Muhammad Muzammil

muzammil-aziz muzammilaz
Nuremberg, Germany

mmuzammilaziz@gmail.com
+49 (0)178 631 0644

Education

University of Erlangen-Nuremberg (FAU) — Erlangen, Germany
Master of Science in Artificial Intelligence — *2021 - 2024 (expected)*

Sir Syed University of Engineering and Technology — Karachi, Pakistan
Bachelor of Science in Software Engineering — *2015 - 2018*

Work Experience

Adidas — Herzogenaurach, Germany
Intern - Future Creation Technologies — *Sep. 2022 - Feb. 2023*

- Primarily worked on researching and evaluating cell-phone based, deep learning driven material capture methods from single or multiple images on various different open datasets as well as in-house collected dataset.
- Captured a dataset of footwear and apparel materials and calibrated the processing of images from the capturing rig developed specifically for cell-phone based material capture.

University of Erlangen-Nuremberg (FAU) — Erlangen, Germany
Student Research Assistant (HiWi) — *Mar. 2022 - Aug. 2022*

- Worked on 3D reconstruction from feature supervision using implicit neural representations in the Cognitive Computer Vision group under the supervision of Prof. Bernhard Egger.

Love for Data (LFD) — Karachi, Pakistan
Data Analyst — *Dec. 2018 - Sep. 2021*

- Worked on a product on ML based Network & Link Analysis for suspicious account and activity detection for the banking industry.
- Worked on a data matching project. In order to make the NP-Complete problem tractable, we used stochastic combinatorial optimization to reach approximate solutions for intractable cases, after reducing the search space using several heuristics.
- Link Analysis for detecting criminal ties using Call Detail Records (CDR).
- Text analytics on chat data of one of the leading textile brands of Pakistan, goal was to organize the most frequent queries according to seasons and sale periods.
- Recommendation engine for a large micro-finance bank of Pakistan to cross sell digital financial inclusion services to their existing customer base.
- Default and delinquency prediction models for a nano loan provider company.
- Partially worked on churn prediction for the largest telco of Pakistan, cargo forecasting for a ground handling agent service provider and property price prediction for a foreign government land department.

Research Projects

Friedrich–Alexander University Erlangen–Nürnberg — *Summer 2022*
Project: Effects of shape bias on medical imaging tasks
Supervised by: Prof. Andreas Kist and Prof. Bernhard Egger

- The project explores how shape bias affect several medical image classification tasks.

Friedrich–Alexander University Erlangen–Nürnberg — *Winter 2021*
Final Project for the course: Computational Visual Perception
Taught by: Prof. Bernhard Egger | **Project Supervised by:** Prof. Andreas Kist

- In this course project, I explored the shape and texture bias in the Vision Transformer (ViT) model. Specifically, I evaluated all variants of ViT and DeiT (from the papers A Dosovitskiy et al. 2020 and H Touvron et al. 2021 respectively) for texture and shape bias using cue-conflict dataset by R. Geirhos et al. 2018. I fine-tuned Imagenet trained DeiT-Small model on Stylized-Imagenet (SIN) dataset and evaluated potential of shape biased models for domain adaptation in medical imaging domain by conducting preliminary experiments of transfer learning on MURA dataset.
- Based on the results, I concluded that all variants of ViT models demonstrate more shape bias than their ConvNet counterparts. The DeiT-S model converged more quickly when fine-tuned on Stylized-Imagenet compared to ResNet-50 which has similar number of parameters and performance of the SIN trained DeiT substantially closed the gap between human and machine shape bias. Furthermore, my evaluation of the pretrained models hinted at the emergence of high shape bias without explicit induction in the models trained on high volumes of data in either supervised or self-supervised manner.

Queen Mary University of London *Spring 2020*
Independent Research Assistant for the project on measuring network flow on internet infrastructure
Supervised by: Dr. Zafar Gilani

- My work in the project mainly consisted of understanding, organizing and documenting the codebase for experiments and analysis. I also worked on creating a pipeline for automatically fixing discrepancies in updated data sources using variable profiles to make an aligned dataset for the experimentation process.

Sir Syed University of Engineering and Technology *Academic Year 2018*
Bachelor's Final Project: Detecting Abnormality in Musculoskeletal Radiographs through ConvNets
Supervised by: Moona Kanwal, Dur-E-Shawar Agha
Domain Advisor: Dr. Tasir Ahmed Mumtaz (Department of Radiology, Hamdard University, Karachi)

- This project was done with 3 other team members. In this project we trained ConvNet model for abnormality detection in upper limb radiographs (X-Ray Images), as well as extended the work for fracture detection by creating novel labels with the help of expert radiologist and used boosting classifier on deep features (reusing the same features for abnormality detection task). Explored various model architectures (DenseNet-169, Inception-ResNetv4 and variants), performed ablation studies, compared performances and trade-offs. Provided a way to interpret model activation through class activation maps. Developed a website and API for hosting the model. Final demo of the project can be seen here.
  Technologies used: Python (PyTorch, Scikit-Learn, Django web framework)

Technical Skills

Programming Languages: Python, C++, R, Java, SQL

Tools and Frameworks: Pytorch, OpenCV, Jax, Tidyverse, R-Shiny, git, LaTeX

Summer Schools and Certifications

Eastern European Machine Learning Summer School Kraków, Poland (Virtual)
Deep Learning & Reinforcement Learning (Organized by Deepmind) *Summer 2020*

Languages

English CEFR C1
IELTS Academic - 8.0 (L 8.5, R 8.5, W 7.5, S 7.0) *Oct. 2020*
German CEFR A1
Self-Assessed
Urdu Native