Marcel Roth

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Research Interests

Advancing medical AI through interdisciplinary research, with a focus on responsible, interpretable AI models for medical diagnostics. Keen to bridge AI, clinical insight, and medicine through impactful research aimed at transforming patient care. Hands-on experience in few-shot learning, addressing challenges like data scarcity and improving diagnostic accuracy. Expertise in machine learning, computer vision, and explainable AI.

Professional Experience

JMU, Chair for HCI, Research Intern
Towards standardizing XR motion datasets [1]. *Developing the BOXRR-24 dataset, featuring 15 million motion capture recordings of XR devices to drive XR data research.*
10/2023 – present, Würzburg, GER

denkbares, Knowledge Engineer Working Student
UI/UX features for product configuration knowledge bases.
11/2023 – present, Würzburg, GER

JMU, Chair for Data Science, Research Assistant
In-depth literature review of environmental variables in ecosystem forecasting models for NDVI vegetation modeling research.
08/2023 – 03/2024, Würzburg, GER

JMU, Chair for AI and KS, Research Intern
Pushed the boundaries of few-shot learning in thorax, pathology, and endoscopy image classification [2].
08/2023 – 02/2024, Würzburg, GER

eXXcellent solutions
Software Engineer, Working Student 2 years 3 months
Software Engineering Intern 6 months
Developed a LLM recommender system for a web-based legal document editor, enabling paraphrasing & simplification of complex text while retaining key technical terms.
02/2021 – 11/2023, Ulm, GER

Selected Skills

Programming Languages
Java 4 years, TypeScript 4 years, Python 3 years
Machine Learning
PyTorch, Lightning, MMCV, wandb, albumentations, timm
Data Analysis
NumPy, Pandas, Pillow, OpenCV, Scikit-Learn
Miscellaneous
React, MUI, PostgreSQL, SQLite, Docker, slurm
Languages
German, English B2, Swedish A1

Education

Julius-Maximilians-University Würzburg
M.Sc. Computer Science, *GPA: 1.1/1.0*
Thesis: *"[...] Medical Image Classification in GIE"* [3].
Focus: *Machine Learning & Computer Vision*
10/2022 – present, Würzburg, GER

University of Applied Sciences Ulm
B.Sc. Computer Science, *GPA: 1.5/1.0*
Thesis: *"The Metaverse: Definition [...] & Current State."*
07/2018 – 02/2023, Ulm, GER

Halmstad University
Graduate Exchange Student, *GPA: A/A*
08/2016 – 02/2017, Halmstad, SWE

Challenges & Awards

Capsule Vision 2024 Challenge (Running)
Domain-adaptive pre-training of self-supervised FMs for medical image classification in gastrointestinal endoscopy [3]. 2024

Ultimate Jailbreaking Championship 1st Place
First to successfully jailbreak LLMs Gemini-Flash-1.5 and Cygnet-Citadel, the latter of which was only successfully jailbroken in 2 out of 24.266 attempts. 2024

Animal Counting Station Challenge 1st Place
Deep learning for automated species recognition from camera trap images for wildlife animal population monitoring. 2024

Vesuvius GP Challenge Progress Prize Winner
Deep learning for binary image segmentation with weak-supervision without labels for groundbreaking ink detection on ancient Greek papyrus scrolls. 2023

NeurIPS 2023 MedFM Challenge 2nd Place
One-shot & few-shot learning for thorax, pathology, and endoscopy image classification using foundation models to improve limited medical data scenarios [2]. 2023

Publications

[1] *Navigating the Kinematic Maze: Analyzing, Standardizing and Unifying XR Motion Datasets*. IEEE'24.

[2] *The NeurIPS MedFM 2023 Challenge: Towards Foundation Model Prompting for Medical Image Classification*. (In review at NeurIPS'24).

[3] *Domain-Adaptive Pre-training of Self-Supervised Foundation Models for Medical Image Classification in Gastrointestinal Endoscopy*. ArXiv'24.

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October 31, 2024