AHMAD REZAEI

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EDUCATION

MSc, Research in Computer and Systems Engineering

Technische Universität Ilmenau

09.2020 - Present Ilmenau, Germany

- Master thesis: Exploring Neural Network mapping techniques for custom multi-processor systems.
- Current GPA: 1.54 (excluding thesis)

BSc, Electrical Engineering - Electronics

Shahid Bahonar University

09.2014 - 09.2019 Kerman, Iran

- Focused on digital systems and hardware design.
- GPA: 15.14/20

ACADEMIC WORK EXPERIENCE

Research Associate

Faculty of Computer Science and Automation, Technische Universität Ilmenau

12.2021 - 03.2024 Ilmenau, Germany

- Conducted research in optimization methods for explainable deep learning applied to the optical inspection of printed circuit boards (PCBs).
- Developed a framework for adaptive selection of explainable AI models to enhance efficiency and explainability in defect detection systems.
- Published 3 peer-reviewed papers on explainable AI and its application in industrial automation.

Research Assistant

Reliable & Smart Systems Lab

01.2019 - 07.2021 Kerman, Iran

- Focused on optimizing (pruning, quantization, weight compression, robustness) deep learning models for large-scale bioinformatics datasets.
- Published 1 ISI journal article and 1 Arxiv paper on machine learning applications in bioinformatics.

PUBLICATIONS

Rezaei, A., Nau, J., Streitferdt, D., Schambach, J., & Vangelov, T. (2023, October). ***ReProInspect: Framework for Reproducible Defect Datasets for Improved AOI of PCBAs.*** In 8th International Conference on Engineering of Computer-based Systems (ECBS), Västeras, Sweden (pp. 205-214). Cham: Springer Nature Switzerland.

RESEARCH INTERESTS

Machine Learning, Explainable AI, Continuous Learning

FUNDED PROJECT

Explainable Cognitive Optical Inspection in Electronics Manufacturing

TAB Project

2021 - 2023 Ilmenau, Germany

- Developed adaptive optimization methods for explainable AI in the context of printed circuit board (PCB) inspection.
- Collaborated with industry partners to deploy AI-driven defect detection systems in manufacturing environments.
- Enhanced explainability and performance of neural networks used in industrial automation.

EXPERIENCE

Reviewer

"IEEE Transactions on Artificial Intelligence" journal

08.2024

Co-Supervisor

Student Research Assistant

01.2023 - 06.2023

- Supervised research on continuous learning models for deep learning applications.

M.Sc. Research Projects

05.2022 - 04.2023, 09.2023 - 03.2024

- Methods and Techniques of Class Imbalance Learning in Deep Learning.
- 3D Simulation of Fluids and Their Interaction with Objects.

Selected M.Sc. Projects

Sensor Data Fusion for Pedestrian Decision Prediction (Autonomous Driving) | Imblearn, Dlib

11.2022 - 07.2023 Group Project

Rezaei, A., Nau, J., Richter, J., Streitferdt, D., & Schambach, J. (2023, June). ***FACEE: Framework for Automating CNN Explainability Evaluation***. In 2023 IEEE 47th Annual Computers, Software, and Applications Conference (COMPSAC), Torino, Italy, (pp. 67-78). IEEE.

Rezaei, A., Richter, J., Nau, J., Streitferdt, D., & Kirchhoff, M. (2023, February). ***Transparency and Traceability for AI-Based Defect Detection in PCB Production***. In Modelling and Development of Intelligent Systems: 8th International Conference, MDIS 2022, Sibiu, Romania, October 28–30, 2022, Revised Selected Papers (pp. 54-72). Cham: Springer Nature Switzerland.

Rezaei, A., Taheri, M., Mahani, A., & Magierowski, S. (2023). ***LRDB: LSTM Raw data DNA Base-caller based on long-short term models in an active learning environment***. arXiv preprint arXiv:2303.08915.

Rezaei, A., Mahani, A. (2021). ***Noise-based logic locking scheme against signal probability skew analysis***. IET Computers & Digital Techniques, Wiley Online Library.

CERTIFICATES

Introduction to Parallel Programming with CUDA

Certificate of successful completion; overall grade achieved: 96.19%

08.2024 — Coursera, Johns Hopkins University

Generative AI with Large Language Models

Certificate of successful completion; overall grade achieved: 91.75%

06.2024 — Coursera, DeepLearning.AI

C++ Programming Course

Certificate of successful completion; "Beginning C++ Programming - From Beginner to Beyond"

04.2020 — Course by Frank J. Mitropoulos

LANGUAGES

English - C1 | German - C1 | Persian - Native

REFERENCES

Dr.-Ing. Detlef Streitferdt

Faculty of Computer Science and Automation
Technische Universität Ilmenau
✉ detlef.streitferdt@tu-ilmenau.de
tu-ilmenau.de/lgi

Dr.-Ing. Johannes Richter

Software Architect
KLA Corporation
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Dr. Jörg Schambach

Product Manager Industrial Image Processing / Patent Manager
Göpel Electronic GmbH
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25.09.2024

- Developed a sensor fusion model to predict pedestrian decisions for autonomous driving systems.
- Implemented using Python, Imblearn, and Dlib for real-time decision-making.

Feature Processing and Time-Series Energy Prediction on Wafer Production Facility | Pandas, Tensorflow 2

04.2022 – 07.2022 — Database Laboratory

- Developed a time-series prediction model for energy consumption in a wafer production facility.

Regularization Techniques for Image Reconstruction | Pytorch, Sklearn, Skimage

06.2021 – 07.2021 — Deep Learning Course

- Applied regularization techniques to deteriorate image reconstruction from model features for the healthcare sector.

Selected Research

Explainable Training: Training CNNs with Explanations as Feedback | tf.Graph, tf.Data

01.2023 - 03.2024

- Used explainability methods to improve CNN model localization by leveraging feedback during training.

ApplyCam: Explainable Software for Image Modification | PyQt5-tools, Docker

07.2022

- Developed an interactive software tool that provides explanations through deep learning models for image modifications.

+15 projects and additional details [1] on my **personal website**

SKILLS

Python | C++/C | MATLAB

TensorFlow 1 & 2, Keras | PyTorch | Hugging Face | Brevitas | QONNX | OpenCV | Scikit-learn | MLOps

PyQt5 | API Integrations | Git (GitHub, GitLab) | CI/CD | Docker | Kubernetes

SQLite | Oracle | SQL | Data Architecture

[1] https://amd-rezaei.github.io/