

Muhammad Muzammil

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Deep Learning • 3D Reconstruction • Inverse Graphics • Vision Transformers

EDUCATION

Friedrich-Alexander-Universität Erlangen-Nürnberg

Master of Science in Artificial Intelligence

Erlangen, DE

2021 - 2024 (expected)

Sir Syed University of Engineering and Technology

Bachelor of Science in Software Engineering

Karachi, PK

2015 - 2018

Grade 1.9, Final Project Grade: 1.0

WORK EXPERIENCE

Fraunhofer Institute for Integrated Circuits IIS

Student Research Assistant

Erlangen, DE

Dec. 2023 - Present

- Working on optimizing [Neural Radiance Fields \(NeRFs\)](#) for 3D object capture in [Moving Picture Technologies](#).

Adidas

Intern - Future Creation Technologies

Herzogenaurach, DE

Sep. 2022 - Feb. 2023

- Worked on improving existing material scanning pipeline through single-shot deep learning based [material reflectance properties \(SVBRDF\)](#) estimation methods with [Jochen Süßmuth](#), [Tim Weyrich](#), and [Bernhard Egger](#).
- Captured a dataset of physical material samples as well as built pipeline for calibrating and processing the captured materials.
- Evaluated state-of-the-art Single-shot methods for estimating material reflectance properties on the captured dataset.

FAU Erlangen-Nürnberg - Cognitive Computer Vision Group

Student Research Assistant

Erlangen, DE

Mar. 2022 - Aug. 2022

- Worked on [light field networks](#) for [3D reconstruction](#) of objects using joint image color & extracted features supervision, in the Cognitive Computer Vision group under the supervision of [Bernhard Egger](#).

LFD - Data Science Consultancy

Data Analyst

Karachi, PK

Dec. 2018 - Sep. 2021

- Developed a product for the banking industry that uses Machine Learning based Network & Link Analysis to detect suspicious account and activity.
- Worked on a data matching project and used stochastic combinatorial optimization to reach approximate solutions for intractable cases.
- Conducted Link Analysis using Call Detail Records (CDR) to detect criminal ties. Analyzed chat data of a leading textile brand of Pakistan to organize the most frequent queries according to seasons and sale periods.
- Built a recommendation engine for a large micro-finance bank of Pakistan to cross-sell digital financial inclusion services to their existing customer base.
- Developed prediction models for default and delinquency, customer churn, and forecasting for cargo handling.

RESEARCH & PROJECTS

Friedrich-Alexander University Erlangen-Nürnberg

Winter 2023

Industrial Visual Inspection using Vision Transformers

AI Applications Project

Project for: [Institute for Factory Automation and Production Systems](#)

- Investigating the potential of [Vision Transformers](#) on industrial visual inspection with limited training data using self-supervised pretraining.
Technologies used: PyTorch

Friedrich-Alexander University Erlangen-Nürnberg

Winter 2021

Shape vs Texture bias in Vision Transformers ([slides](#))

Course Project

Supervised by: [Bernhard Egger](#) and [Andreas Kist](#)

- Explored shape and texture bias in [Vision Transformer \(ViT\)](#) models. Concluded that ViT models exhibit more shape bias than ConvNets, while also noting quicker convergence of DeiT-S on Stylized-Imagenet compared to ResNet-50. Found SIN-trained DeiT narrowed the gap between human and machine shape bias. The evaluation of various ViT models suggested the emergence of high shape bias in ViT models trained on really large datasets, whether supervised or self-supervised.
Technologies used: PyTorch

- Collaborated with a team of four on a project involving ConvNets training for upper limb radiograph abnormality detection. Extended the scope to include fracture detection with novel labels created with expert radiologist input. Utilized a boosting classifier on shared deep features for both tasks. Explored diverse model architectures, conducted ablation studies, and provided insights through class activation maps. Developed a website and API to host the model. *Technologies used: PyTorch, Scikit-Learn, Django web framework*

TECHNICAL SKILLS

Programming Languages: Python (5+ yrs), C++ (< 1 yr), R (2+ yrs), Java (1+ yrs), SQL (2+ yrs)

Tools and Frameworks: Pytorch, CUDA, OpenCV, Jax, Tidyverse, R-Shiny, git, L^AT_EX

SUMMER SCHOOLS AND CERTIFICATIONS

Eastern European Machine Learning Summer School

Kraków, PL (Virtual)

Deep Learning & Reinforcement Learning (Organized by Deepmind)

Summer 2020

VOLUNTEERING AND SOCIETIES

Fachschaftsinitiative (FSI) Artificial Intelligence

Erlangen, DE

Friedrich-Alexander-Universität Erlangen-Nürnberg

Oct. 2022 - Present

IEEE Computer Society

Karachi, PK

Sir Syed University of Engineering & Technology

Jan. 2017 - Dec. 2018

LANGUAGES

English

CEFR C1

German

CEFR A1

Urdu

Native



Muhammad Muzammil

December, 2023