Alex Sheldrick

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Summary

AI Engineer with dual Master's degrees in Physics and AI, specializing in 3D Deep Learning and neural rendering. Proficient in Python and PyTorch, with experience in developing and optimizing machine learning models. Successfully led projects integrating cutting-edge research into practical applications, such as creating LLM-based data ingestion pipelines and developing AI strategies for retail sector automation. Adept at collaborating in interdisciplinary environments and providing expert support for AI workload optimization. Fluent in German and English, committed to advancing AI technologies and enhancing engineering processes.

Experience

AI Engineer Mar. 2024 – Ongoing
appliedAI Initiative GmbH Munich, Germany

- Led development of a LLM middleware solution, integrating privacy filtering, semantic caching, and usage analytics to enable secure and cost-effective integration of LLM agnostic APIs with internal applications, reducing PII exposure risk on average by 61% and decreasing API costs by 12%
- Moderated cross-functional workshops on AI capabilities, legal requirements, and advanced computer vision techniques, bridging the gap between technical solutions and business needs for DAX-level partners and internal teams
- Formulated AI strategies and architected natural language processing (NLP) based solutions for retail sector executives, automating customer interactions and improving operational efficiency

Data Scientist Dez. 2023 – Feb. 2024
ExoMatter GmbH Munich, Germany

- Engineered an LLM-based data ingestion pipeline for extracting and aggregating material science quantities from unstructured sources, implementing semantic search functionality with PostgreSQL for enhanced data retrieval and processing efficiency
- Developed and optimized custom machine learning models for compound property prediction, achieving a 26% improvement in prediction accuracy compared to baseline models by leveraging domain-specific expertise

Research Assistant Apr. 2021 – Sep. 2023
Visual Computing & Artificial Intelligence Group Munich, Germany

- Performed grant-funded 3D computer vision research focusing on the rapid development, iteration, and deployment of machine learning models for real-world applications
- Managed the complete cycle of optical sensor data handling, from gathering and processing to the streamlined deployment of comprehensive datasets, enhancing the efficiency of computer vision projects
- Achieved 4x improved training times and 50% reduction in data required for photorealistic reconstruction of scenes with neural radiance fields by deriving a probabilistic novel loss for RGB-D supervision

Education

Master of Science | **Grade: 1.7** | ***Robotics, Cognition, Intelligence*** 2023
Technical University of Munich Munich, Germany
M.Sc. Thesis: Neural Radiance Field Reconstruction with Depth and Normal Constraints

Master of Science | **Grade: 1.2** | ***Physics*** 2020
Technical University of Berlin Berlin, Germany
M.Sc. Thesis: Generation and characterisation of metalated biomolecules in an electrospray ionisation mass spectrometer: metal-flavin complexes

Skills

Technical Skills

Python Programming: Advanced proficiency in Python with extensive experience in AI and data science applications, including PyTorch, FastAPI, and PostgreSQL

Machine Learning: Proficient in designing custom loss functions, data augmentation techniques, and hyperparameter optimization for domain-specific ML models

3D Computer Vision & Deep Learning: Specialized in neural rendering, implicit scene representations, and 3D CNN architectures; experienced with diffusion models and transformers

LLM Technologies: Expert in developing LLM middleware, including privacy-preserving techniques, semantic caching, and analytics for enterprise-grade AI integration

C++: Competent in implementing traditional computer vision pipelines using OpenCV

Soft Skills

Project Management: Skilled in managing the full cycle of AI projects, from concept to deployment, ensuring high customer satisfaction

Communication: Bilingual in German and English; adept at delivering technical reports and consulting on AI strategies to diverse audiences, including C-level executives

Leadership: Experience leading engineering projects and cross-functional workshops in AI and computer vision

Selected Machine-Learning & Computer Vision Projects

Neural Radiance Field Reconstruction with Depth and Normal Constraints Spring 2023

Python | PyTorch | *Neural Radiance Field (NeRF)*

- Initiated a project aimed at optimizing data efficiency in machine learning applications: data visualization and analysis outlined actionable insights that led to the derivation of novel loss
- Designed and executed an end-to-end data pipeline, overseeing the entire process from data collection to comprehensive and robust processing, leading to efficient deployment
- Improved reconstruction quality in sparse view settings by 24%, accelerated model training time by 4x, and reduced the necessary data by up to 50%, by integrating depth data and deriving a novel loss function

3D Reconstruction: single-view colored mesh generation Fall 2021

Python | PyTorch | *3D CNN encoder-decoder architecture*

- Engineered a 3D CNN to generate fully colored meshes from single-view images, incorporating a differentiable point cloud voxelizer and marching cubes for mesh extraction
- Implemented point-to-image-plane projections for optimized local feature extraction, achieving a 2.7% improvement in IoU and 464% reduction in Chamfer-L1 distance compared to contemporary 2D models

Achievements and Grants

Fellowship Grant Apr. 2021

Awarded to outstanding Master's students for conducting independent research in Visual Computing & AI

WoW Arena World Champion (Arena World Championship) Nov. 2017

Founded and led a team to victory in a premier e-sports tournament, securing a $280,000 prize pool

Publications

Nieto, P., Müller, D., Sheldrick, A., Günther, A., Miyazaki, M., & Dopfer, O. (2018). Effect of alkali ions on optical properties of flavins: Vibronic spectra of cryogenic m+lumichrome ions (m = li–cs) in the gas phase. *Phys. Chem. Chem. Phys.*, *20*, 22148–22158. doi:10.1039/C8CP03950J

Sheldrick, A., Müller, D., Günther, A., Nieto, P., & Dopfer, O. (2018). Optical spectroscopy of isolated flavins: Photodissociation of protonated lumichrome. *Phys. Chem. Chem. Phys.*, *20*, 7407–7414. doi:10.1039/C8CP00590G

Günther, A., Nieto, P., Müller, D., Sheldrick, A., Gerlich, D., & Dopfer, O. (2017). Berlintrap: A new cryogenic 22-pole ion trap spectrometer. *Journal of Molecular Spectroscopy*, *332*, 8–15. Molecular Spectroscopy in Traps. doi:https://doi.org/10.1016/j.jms.2016.08.017