

MUHAMMAD NABEEL RAZA

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Education

National University of Science and Technology

Masters of Science in Data Science

Sep. 2023 – Present

Islamabad, Pakistan

University of Engineering and Technology, Lahore

Bachelor of Science in Computer Engineering

Oct. 2019 – Jul. 2023

Lahore, Pakistan

Experience

Spatial Labs Pvt. Ltd.

Software Engineer - AI / ML

Feb. 2023 – Present

Pakistan (Remote)

- After completing my internship, I accepted the offer to work part-time which later turned into a full-time role. Although I have worked on multiple things here I am mentioning some of the prominent works. Most of my work is contributed to Decision Labs which is the parent company of Spatial Labs.
- Developed scripts to generate synthetic data of automobiles in Blender. By using open-source 3D models, I wrote scripts that allowed random placement of the automobile and camera movements. I also added scripts to customize textures of windows, metallic bodies, headlights, etc.
- We used the generated data in tandem with Yolo v8 to perform object detection without training from scratch. For this, we used embeddings created by a pre-trained model to re-evaluate the class predicted by Yolo.
- Contributed to a big data course for a client who wanted to use Uber's H3 indexes. This course included topics like big data handling in data warehouses, spatial indexes in faster queries, and ETL pipelines. We also showed how these indexes help create matrices that can further be used in spatio-temporal tasks.

Spatial Labs Pvt. Ltd.

Software Engineer - Intern

Sep. 2022 – Feb. 2023

Pakistan (Remote)

- As an intern, I frequently attended pair sessions to code with senior developers. I learnt to use PyTorch, Matplotlib, NumPy, OpenCV, Pandas, etc.
- I used the learnt libraries and packages in training a UNET model for land cover mapping which included 5 classes. I managed to attain roughly 75% accuracy and deploy the model using HuggingFace spaces.
- I also trained a Yolo v5 model to detect and quantify Forest tree damage. I got hands-on experience in converting Pascal VOC dataset annotations to Ultralytics dataset format.
- I used the same techniques in detection ships. This time, I also used Yolo v8. I participated in a ship detection competition by Data Driven Science on HuggingFace and achieved an mAP score of around 0.82 securing myself the 7th position on the private leaderboard. [Link to the competition.](#)

Educative Inc.

Answers Intern

Jun. 2022 – Aug. 2022

Lahore, Pakistan

- Wrote 28 technical articles and code blocks. The articles were related to AI and Computer vision with emerging topics. I also assisted in reviewing 52 articles.
- Topics included Vision Transformers, Segmentation (Instance, Semantic, Panoptic), Transformers, Attention Mechanism, Data Augmentation, etc. [Link to my profile.](#)

Research Projects

Using CNN Transformers for ECG based disease detection | Python, PyTorch, Fast AI, Scikit-Learn

Oct. 2023

- Conducted research on how all 12 leads of an ECG help in disease diagnostics by using a CNN Transformer. I combined positional embeddings from a 1D CNN architecture with a vanilla Transformer. I demonstrated that pre-training the model on a simple task as the next sequence prediction before actual disease classification was more effective.
- I also processed ECG data from PTB-XL by performing normalization and baseline wander removal and tackled the problem of class imbalance. Finally, I achieved an F1 score of 0.84.

Leadership / Extracurricular

UET-ACM Student Chapter

Vice President

May 2022 – May 2023

UET, Lahore

- As a member of the decision committee, I helped arrange community events like AWS Community Day, and UTS (UET-ACM Technical Symposium) 2023. Played a key role in arranging coding competitions

UET-ACM Student Chapter

General Secretary

Jul. 2021 – May 2022

UET, Lahore

- Represented the student chapter in local events and helped organize UTS (UET-ACM Technical Symposium) 2022. I also helped organizations arrange their recruitment drives and recruitment tests.