

Hi there!

I'm Kağan Küçükaytekin.

Little bit hard to pronounce, right?

You can call me "**Kaan**" ([hear it](#)), or just "**K**" if that's easier.

If you prefer a more formal tone, you can call me "Mr. Aytekin".

[Contact Me](#)



About Me



I'm a highly motivated and results-driven MSc. graduate from Technical University of Munich's Robotics, Cognition & Intelligence program with a strong passion for driving innovation in machine learning, computer vision, and robotics.

My professional experience includes developing and implementing cutting-edge solutions, from 3D avatar reconstruction to autonomous driving enhancements. I am eager to contribute my skills to forward-thinking projects in challenging environments.

Education

MSc. Robotics, Cognition & Intelligence

Technical University of Munich
School of Computation,
Information, Technology
April 2024 - November 2024
October 2020 - September 2022

Finished with distinction.
[Thesis →](#)



BSc. Mechanical Engineering

Istanbul Technical University
Faculty of Mechanical
Engineering

September 2015 - August 2020

Finished at the top 5% of last 5
years' graduates (1152
students).

Minor in Industrial Design
(Faculty of Architecture).



Work Experience

Applied Scientist

High-Performance Computing
Center, Stuttgart

August 2025 - Present

AI Application Specialist

- Providing technical support and consulting for industry partners and research institutions in the implementation and optimization of AI workloads on HLRS HPC systems.
- Offering direct support to external users in AI and hybrid HPC-AI workflows.
- Performing benchmarking, analysis, and optimization of AI workflows on HPC systems using profiling tools.
- Contributing to documentation and scientific publications.

H L R S

Machine Learning Engineer

Sony Europe B.V., Stuttgart

December 2024 - March 2025

Contributed to video-based 3D avatar reconstruction using Gaussian Splatting, built synthetic dataset pipelines, and researched egocentric human mesh recovery.

- Contributed to video-based 3D avatar reconstruction using Gaussian Splatting and SMPL-X.
- Built synthetic dataset generation pipeline using Unreal Engine and Blender.
- Contributed to research on egocentric vision, specifically on human mesh recovery from binocular wide-angle cameras.

SONY

Master Thesis

Sony Europe B.V., Stuttgart

April - November 2024

Developed a generalizable pixel-aligned Gaussian splatting method for real-time novel view synthesis of humans from sparse input images.

[Details →](#)

SONY



Research Intern

Huawei Munich Research Center,
Munich

June - December 2023

Improved semantic segmentation for autonomous driving through weather-controllable diffusion models and unsupervised domain adaptation techniques.

[Details →](#)

Student Assistant (HiWi)

LMU Chair of Statistical Learning
& Data Science, Munich

April - September 2023

Developed monocular depth estimation techniques for animal population estimation in Bavarian forests as part of the AI4Wildlife project.

- Developed monocular depth estimation techniques for animal population estimation in Bavarian forests, supporting the AI4Wildlife project.
- Combined 3D computer vision and statistical knowledge to identify limitations in existing methods and implement novel solutions.
- Rapidly developed and presented a successful Proof-of-Concept, autonomously establishing the groundwork for subsequent research whose results and code are still utilized in ongoing publications.



Working Student

iteratec GmbH, Munich

November 2021 - March 2022

Contributed to 2D-to-3D localization within industrial facility digital twins using traditional and modern feature extraction methods.

- Contributed to 2D-to-3D localization within a digital twin of an industrial facility.
- Explored traditional (SIFT, SURF, ORB, BRISK) feature extraction & matching methods.
- Explored modern (SuperPoint, SuperGlue) feature extraction & matching methods.
- Actively participated in collaborative software development with high focus on code quality.



Working Student

Mercedes-Benz Turkey, Istanbul

August 2019 - June 2020

IT Solutions Specialist

- Worked in IT Rollout team of the Solutions Delivery Center, a consulting unit serving the Daimler Group business units around the globe.
- Automated reporting through Excel macros.
- Led team workshops on adaption of OKR based performance metrics.
- Created mobile app mock-ups for internal use.
- Administered an internal Idea Management Portal.



Working Student

RIO.cloud & MAN, Munich

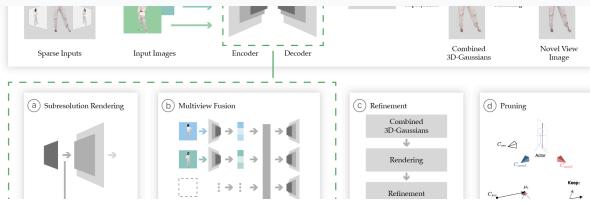
February - September 2018

Collaborated with senior Product Owner to drive IoT product development and coordinate interdisciplinary testing teams in a Scrum environment.

