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.

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.

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 →

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

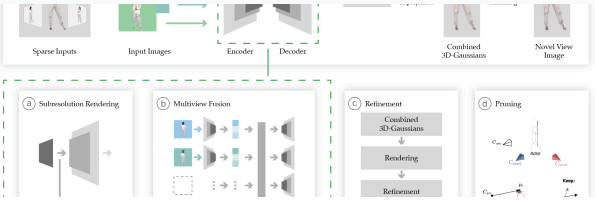
RIO.cloud & MAN, Munich

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.

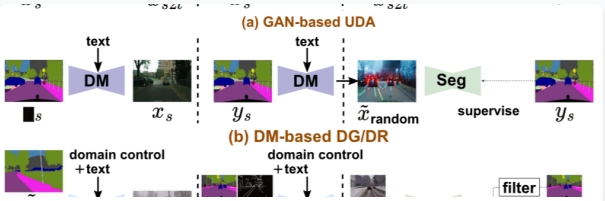
- Proposed a simpler and more flexible method than the existing methods:

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

SONY SLAMP CAMP



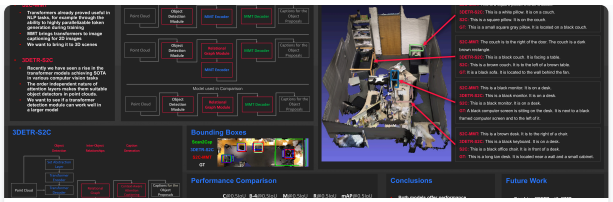
Publication: W-Control UDA

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

HUAWEI



Dense Captioning for 3D Scenes with Transformers

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

- As 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

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

DLR

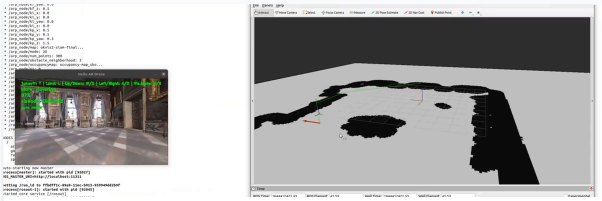
Monocular Depth Estimation with Polarimetric Camera

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

CAMP VIS



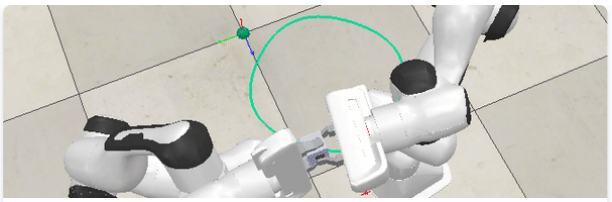
Autonomous Delivery Drone

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 intertial 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

SMART ROBOTICS LAB



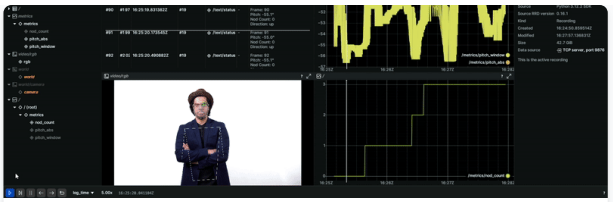
Shared Object Manipulation with Franka Robot Arms

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

MRM



Vibe Coding a Nod Detector

Main goal here was to test the capabilities of Coding IDE's and CLI's. Used Windsurf and Claude Code for this project. Vibe coded a multi-modal data collection pipeline.

- 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:Typer Containerization:Docker Code Quality:Black Static Analysis:Flake8 Type Checking:Mypy MediaPipe

Teleoperating 3D Printed Robot Arms

As a hobby project, 3D printed, built, calibrated SO-100 robot arms. Tweaked LeRobot source code for dual follower teleoperation.

- Experienced the entire learning journey from the beginning by 3D printing the robot components rather than ordering a kit.
- The two follower and one leader SO-100 robot arms are still fully operational.
- Looking forward to connect with hobbyists and enthusiasts to share knowledge and collaborate!

Hardware 3D Printing Teleoperation SO-100 LeRobot Builder

Designed with Tailwind CSS and Mermaid JS.