Abdul Hanan Khan

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WORK EXPERIENCE

GlobalFoundries **May 2022 – May 2023**
Data Scientist - TCAD *Dresden, Germany*

- Conducted ETL processes on raw transistor data from FEM simulations, ensuring high-quality, structured datasets for analysis and model training.
- Automated hyperparameter optimization for deep neural networks using a blend of Bayesian optimization and random search algorithms, resulting in around 35% performance boost.
- Implemented transfer learning to leverage device physics from one semiconductor device for training neural networks on other devices, leading to reduction in training resources by ~45%
- Generated multi-dimensional parallelized deep neural network implementations through shell scripting, reducing model development time by ~60%.
- Employed Power BI to generate interactive dashboards visualizing neural network outcomes and semiconductor data insights, aiding data-driven decision-making.

Bauhaus-Universität **Nov. 2020 – May 2022**
Teacher Assistant (Tutor/HiWi) *Weimar, Germany*

- Developed stochastic simulation techniques in python reducing runtime by almost 40 % compared to previous MATLAB implementation.
- Presented tutorials in Optimization and stochastic simulations.

Sohaib Construction Pvt. **July 2016 – Dec. 2019**
Planning Engineer *Lahore, Pakistan*

- Led project planning, resource allocation, and timeline management.

EDUCATION

Bauhaus-Universität **Jan, 2024**
M.Sc. Digital Engineering *Weimar, Germany*

- Main subjects: Machine learning, Natural language processing, Image analysis, Computer vision, Software engineering, Algorithms & Data structures
- Thesis: Transfer Learning in TCAD Enabled Machine Learning.

FAST NUCES **June, 2016**
B.Sc. Civil Engineering *Lahore, Pakistan*

- Relevant subjects: Applied calculus, Differential equations, Numerical analysis, Probability & statistics, Technical report writing & presenting, Psychology, Sociology.

PROJECTS

- **Transfer learning in TCAD-enabled machine learning models**
  - Utilized the power of transfer learning to develop an efficient training technique for similar transistor devices using deep NN.
- **Hyperparameter optimization for neural networks**
  - Built a hybrid automated optimization model using Bayesian and random search algorithms for neural network hyperparameters**.**

- **DeeplabV3 background removal: model development and flask deployment on AWS EC2**
  - Deployed a state-of-the-art deep learning model, DeepLabV3, for accurate background removal in images, using Flask on AWS EC2 instance using REST API.
- **Churn Prediction And Comparative Analysis**
  - Conducted exploratory data analysis (EDA), predicted churn through unsupervised KMeans clustering, and validated the results through ANN, Random forest and SVM classifier.
- **Custom deep neural network deployment on AWS sagemaker**
  - Created, trained, and deployed a custom deep neural network on AWS SageMaker using Docker.
- **Low context word prediction with large language models**
  - Fine-tuned language models such as BERT, GPT and n-gram to boost their performance in low-context word prediction scenarios by almost 35%.
- **Web pages classification**
  - Got 1st place in two web page classification competitions using methods like least mean squares, batch gradient descent, and ANN.

- **GITHUB link**
  - https://github.com/HananKhan7/Projects

PUBLICATION

- **TCAD-enabled Machine Learning – An Efficient Framework to Build Highly Accurate and Reliable Models for Semiconductor Technology Development and Fabrication (IEEE, 2023)**
  - Developed highly accurate deep neural networks (Digital twins) using automated hyperparameter optimization and transfer learning for semiconductor technology.

SKILLS

- **Language skills:** English (C2), German (B1)

- **Programming languages***:* Python, Java, R, Bash, Tcsh, MATLAB

- **Big Data:** Microsoft SQL server, Apache spark, Apache Airflow, Pandas, NumPy, Docker, Git

- **Data visualization:** Matplotlib, Power BI

- **ML libraries:** Tensorflow, Keras, Scikit-learn, PyTorch, OpenCV, Flask , FastAPI

- **ML models:** ANN, CNN, KNN, XGBoost, linear/non-linear regression/classification models, BERT, GPT, Deeplab, ResNet, AlexNet,, GoogleNet (Inception), Transformers

- **Cloud related:** AWS SageMaker, AWS S3, AWS EC2, AWS lambda, AWS ECS, AWS ECR, AWS fargate

- **Additional:** Microsoft VS code, Jupyter Notebook, Microsoft Office, Kubernetes, RESTAPI