- Collaborated with the senior Product Owner in a Scrum environment to drive product development.
- Managed and coordinated interdisciplinary teams for real-world IoT hardware testing and analysis.
- Supported user tests and contributed across the lifecycle of software and hardware products.
- Crafted user stories tailored to customer needs and orchestrated IoT product tests with multiple vehicles and wireless solutions.
- Analyzed telematics, CANBus, and Bluetooth beacon data; presented key outcomes to stakeholders.



Featured Projects



Master Thesis: Generalizable Human Novel View Synthesis with Pixel Aligned Gaussian Splatting

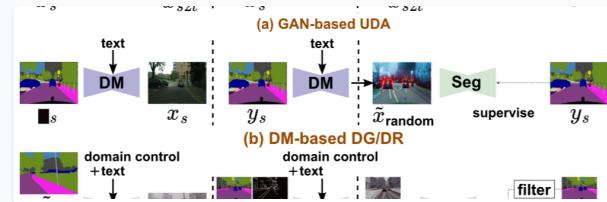
A real-time capable pixel-aligned Gaussian splatting-based method for realistic novel view synthesis of humans from sparse input images, enhancing flexibility by reducing reliance on priors and preprocessing.

- Proposed a simpler and more flexible method than the existing methods:

Method	Priors	Preprocessing	Limitation	#Params
GHG (ECCV24)	SMPL-X Template	SMPL-X Template extraction, Texture-map rearrangement, Scaffold creation	Fixed angle between cameras, Relies on good SMPL-X estimation	17.8M
GPS-Gaussian (CVPR24)	Binocular-View	Image Rectification	Max. 72-degree baseline	5.5M
Ours	Monocular-View	None of the above	None of the above	3.5M

- Developed a reliable pixel-aligned Gaussian Splatting method for generalizable 360-degree novel view synthesis of human heads from minimal input data and demonstrated capacity on the NPHM dataset.
- Demonstrated in-domain and cross-domain generalization capability on sparse-view full-body human datasets (THuman 2.0, CustomHumans).
- Conducted experimental analysis of various extensions to the proposed method, including:
 - In-Domain and Cross-Domain Generalization
 - Sub-Resolution Rendering
 - Combining Multi-View Information
 - Refinement with a Neural Network
 - Refinement with non-rigid 3DGS optimization
 - Pruning of 3D Gaussians
 - Camera Pose Encoding with Plücker Coordinates
 - Using Template Priors As Supervision (SMPL-X)
 - Transfer Learning with a Frozen Human-Centric Encoder (Sapiens)
 - LPIPS as a Loss Function

Pytorch Slurm OpenCV Open3D
NeRFStudio Neural Rendering
3D Reconstruction Gausian Splatting
Transfer Learning



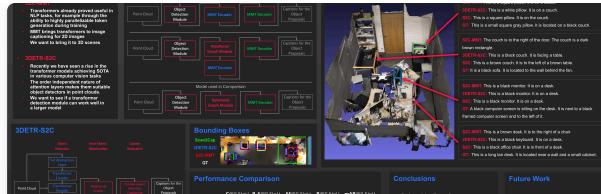
Publication: W-Control UDA

Focused on improving semantic segmentation for autonomous driving in challenging weather conditions, leveraging self-training, semi-supervised learning, and data augmentation from generative models like GANs and diffusion models.

- Article: W-ControlUDA: Weather-Controllable Diffusion-assisted Unsupervised Domain Adaptation for Semantic Segmentation
- Journal: IEEE Robotics and Automation Letters
- Publication Date: 24 February 2025
- Volume: 10, Issue: 5
- On Page(s): 4204-4211
- Print ISSN: 2377-3766
- Online ISSN: 2377-3766
- DOI: 10.1109/LRA.2025.3544925

Semantic Segmentation Distillation Autonomous Driving
Generative Models GAN Diffusion Pytorch Lightning
MMSegmentation MMCV MMEngine





Dense Captioning for 3D Scenes with Transformers

Introduced transformers to different components of a 3D Dense Captioning pipeline to boost performance.

- As a team, we proposed two architectures based on transformers to achieve state-of-the-art performance in 3D Dense Captioning Task.
- I mainly focused on 3DETR-S2C, which achieved SOTA results on 3 of the 5 benchmarking criteria.
- Briefly, I integrated a transformer backbone to extract features and detect 3D bounding boxes from 3D point clouds, which are then processed further with a Graph Neural Network (GNN) based relational module and a recurrent neural network based NLP module to describe relations between 3D objects of an indoor scene.
- Furthermore, I have done end-to-end training and optimization of the neural network on remote Google Cloud Platform servers.
- I also supported my teammate on implementing S2C-MMT, which achieved SOTA results on 2 of the 5 quantitative criteria. Built upon a PointNet++ backbone, S2C-MMT partially or fully replaces the relational module and NLP module with the Meshed Memory Transformer (MMT).

