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Summary

Extensive international full-time experience in Data Science, AI Engineering, and Software Engineering. Holder of a Master's degree from the prestigious **Technical University of Munich (TUM)**, with a thesis completed in collaboration with **Volkswagen Group**. Additionally, gained practical experience as a working student in leading German companies.

Education

Master of Science in Informatics

Technical University of Munich (**TUM**), Germany

Major: Machine Learning and Analytics

Minors: Computer Vision / Security

Thesis Grade: 1.0

September 2024

GPA: 1.9

Bachelor of Science

German University in Cairo (**GUC**), Egypt

Computer Science and Engineering

Thesis Grade: 1.0

July 2020

GPA: 1.8

Experience

EFG Holding

AI Engineer (Remote) - Full-time

December 2024 – Present

- Developing **LangGraph** RAG AI agents with FastAPI on **Azure**, integrated into Microsoft Power Automate to build a smart chatbot that improved EFG's internal workflow efficiency by 70%.
- Developing a multi-modal RAG pipelines enabling LLMs to query across text, images, and tables for enhanced information retrieval.
- Utilizing **Langsmith** (LLMOps) to monitor, test, and debug the LLMs pipeline during development and production.
- Evaluating the RAG pipeline using RAGAS metrics to ensure efficiency and accuracy.
- Performing data pre-processing and transformation tasks using Pandas and SQL, ensuring data quality and feature readiness for advanced analytics.

Volkswagen Group, Wolfsburg

Gen AI Researcher - Master Thesis Internship

December 2023 – September 2024

- Conducted master thesis research (graded 1.0, highest distinction) on generating complex corner case street scenes for autonomous driving algorithms using **Generative AI Diffusion Models**.
- Implemented complex corner cases in Unity game engine and transformed them to realistic scenes using generative AI.
- Generated high-quality synthetic data leveraging state-of-the-art diffusion models to enhance autonomous driving testing datasets.
- Finetuned Stable Diffusion XL with LoRA on Audi's A2D2 Dataset, achieving superior domain adaptation for autonomous vehicle applications.

Hotdesk, Dubai

Software Engineer (AI) - Full-Time

September 2022 – December 2023

- Developed Hotdesk's first recommendation engine, improving user retention by over 20% by providing tailored listing recommendations based on factors like proximity, price, amenities, and user behavior.
- Created a CNN-based machine learning model and using OpenCV to assess listing image quality, detecting watermarks, blur, and brightness to ensure optimal content standards.
- Optimized ETL pipelines on Google Cloud Platform (GCP), achieving a 65% reduction in operational costs.
- Served the models using the AWS Lambda, and Flask API.
- Produced impactful visualizations with Google Data Studio to support data-driven business decisions.

Stadtwerke München, München

Software Engineer (AI) - Working Student

October 2022 – December 2023

- Developed advanced machine learning models using PyTorch, with a focus on large language models (LLMs) to address complex business challenges.
- Designed and deployed an NLP-based email classification system, fine-tuning a German BERT model to categorize German emails into 10 distinct topics, improving organizational workflow and response efficiency.
- Built a robust data anonymization pipeline for PDF documents, integrating OCR and NLP entity recognition techniques using fine-tuned BERT, ensuring data privacy.

KNOWRON, München

Machine Learning/ Software Engineer - Working Student

July 2021 – September 2022

- Developed a dense passage retrieval search engine using machine learning and NLP techniques to improve the company's knowledge management capabilities.
- Created mobile apps to assist workers in various industries, enhancing their productivity and operational efficiency.
- Collaborated closely with the engineering team to successfully launch three mobile apps—Knowron, Voith, and ASM—on both the App Store and Google Play.

Extreme Solution, Cairo

Software Engineer - Full-Time

July 2020 – August 2021

- Developed mobile applications using React Native, iOS, and Android native technologies for diverse client needs.
- Worked closely with the team to successfully publish the American University in Cairo app on both the App Store and Google Play.
- Worked on front-end web applications using ReactJS, contributing to the delivery of high-quality software products.

Academic Projects

Masters Practical Course: Question Answering over Privacy Policies:

- Used Cross-Task generalization to enable a FLAN T5 model to generalize to seen and unseen tasks.
- Used Zero-Shot Learning & Few-Shot Learning
- Performed Instruction Finetuning & Parameter Efficient Finetuning (PEFT) to finetune 0.6% of the parameters.

Technical Skills

Python, JavaScript, Java, PyTorch, Tensorflow, CNN, NLP, Diffusion Models, Pandas, NumPy, Matplotlib, Seaborn, Scipy, MySQL, PostgreSQL, MongoDB, AWS, Azure, Google Cloud, Docker, ReactJS, React Native, Deep learning, Autonomous driving, LLMs, Prompt Engineering, LangChain, RAG, Semantic Search, FastAPI, OpenAI, Numpy, Streamlit

Competitions

Facebook Developer Circles Hackathon'19

- **Winner** - *Third Place*

October 2019

- Developed an app for Resala organization that solves their Facebook group issues using Machine learning to classify the Arabic/English posts into categories.

Certificates

Deep Learning Specialization

November 2019

Coursera - Taught by: DeepLearning.AI (Dr.Andrew Ng)

Extracurricular Activities

Basketball Team, Wadi Degla club.

- Won First in Fourth division Egyptian Basketball league and qualified for Third division, 2017.
- Won Second in Cairo Basketball Championship, November 2016.

Languages Spoken

English: Fluent.

German: Good (B1).