

ADIL QURESHI

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Education

University of Michigan

Master of Science in Artificial Intelligence (Concentration: Computer Vision)

Dearborn, MI
Sep 2024 – May 2026 (expected)

National University of Sciences and Technology

Bachelor of Engineering in Electrical Engineering

Islamabad, Pakistan
Sep 2018 – Aug 2022

Skills

Programming: Python, C, C++, MATLAB

Frameworks and Libraries: PyTorch, TensorFlow, OpenCV, Open3D, PCL, Numpy, Scikit-Learn, Matplotlib, SQL

Tools: Linux(Terminal Commands, Bash/Shell, JIRA, Version Control(Git), Docker, VS Code, Jupyter Notebook

Experience

RoadGauge Ltd.

Computer Vision Engineer

Lahore, Pakistan
Aug 2022 – July 2024

- Developed an automated 3D road surface analysis product ground-up, currently serving major government contractors. Achieved surface defect measurement precision of $< 4\text{mm}$ from a monocular road facing video.
- Trained DeepLabv3+ for segmentation of 7 types of pavement defects. Achieved iOU of 91.34%.
- Developed SfM (Structure from motion) pipeline for 3D reconstruction of road surface and camera pose estimation involving SIFT key-point matching, 8 Point algorithm for fundamental matrix estimation and linear triangulation.
- Developed an algorithm for generating depth map and stitched 2D birds-eye-view images of road surface.
- Implemented RANSAC planar surface segmentation algorithm for point-clouds to measure depth-based defects.

Computer Vision Intern

May 2022 – Aug 2022

- Improved existing algorithm for object detection and inventory in cluttered background by 11% using classical CV and deep learning approaches.

Deep Learning Lab, NCAI

Research Assistant

Islamabad, Pakistan
May 2021 – Aug 2022

- Worked on classification and localization of abnormalities in EEG signals for assisting neurologists in diagnosis.
- Developed CWT (continuous wavelet transform) based pre-processing routine to generate scalograms of EEG windows for training CNNs. Led to 25% increase in performance compared to initial baseline.
- Trained and evaluated classical and deep learning based classification architectures (GoogLeNet, VGG16, EffienctNetB0, Random Forest Classifiers, Desision Trees, SVM).
- Published the first-of-its-kind event localization EEG dataset with a focus on South Asian demographics.

Projects

Neural Radiance Fields (NeRF) for 3D Scene Rendering | *Python, PyTorch, Numpy, CUDA*

- Implemented and optimized NeRF for high-quality 3D scene reconstruction.
- Implemented dynamic frequency selection for positional encoding, adaptive sampling based on scene complexity.

Camera pose based 3D Object Tracking and Inventory | *Python, OpenCV, Open3D, Numpy*

- Used segmentation mask to identify 2D ROI and extracting corresponding 3D points from point-cloud. Applied voxel downsampling for optimization of large 3D reconstructions.
- Used camera pose information (SfM based) and correspondence between subsequent frames for inventory.

Panorama Stitching | *Python, OpenCV, Numpy*

- Implemented image stitching using both; traditional SIFT based key-points homography estimation and deep learning based (HomographyNet).

Anomaly Detection in Streaming Energy Meter Time Series Data | *Python, PyTorch, TensorRT*

- Developed LSTM autoencoder pipeline for unsupervised time-series anomaly detection.
- Acquired and pre-processed real-time input data stream from a energy monitor on Nvidia Jetson Nano.

Publications

- T.Y. Azim, M. Rahman, A. Abed, **A. Qureshi**, A. Vakeel, M. Ashraf, A. Saeed, A. Saeed, Z. Ul Mustafa "Low-cost automated image based rutting identification and measurement." *8th ICBMP (2024)*, doi.org/10.1201/9781003402541
- Alqarni, M.A, **Qureshi, A.J.**, and Alvi, M. "NeuroAssist: An Open-Source Tool for Automatic Event Detection in Scalp EEG", On-going Review IEEE Access