KHIZAR ANJUM
Machine Learning Engineer
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PROFESSIONAL EXPERIENCE

Graduate Research Assistant, CPS Lab — (2019 – Present) | Piscataway, NJ, US
- Specialized in developing efficient deep learning architectures for various applications, with focus on resource-constrained devices. Published in prestigious journals including IEEE JBHI, IEEE JSAC and conferences like IEEE PerCom, MASS, and Ucomms, resulting in multiple patents and prestigious government grant funding.

Research Assistant, Communications Lab — (2017 – 2019) | Lahore, Pakistan
- Developed cutting edge neural networks with TensorFlow for Parkinson's detection using tremor data.

RESEARCH INTERESTS

Deep Learning, Efficient Neural Network Architectures, Transformer Architectures, Analog Neural Networks, Computer Vision, Resource-constrained ML Systems, Edge AI Solutions, Parallel and Distributed Computing, MLOps and Model Deployment

EDUCATION

Rutgers University, New Brunswick, NJ, (2019–2025 [Expected])
- PhD Candidate & Master of Science (MS), Electrical and Computer Engineering (ECE)
- Grade Point Average (GPA): 3.92/4; *Advised by* **Dr. Dario Pompili**

Lahore University of Management Sciences (LUMS), Lahore, Pakistan (2015–2019)
- Bachelor of Science (BS), Electrical Engineering (EE) – Gold Medalist
- *Advised by* Dr. Muhammad Tahir and Dr. Momin Uppal; Grade Point Average (GPA): 3.86/4

SELECTED RESEARCH PROJECTS

Synthetic Knee X-ray Generation — 2024
- Developed a diffusion-based generative model to synthesize realistic knee X-ray images with controllable osteoarthritis severity levels. Achieved high-fidelity image synthesis with clinically relevant anatomical accuracy.

Multi-Agent Drone 3D Mapping with Reinforcement Learning — 2022
- Designed and implemented a multi-agent reinforcement learning system for coordinated 3D object mapping using autonomous UAVs.

Ultra-Low Power Analog Neural Network Design for Health Monitoring —2023/24
- Developed novel analog neural networks for ECG/EEG processing achieving micro-watt power consumption, published in IEEE JSAC and JBHI. Led NSF I-Corps customer discovery with 20 industry interviews to validate clinical needs.

Deep Joint Source Channel Coding for Underwater Image & Video Transmission — 2022
- Developed a model using PyTorch for integrating deep learning models into complex underwater communication systems, demonstrated efficacy and published in world-class ACM conferences.

Crowd Prediction and Behavior Assessment Using Adaptive UAVs — 2024
- Leveraged efficient signal processing techniques and polygonal flow estimation algorithms to predict real-time high-density crowd patterns from UAVs using multimodal sensor data

PATENTS

- **WO 2025/064997:** Anisotropic Diffusion-based Analog Neural Network Architecture
- **WO 2024/107672:** Techniques for Image Transmission through Acoustic Channels in Underwater Environments
- **(Pending Application):** Methods and Systems for Determining Group Motion Patterns

RELEVANT SKILLS

- **Programming Languages**: Python (advanced), C++, CUDA, MATLAB, Bash, SPICE
- **ML & AI Tools**: PyTorch, TensorFlow, OpenCV, Pandas, Jupyter, MLOps, Tensorboard, Llama 2, Scikit-learn
- **Edge Computing & DSP**: GNU Radio, ROS, low-power analog-digital ML systems
- **Cloud & DevOps**: Google Cloud Platform (GCP), Docker, GitHub Actions, Kubernetes
- **Deployment Environments**: Linux, Windows, FPGA, Embedded Systems (real-time AI)
- **Development Tools**: Visual Studio Code, Git, GitHub, Cursor

ACHIEVEMENTS

- Recipient of **Paul Panayotatos Scholarship** for Sustainability-aware Electrical Engineering, 2024
- Selected for **NSF NOVUS & NSF I-Corps** programs for innovation & customer discovery training, 2022
- Awarded **Travel Grants** from Rutgers University and ACM for **ACM WUWNet** and **IEEE MASS** participation
- Recognized with **Gold Medal** at LUMS for academic excellence, 2019
- Win: **TA Achievement Award**, 2020 from Rutgers