Doha, Qatar
- Supervising Doctoral Studies, Epigeum, Oxford University Press
- Certified Peer Reviewer, Elsevier
- Certified Peer Reviewer, Web of Science Academy
- Mentor Community and Training, Coursera
- IBM Maximo, Asset, Inventory, and Work Order Management
- Energy Efficiency and Building Automation Systems, Schneider Electric
- Juniper Networks Certified Internet Associate - JNCIA
- IPv6 Forum Certified Network Engineer, IPv6 Forum
- 4G Mobile and Future Internet, ITU Academy
- Mobile Broadband: LTE/LTE-Advanced, WiMAX and WLAN, ITU Academy
- Future Internet, ITU Academy
- Migration to IPv6, ITU Academy

Conferences Attended

- 38th IEEE Image and Vision Computing Conference (IVCNZ), Palmerston North, New Zealand, 2023
- IEEE Consumer Communications and Networking Conference 2023, Las Vegas, USA
- IEEE 41st International Conference on Consumer Electronics, 2023, Las Vegas, USA
- IEEE International Conference on Big Data and Smart Computing, 2023, Jeju, South Korea
- IEEE 23rd IEEE International Conference on Industrial Technology, 2022, Shanghai, China
- International Conference on Computers and Automation, 2023, Paris, France
- International Conference on Innovation and Technological Advances for Sustainability,2023, Doha, Qatar.

References

Ridha Hamila, *Professor of Electrical Engineering, Qatar University*, Doha, Qatar, Tel: (+974) 44032 4210, Email: hamila@qu.edu.qa

Aiman Erbad, *Associate Professor of Computer Science & Engineering, Hamad Bin Khalifa University*, Doha, Qatar, Tel: (+974) 4454 2431, Email: aerbad@hbku.edu.qa

Hamid Menouar, *Principal R&D and Innovation Lead at Qatar Mobility Innovation Center (QMIC)*, Doha, Qatar, Tel: (+974) 4459 2712, Email: hamidm@qmic.com

Nasir Saeed, *Associate Professor of Electrical Engineering, United Arab Emirates University*, UAE, Mob: (+971) 03-7136492, Email: nasir.saeed@uaeu.ac.ae

Fethi Filali, *Head of Technology Development & Applied Research at Qatar Mobility Innovation Center (QMIC)*, Doha, Qatar, Tel: (+974) 4459 2712, Email: filali@qmic.com