

BERK KIVILCIM

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EDUCATION

Karlsruhe Institute of Technology (KIT)

2022 – 2024

Department of Civil Engineering, Geo and Environmental Sciences

Karlsruhe, Germany

- **Master of Science in Remote Sensing and Geoinformatics, GPA: 1.3** (German Grading Scale – *Very good*)
- **Elective Profile Module:** Computer Vision and Geoinformatics
- **Thesis** [Computer Graphics and Visualization Group (TU Delft), Institute of Photogrammetry and Remote Sensing (KIT), 2024]: *Studying the Geometric Convergence Behaviour of Neural Radiance Fields (NeRFs) for Improving Training Time*
 - Developed an adaptive strategy by utilizing voxels to terminate training when 3D geometric convergence reaches a sufficient level to significantly conserve time and computation resources without compromising the quantitative and qualitative qualities
 - By masking pixels where the depth information of a ray generated from a pixel intersects with a converged voxel region, subsequent training batches can focus on regions that have not yet converged well, reducing the risk of divergence during long-term training
- **Lab Rotation II** [Computer Graphics and Visualization Group (TU Delft), Institute of Photogrammetry and Remote Sensing (KIT), 2023]: *Evaluation of NeRF Methods – Impact of Trajectories and Implications for Real-Time 3D Reconstruction*
 - Investigated and compared the different NeRF methodologies (Vanilla-Nerf, MipNerf, Instant-NGP, Nerfacto) in terms of effectiveness for their potential contributions to urban modelling, mobile mapping, and autonomous driving
 - The KITTI dataset (created in collaboration between KIT and Toyota Technological Institute) was pre-processed to test different data capture frequency setups and prepared for use in NeRF training with a Python script
 - Observed that Nerfacto exhibited overfitting with the KITTI dataset but produced excellent results with datasets provided by Nerfstudio, whereas Instant-NGP delivered more consistent results with the KITTI dataset
- **Lab Rotation I** [Geodetic Institute, 2023]: *CityGML to Voxel Conversion for Geodetic Applications – Designing an Efficient Algorithm to Simulate Time Dilations to Test the Precision of Voxelized Methods*
 - Developed a Python script to convert CityGML data into voxel format
 - Tested the precision and efficiency of the voxelized methods by simulating time dilations in GNSS (Global Navigation Satellite System) satellites caused by masses (general relativity) by developing an algorithm using Python and the PostgreSQL databases
 - Investigated the applications of N-dimensional spaces in quantum physics and made sure the algorithm works for N-dimensional space, not just 3-dimensional space

Stuttgart University of Applied Sciences

2021 – 2022

Photogrammetry and Geoinformatics

Stuttgart, Germany

- Participated in lectures and completed assignments for the 1st semester of the Master's program of Photogrammetry and Geoinformatics before transferring to KIT

Hacettepe University

2016 – 2021

Geomatics Engineering Department

Ankara, Turkey

- **Bachelor of Science in Geomatics Engineering, GPA: 3.01/4.00** (*Honours*)
- **Graduation Project:** Investigation of Forest Fires with Google Earth Engine (as a group of three, 2021)
 - Wrote JavaScript code to visually and numerically analyze satellite images of areas before and after forest fires to quantify and visualize the impact of the forest fire in terms of the size of the burned area and burn severity and compared supervised (Minimum Distances, Smile Cart, Support Vector Machine), unsupervised (LCV, K-means) and spectral index-based thresholding methods for the analysis and identified the user experiences of these methods from the perspective of a non-expert user

- Utilized data from Sentinel-2 and Modis satellites through Google Earth Engine (GEE) and the NDVI spectral index for threshold classification and created a user-friendly website that informs users about forest fires and how to investigate them using our algorithms to analyze their impact
- Shared the algorithms and the process of using them with GEE [on GitHub alongside a tutorial](#)
- Reached the 2021 finals of the [TUBITAK 2242](#) project competition in the environment and energy field

RESEARCH & WORK EXPERIENCE

Karlsruhe Institute of Technology (KIT) **2022 – 2024**
Research Assistant at the Geodetic Institute **Karlsruhe, Germany**

- Worked on the [Distributed Simulation of Processes in Buildings and City Models](#) research project, predicting urban heat islands to support urban planners using an ML model using voxels derived from CityGML

Karlsruhe Institute of Technology (KIT) **2023 – 2024**
Teaching Assistant: “Numerical Mathematics” (Winter 23/24) **Karlsruhe, Germany**

Akdeniz University **2020 – 2021**
Intern at the Department of Space Sciences and Technologies, under the supervision of [Assoc. Prof. Dr. Nusret Demir](#)

- Researched various machine-learning algorithms to analyze forest fires with the help of Google Earth Engine, laying the foundation of my undergraduate graduation project

Geotech Company **2019**
Intern **Ankara, Turkey**

- Generated 3D surface and terrain models of the city of Medina
- Studied the impact of different filtering parameters on the creation of terrain models

PUBLICATIONS

In progress, as First Author **Upcoming – 2025**

- Predicting Air Temperature from Volumetric Urban Morphology with Machine Learning
- Submitted to Environment and Planning B: Urban Analytics and City Science, waiting for confirmation

In preparation, as Co-Author **Upcoming – 2025**

- More information will be available by the end of this year on an article about a research project that uses the methodologies documented in my thesis
- The accepted full paper will be published in the ISPRS International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences
- Will be presented at Optical 3D Metrology Workshop (12-13 December 2024)

SKILLS & QUALIFICATIONS

- **Technical:** **Advanced:** Python, Nerfstudio, Matlab, QGIS, PostgreSQL, LaTeX
Basic: Javascript, Google-Earth-Engine, ArcGIS Pro, Erdas, Lastools
- **Research Interests:** **Main Interests:** Deep Learning and Artificial Intelligence, Neural Radiance Fields, Computer Vision, Geoinformatics, Data Science
Familiar Topics: Geodesy, Photogrammetry, Surveying, Remote Sensing
- **Language:** Turkish (Native), English (Advanced)
- **Sports:** President of capoeira community at Hacettepe University 2017 – 2019
[Competitor in the Capoeira World Championship, senior category](#) 2018
Vice-president of capoeira community at Hacettepe University 2016 – 2017

REFERENCES

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