



Name : Alhussain Almarhabi
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Alhussain Almarhabi is an Assistant Professor in the Department of Electrical Engineering with a Ph.D. in Electrical Engineering from Stevens Institute of Technology, USA. His research spans signal processing, artificial intelligence, and wireless communications, with a strong record of applying deep learning to real-world engineering and healthcare problems.

With over five years of academic experience, Alhussain has authored multiple IEEE conference and journal publications on modulation classification and deep learning architectures for wireless systems, while also contributing to machine learning research in medical diagnostics. He has held teaching and mentoring roles across Engineering Programming and Communication Systems courses, developing lab curricula and guiding students through hands-on, project-based learning.

Alhussain's work reflects a continued commitment to bridging rigorous research with practical, industry-relevant engineering education, and he remains active in the IEEE Communications and Signal Processing Societies.

Qualification:

- Ph.D. Electrical Engineering, Stevens Institute of Technology, Hoboken, NJ, USA, 2023
- MSc. Electrical Engineering, Stevens Institute of Technology, Hoboken, NJ, USA, 2018
- Certificate in Data Engineering, Stevens Institute of Technology, Hoboken, NJ, USA, 2018
- Bachelor's in Electrical and Computer Engineering, King Abdul Aziz University, Jeddah, Saudi Arabia, 2013

Research Interest:

- Spectrum Awareness
- Wireless Communications
- Artificial Intelligence and Deep Learning
- Computer Vision
- Machine Learning in Medical Applications
- Big Data Optimization
- Cognitive Radio
- Intelligent Radio
- Signals and Data Representation and Measurement Tools
- Signal Integrity Degradation
- Internet of Things (IoT)
- Edge Computing

Teaching and Leadership Experience:

- Served as Teaching Assistant for Engineering Programming (C++) and Communication Systems courses
- Led weekly Q&A sessions for 30+ students and initiated curriculum improvements
- Designed MATLAB-based lab sessions on communication fundamentals, subsequently adopted into course curriculum
- Mentored 20+ students and conducted exam review sessions
- Managed GitHub-based assignment submissions, streamlining the evaluation process
- Completed an 8-week workshop on college-level teaching

Work Experience:

Ph.D. Researcher, Electrical and Computer Engineering Department, Stevens Institute of Technology, NJ, USA (Jan 2019 – Dec 2023)

- . Developed a neural model to identify timing jitter in QAM signals, published at the WOCC21 conference
- . Modeled self-designed datasets for various research projects, adopted in IEEE publications
- . Created experiments and implementations in deep learning architectures, resulting in 8 IEEE publications

Teaching Assistant, Engineering Programming (C++), Stevens Institute of Technology, NJ, USA (Jan 2022 – Dec 2022)

- . Initiated ten new weekly assignments for the course curriculum and led weekly Q&A sessions for 30+ students
- . Managed assignment submission logistics using GitHub Classroom and Gtest to test C++ code

Teaching Assistant, Introduction to Communication Systems, Stevens Institute of Technology, NJ, USA (Aug 2021 – Dec 2021)

- . Constructed five lab sessions simulating communication system fundamentals using MATLAB, adopted into future course curricula
- . Mentored 20+ students and taught tutorial and exam review sessions

Research Assistant, Stevens Institute of Technology, NJ, USA (Aug 2018 – Jun 2019)

- . Investigated “Fast Detection of Brains With Abnormalities” using unsupervised learning, leading to an accepted poster presentation at the Organization for Human Brain Mapping (OHBM), Italy 2019

MSc Researcher, Stevens Institute of Technology, NJ, USA (Jan 2017 – Dec 2018)

- . Developed a font recognition prototype for English, Arabic, and Japanese using a Raspberry Pi camera, Keras, TensorFlow, OpenCV, and Raspbian OS
- . Designed and optimized machine learning algorithms for breast cancer diagnostics, achieving 97% accuracy with SVM
- . Designed a finite impulse response (FIR) filter solving a convex optimization problem, with a MATLAB GUI for client-specified generation
- . Implemented a music recommendation system using the Yahoo music database and Spark Hadoop, achieving 87% accuracy

Skills:

- **Programming:** Python, C/C++, MATLAB, R, Rust, Spark (Hadoop), CMake, Assembly, Git
- **Frameworks / IDE:** PyTorch, TensorFlow, Keras, Google Colab, Jupyter Notebook, Emacs, Vim, LaTeX
- **Artificial Intelligence:** Foundation Models, CNNs, VAE, Regression, Classification, SVM, PCA, K-Means, KNNs, Decision Trees, Transformers, Signal Preprocessing
- **Operating Systems / Cloud:** Linux, Ubuntu, Debian, Raspbian, Azure, AWS, Docker
- **CAD & Hardware:** Eagle, Multisim, Fritzing, SolidWorks, Raspberry Pi, Arduino Uno, chipKIT uC32, ZigBee, PIC Microcontroller

Honors, Awards and Volunteer :

- Saudi Ministry of Education Full-Scholarship Award for Higher Education (Master's), 2017–2018
- Volunteer Research Assistant, “Fast Detection of Brains With Abnormalities,” 2018
- Stevens Institute of Technology Award for Outstanding Master's, 2019
- Stevens Institute of Technology Award for Research Assistantship, 2019–2020
- Saudi Ministry of Education Full-Scholarship Award for Higher Education (Ph.D.), 2019–2023

Professional Affiliations:

- Institute of Electrical and Electronics Engineers (IEEE) – 8 years
- IEEE Communications Society and Signal Processing Society
- Saudi Council of Engineers (SCE)

Publications:

Summary: Conferences: 9 research papers | Journals: 1 article | Talks: 4 professional presentations

1. A. Almarhabi, H. Alhazmi, A. Samarkandi, and Y.-D. Yao, “Modulation classification based on eye diagrams and deep learning,” in 2022 31st Wireless and Optical Communications Conference (WOCC). IEEE, 2022, pp. 35–40.
2. A. Almarhabi, H. Alhazmi, A. Samarkandi, M. Alymani, M. H. Alhazmi, and Y.-D. Yao, “QAM signal classification and timing jitter identification based on eye diagrams and deep learning,” in 2021 30th Wireless and Optical Communications Conference (WOCC). IEEE, 2021, pp. 1–5.
3. A. Samarkandi, A. Almarhabi, H. Alhazmi, and Y.-D. Yao, “Combined signal representations for modulation classification using deep learning: Ambiguity function, constellation diagram, and eye diagram,” in 2023 32nd Wireless and Optical Communications Conference (WOCC). IEEE, 2023, pp. 1–4.
4. H. Alhazmi, A. Almarhabi, A. Samarkandi, and Y.-D. Yao, “Modulation classification of QAM signals with different phase noise levels using deep learning,” in 2022 31st Wireless and Optical Communications Conference (WOCC). IEEE, 2022, pp. 57–61.
5. A. Samarkandi, A. Almarhabi, H. Alhazmi, M. Alymani, M. H. Alhazmi, and Y.-D. Yao, “Modulation classification in a multipath fading channel using deep learning: 16QAM, 32QAM and 64QAM,” in 2021 30th Wireless and Optical Communications Conference (WOCC). IEEE, 2021, pp. 6–10.
6. H. Alhazmi, A. Almarhabi, A. Samarkandi, M. Alymani, M. H. Alhazmi, Z. Sheng, and Y.-D. Yao, “Classification of QPSK signals with different phase noise levels using deep learning,” in 2020 29th Wireless and Optical Communications Conference (WOCC). IEEE, 2020, pp. 1–5.
7. M. H. Alhazmi, M. Alymani, H. Alhazmi, A. Almarhabi, A. Samarkandi, and Y.-D. Yao, “5G signal identification using deep learning,” in 2020 29th Wireless and Optical Communications Conference (WOCC). IEEE, 2020, pp. 1–5.
8. M. Alymani, M. H. Alhazmi, A. Almarhabi, H. Alhazmi, A. Samarkandi, and Y.-D. Yao, “Rician K-factor estimation using deep learning,” in 2020 29th Wireless and Optical Communications Conference (WOCC). IEEE, 2020, pp. 1–4.
9. Y. Zhou, H. Alhazmi, M. H. Alhazmi, A. Almarhabi, M. Alymani, M. He, S. Peng, A. Samarkandi, Z. Sheng, H. Wang et al., “Radio spectrum awareness using deep learning: Identification of fading channels, signal distortions, medium access control protocols, and cellular systems,” *Intelligent and Converged Networks*, vol. 2, no. 1, pp. 16–29, 2021.