Pytorch
3D
NLP
GNN
RNN
GCP
Transformers



Visual Computing & Artificial Intelligence
Prof. Matthias Nießner

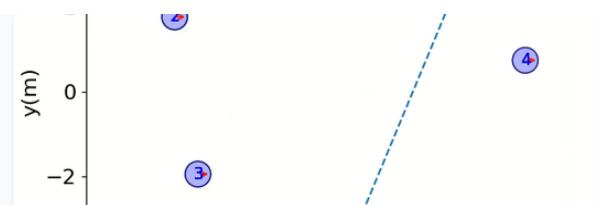


Monocular Depth Estimation with Polarimetric Camera

A supervised monocular depth prediction model leveraging polarimetric characteristics of light. During the model development, particular emphasis was put on improvement of the depth estimation for photometrically challenging objects.

- As a team of four, we proposed a monocular depth estimation model turning a video stream from a single polarimetric camera into dense depth prediction.
- We leveraged properties of polarized light to improve depth estimation reliability on photometrically challenging non-Lambertian materials.
- We demonstrated qualitative and quantitative improvements on transparent objects such as glass and on shiny surfaces such as metal.
- I focused on optimizing the neural network architecture by introducing modality-specific encoders, channel-wise and spatial attention modules, and cross-component skip connections to push performance higher.

Python
Numpy
Kornia
CNN's
Attention
U-Net

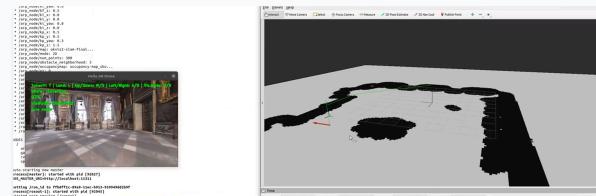


Social Navigation with Reinforcement Learning

Trained an agent to navigate in dynamic environments using reinforcement learning and curriculum learning.

- Identified and proposed a promising robotics research project concerning social navigation - autonomous navigation of a robot in a dynamic environment filled with pedestrians.
- Extended and improved the world simulation by adding static obstacles and limited field of view constraints.
- As a team, developed a new RL agent with an extended version of the baseline.
- Intertwined training with world simulation extension via curriculum learning by optimizing the RL agent training with gradually increasing simulation difficulty.

Pytorch
OpenAI Gym
Reinforcement Learning
Robotics
GCP



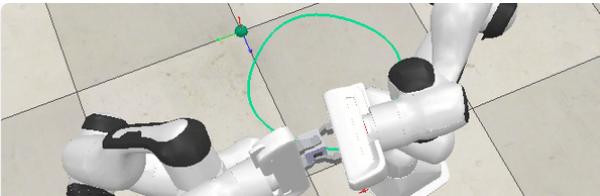
Autonomous Delivery Drone

Implemented localization, sensor fusion, navigation, control, and path planning of an autonomous drone.

- In a team of two, programmed AR Drone 2 to autonomously carry a packet between random start and end points within an environment with known 3D occupancy grid.
- Implemented manual steering of the drone using keyboard input with SDL2 library.
- Implemented and tuned a PID controller for feedback control from visual inertial state estimation signals.
- Implemented collision-avoidance capability, enabling safe navigation between user selected checkpoints when a log-odds occupancy map is given.
- Extended occlusion-aware navigation with A* trajectory search, yielding a reliably motion plan between start and end points.
- Further programmed and streamlined the autonomous packet delivery task and successfully completed the navigation challenge.

C++
CMake
ROS
Gazebo
OpenCV
SDL2





Shared Object Manipulation with Franka Robot Arms

Programming two Franka Panda robot arms to achieve collaboration in CoppeliaSim (V-REP), while avoiding self-collision and obstacles.

- As a team of 5, we took the robothon challenge of the Fundamentals of Human Centered Robotics course.
- Carried the team by taking the lead on 2/3 of the tasks.
- Programmed the robot for collision-checking from specific joint configurations.
- Programmed end-effector trajectory planning and shared object manipulation.

[Go](#) [Lua](#) [V-REP](#) [Physics Simulation](#)



Nod Detector

Developed a Python package for detecting nodding behavior in videos using advanced computer vision and machine learning techniques.

- Created a robust Python package using MediaPipe for detecting and analyzing nodding behavior through 3D face and pose landmark tracking.
- Implemented advanced visualization with Rerun, enabling real-time tracking of head pitch angles and nod detection.
- Developed a modular, extensible system with comprehensive command-line interface and JSON export functionality.
- Ensured high code quality through pre-commit hooks, unit testing, and rigorous static type checking.

[CI:Github Actions](#) [Testing:Pytest](#) [Docs:Sphinx](#) [Vis:Rerun](#) [CLI:Type](#)
[Containerization:Docker](#) [Code Quality:Black](#) [Static Analysis:Flake8](#)
[Type Checking:Mypy](#) [MediaPipe](#)

© 2025 Kağan Küçükaytekin. All rights reserved.

Designed with Tailwind CSS and Mermaid JS.