CAVIT CAKIR

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EDUCATION

Technical University of Munich (TUM) — Munich, Germany
Master of Science in Informatics — *Oct 2021 – Mar 2024*

- Specializations: Computer Vision, Natural Language Processing
- Thesis: Self-Supervised Feature Learning for 3D LiDAR Semantic Segmentation with Neural Radiance Fields

Sabanci University — Istanbul, Turkey
Bachelor of Science in Computer Science and Engineering — *Sep 2016 – Jun 2021*

- Specializations: Software Engineering, Natural Language Processing

TECHNICAL SKILLS

Languages: Python, C++
Machine Learning: PyTorch, NumPy, pandas, TensorFlow, Scikit-Learn, OpenCV, BentoML, Ollama, Langchain, RAG, LLM
Databases: Qdrant, MongoDB, MySQL
Developer Tools: Git, Docker, Bash, AWS, Google Cloud Platform
Web Development: React, Node.js, FastAPI
Natural Languages: Turkish (native), English (advanced), German (basic - learning)

EXPERIENCE

Software & Machine Learning Engineer — May 2024 – Present
Quasara GmbH — *Munich, Germany*

- Designed, developed, and maintained RAG-based chatbots by leveraging open-source large language models (LLMs), including LLaMA and DeepSeek, and integrating them with the external knowledge base Qdrant.
- Designed and implemented a scalable vectorization pipeline using zero-shot multimodal models to process large-scale image datasets from S3 into Qdrant, achieving **5x faster processing and reducing costs.**
- Improved small object recognition speeds by **2x with a 3% accuracy trade-off** and **3x with a 5% trade-off** using multimodal VLMs and computer vision techniques.
- Built and maintained a **FastAPI backend**, collaborating with client engineering teams for integration.
- Deployed scalable solutions on Google Compute Engine and AWS EC2.

Master Thesis Student | ▉ View Thesis — May 2023 – Nov 2023
CARIAD - a subsidiary of Volkswagen — *Ingolstadt, Germany*

- Developed a novel self-supervised learning approach for 3D LiDAR semantic segmentation, utilizing Neural Radiance Fields (NeRFs) to extract volumetric features from image data.
- Distilled 2D image features into 3D domains, allowing LiDAR segmentation models to be trained with geometrically aware features without relying on labeled data.
- Demonstrated the potential of self-supervised techniques to overcome the limitations of densely labeled 3D datasets.

Software & Machine Learning Engineer Working Student — Dec 2022 – May 2023
Quasara GmbH — *Munich, Germany*

- Led the end-to-end development of a Damage Classification Project using state-of-the-art transformer models, achieving over 93% accuracy in image classification.
- Implemented advanced cleaning and augmentation techniques to overcome imperfect labeled data.
- Enhanced client communication through regular updates and detailed presentations of project outcomes.

Natural Language Processing (NLP) Intern — Jul 2020 – Oct 2020
FineSci Technology — *Istanbul, Turkey*

- Contributed to the News Classification and Clustering Project by applying state-of-the-art transformer language models to classify Turkish news.
- Achieved over 96% accuracy in news classification, significantly improving efficiency and accuracy of categorization.

Undergraduate Teaching Assistant
Sabanci University

Feb 2019 – Feb 2020

Istanbul, Turkey

- Independently managed lab sessions for 20 – 30 students, providing hands-on support and guidance, and offered mentoring during office hours to enhance students' understanding and engagement with course materials.
- Utilized C++ as the primary programming language to facilitate practical learning in the Introduction to Computing course, demonstrating strong technical expertise and application skills.

SELECTED PROJECTS IN COMPUTER VISION

Implementation of Panoptic Neural Field
Oct 2022 – Mar 2023

- *Python, Pytorch, NeRF* | ▤ View Project
- Implemented the *Panoptic Neural Field (PNF)* paper from scratch using *Kaolin Wisp* and the *KITTI 360 dataset*, demonstrating initiative and expertise in translating theoretical concepts into practical, executable code without existing implementations.
- Optimized the *PNF* architecture for better performance, employing advanced techniques to significantly improve model efficiency and accuracy, highlighting my ability to innovate and enhance existing methodologies.

Improving Point Cloud Transformer using Curve Aggregation
Apr 2022 – Sep 2022

- *Python, Pytorch, Transformers* | ⓞ View Project
- Enhanced the shape analysis capabilities of a *Point Cloud Transformer* by implementing a *Curve Aggregation* method, improving model performance for detailed 3D point cloud processing by 0.35%. This innovation led to more accurate shape interpretations on the *ShapeNet Parts* dataset.
- Converted the *Point Cloud Transformer* implementation from *Jittor* to *PyTorch*, demonstrating technical proficiency and versatility in adapting complex models to widely used frameworks.

SELECTED PROJECTS IN NLP

NLP and Knowledge Graphs for Research Cluster Prediction and Analysis
Oct 2022 – Mar 2023

- *Python, Pytorch, Transformers, LLM* | ▤ View Project
- Contributed to the *Unsupervised Classification of Research Papers Project* by proposing a novel *Hierarchical Classification Method* and successfully applying existing techniques.
- Used the cutting-edge *SPECTER* embedding model to enhance the quality of embeddings, enabling a more precise understanding of research paper content and significantly contributing to the project's success.

Emotional Clustering of Social Media Users
Apr 2022 – Sep 2022

- *Python, Pytorch, BERT* | ▤ View Project
- Utilized a *BERT model* to extract embeddings and cluster users based on their textual data, demonstrating proficiency in advanced NLP techniques for user segmentation.
- Preprocessed Reddit user posts to meet the requirements of the *BERT model*, showcasing the ability to prepare and adapt large-scale datasets for complex NLP tasks.
- Applied various *Dimensionality Reduction Methods* like PCA, and clustering methods including *HDBSCAN* and *KMeans*, to efficiently analyze and cluster high-dimensional data.

Meeting Scheduler Chatbot — *Graduation Project*
Sep 2020 – Jun 2021

- *Python, JavaScript, React, Node.js, Docker* | ⓞ View Project
- Developed an advanced chatbot using the *RASA Bot Framework*, integrating pre-trained natural language understanding methods to accurately process and interpret user inputs. This demonstrated expertise in utilizing state-of-the-art AI technologies to create intelligent conversational agents.
- Implemented a graphical user interface for the chatbot with *React* and *Node.js*, encapsulated in *Docker* containers to ensure ease of deployment and scalability. This end-to-end development highlighted my full-stack development skills and commitment to delivering robust, scalable applications.