

# Cavit Cakir

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## Education

### Technical University of Munich (TUM)

Munich, Germany

Master of Science in Informatics

Oct 2021 - Apr 2024 (Expected)

- **Specializations:** Computer Vision, Natural Language Processing (NLP), Machine Learning, Artificial Intelligence (AI)
- **Grade:** 2.0/5.0 (German grading system, 1.0 highest - 5.0 lowest)

### Sabanci University

Istanbul, Turkey

Bachelor of Science in Computer Science and Engineering

Sep 2016 - Jun 2021

- **Graduation Project Area:** Natural Language Processing (NLP)
- **Major GPA:** 3.78/4.0 (US grading system, 4.0 highest - 0.0 lowest)

## Skills

**Programming** Python, C++, JavaScript | Pytorch, Numpy, Pandas, Tensorflow, Git, Docker, React, Node.js, SQL, NoSQL

**Natural Languages** Turkish (native), English (advanced), German (basic)

## Experience

### Master Thesis Student

Ingolstadt, Germany

CARIAD | Python, Pytorch, Transformers, NeRF | 📄 View Thesis

May 2023 - Dec 2023

- Title: Self-Supervised Feature Learning for 3D LiDAR Semantic Segmentation with Neural Radiance Fields (NeRFs)
- Conducted under CARIAD, the automotive software company of Volkswagen, focusing on the *autonomous driving domain*.
- Managed the entire project lifecycle, from data preprocessing to the novel application of *Neural Radiance Fields (NeRFs)* and *3D LiDAR models*, demonstrating a comprehensive approach to complex challenges in the field.
- Utilized state-of-the-art techniques to significantly reduce the reliance on labeled datasets in autonomous driving, demonstrating the potential for more efficient and scalable model training methodologies.

### Computer Vision Engineer Working Student

Munich, Germany

Quasara GmbH | Python, Pytorch, Transformers

Dec 2022 - May 2023

- Led the end-to-end development of a *Damage Classification project*, from initial data preprocessing to model training and implementation, significantly enhancing image analysis performance by utilizing state-of-the-art transformer models. This role showcased not only strong project ownership and technical expertise but also proficiency in applying cutting-edge AI technologies in practical applications.
- Facilitated communication with the client company through regular updates, in-depth discussions on findings, and comprehensive presentations of model outcomes, demonstrating exceptional client engagement and presentation skills.

### Natural Language Processing (NLP) Intern

Istanbul, Turkey

FineSci Technology | Python, Pytorch, Transformers

Jul 2020 - Oct 2020

- Contributed to a *News Classification and Clustering project* by focusing on the classification of news using NLP techniques.
- Utilized state-of-the-art transformer language models to classify news articles, showcasing expertise in applying cutting-edge NLP technologies.

### Undergraduate Teaching Assistant

Istanbul, Turkey

Sabanci University | C++, Teaching

Feb 2019 - Feb 2020

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

## Selected Projects in Computer Vision

### Implementation of Panoptic Neural Field

Technical University of Munich

Advanced Practical Course | Python, Pytorch, NeRF | 📄 View Project

Oct 2022 - Mar 2023

- 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 in the absence of pre-existing implementations.
- Optimized the *PNF* architecture for enhanced performance, employing advanced techniques to achieve significant improvements in model efficiency and accuracy, showcasing my ability to innovate and improve upon existing methodologies.

### 3D Perception for Autonomous Driving Survey

Technical University of Munich

Advanced Seminar Course | Research |  View Project

Apr 2022 - Sep 2022

- Conducted in-depth research on *3D Object Tracking Methods*, with a particular focus on utilizing infrastructure sensors. This involved a comprehensive comparison of cutting-edge methodologies presented in recently published papers from top-tier conferences, demonstrating my analytical skills and ability to synthesize complex information.
- Written a survey paper that encapsulates the findings and insights derived from comparing recent advancements in 3D object tracking.

### Improving Point Cloud Transformer using Curve Aggregation

Technical University of Munich

ML for 3D Geometry Course Project | Python, Pytorch, Transformers |  View Project

Apr 2022 - Sep 2022

- Improved the shape analysis capabilities of a *Point Cloud Transformer* by implementing a *Curve Aggregation* method, showcasing my ability to enhance model performance for detailed 3D point cloud processing. This novelty led to more accurate shape interpretations on the *ShapeNet Parts* dataset.
- Successfully converted the *Point Cloud Transformer's* implementation from *Jittor* to *PyTorch*, demonstrating technical proficiency and versatility in adapting complex models to widely used frameworks.

### Skin Cancer Classification

Sabancı University

Machine Learning Course | Python, Tensorflow |  View Project

Feb 2020 - Jun 2020

- Used transfer learning techniques to facilitate early diagnoses of skin cancer through image analysis of skin segments. This approach enhanced the accuracy and reliability of diagnostic processes.

## Selected Projects in NLP

### NLP and Knowledge Graphs for Research Cluster Prediction and Analysis

Technical University of Munich

TUM-DI-LAB Interdisciplinary Project | Python, Pytorch, Transformers |  View Project

Oct 2022 - Mar 2023

- Participated in *Unsupervised Classification of Research Papers Project* and proposed a novel *Hierarchical Classification Method* while successfully applying existing methods.
- Used the cutting-edge *SPECTER* embedding model to enhance the quality of embeddings substantially. This choice enabled a more precise and nuanced understanding of research paper content, contributing to the project's success.

### Emotional Clustering of Social Media Users

Technical University of Munich

Advanced Practical Course | Python, Pytorch, Transformers, BERT |  View Project

Apr 2022 - Sep 2022

- Used the pre-trained *BERT model*, extracted embeddings to cluster users based on their textual data. This approach demonstrated my proficiency in utilizing advanced NLP techniques for user segmentation.
- Preprocessed Reddit users' posts to align with the pre-trained *BERT model's* requirements, showcasing my ability to prepare and adapt large-scale datasets for complex NLP tasks.
- Applied a variety of *Dimensionality Reduction Methods*, including *HDBSCAN* and *KMeans*, to analyze and cluster high-dimensional data efficiently.

### Meeting Scheduler Chatbot

Sabancı University

Bachelor's Graduation Project | Python, JavaScript, React, Node.js, Docker |  View Project

Sep 2020 - Jun 2021

- Developed an advanced chatbot utilizing the *RASA Bot Framework*, incorporating pre-trained natural language understanding methods to accurately process and interpret user inputs. This approach showcased my ability to use state-of-the-art AI technologies for creating interactive and intelligent conversational agents.
- Implemented a graphical user interface for the chatbot using *React* and *Node.js*, encapsulated within *Docker* containers for ease of deployment and scalability. This end-to-end development highlights my proficiency in full-stack development and my commitment to delivering robust, scalable applications.

### Lexicon and Rule-based Named Entity Recognition (NER)

Sabancı University

NLP Course Project | Python |  View Project

Sep 2020 - Nov 2020

- Collected and preprocessed Turkish and English datasets with tagged data for the lexicon.
- Developed 25 regular expression (regex) patterns for efficient entity recognition and data extraction tasks.
- Achieved first place in class ranking, demonstrating academic performance and mastery of subject matter.