

# CAVIT ÇAKIR

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## EDUCATION

### Technical University of Munich (TUM)

Master of Science in Informatics

Munich, Germany

Oct 2021 – Mar 2024

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

### Sabancı University

Bachelor of Science in Computer Science and Engineering

Istanbul, Turkey

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

Quasara GmbH

May 2024 – Present

Munich, Germany

- Designed, developed, and maintained RAG-based chatbots by leveraging open-source large language models (LLMs) including LLaMA and Deepseek integrating them with 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

CARIAD - a subsidiary of Volkswagen

May 2023 – Nov 2023

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

Quasara GmbH

Dec 2022 – May 2023

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

FineSci Technology

Jul 2020 – Oct 2020

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

Sabancı 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

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### 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

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### 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.