Muhsin Kompas

MSc Computer Engineer · R&D Software Engineer

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Summary

R&D Software Engineer with an MSc in Computer Engineering, specializing in **ADAS**, **Deep Learning**, and **Computer Vision**. Possesses a strong technical foundation in developing ADAS algorithms (Lane Detection, Path Planning, RL agents) through rigorous academic research and competitive experience (Teknofest Robotaxi). Skilled in bridging the gap between theoretical AI models and practical deployment using **C++**, **Python**, and **ROS**. Currently developing scalable AI-driven software architectures in a professional R&D capacity, now seeking to leverage this expertise to drive innovation in the automotive technology sector.

Education

MSc Computer Engineering, GPA: 3.61/4.00 — Denizli, Turkey

Pamukkale University — Sep 2021 – Oct 2024

Thesis: Explainable Artificial Intelligence (XAI) for Deep Reinforcement Learning-Based Autonomous Driving. [**Link**]

Focused heavily on Autonomous Systems, Deep Learning, and XAI. Beyond the standard curriculum, I conducted in-depth research to address the "black box" problem in AI decision-making processes for self-driving vehicles, aiming to bridge the gap between complex algorithms and human interpretability.

- Developed and trained autonomous racing agents using **TD3, DDPG, and PPO** algorithms within the **TORCS** simulation environment.
- Implemented **SHAP** (SHapley Additive exPlanations) to analyze global and local model interpretability, validating that the vehicle's steering and throttle decisions were logical and safe.
- Modified the **TORCS source code (C++)** to increase simulation speed for faster training cycles and to enable headless mode.
- Demonstrated that the TD3 algorithm achieved the highest stability and human-like driving behavior among tested models.
- **Tech Stack:** Python, PyTorch, TensorFlow, Keras, OpenAI Gym, NumPy, Pandas, Linux.

BSc Electrical-Electronics Engineering, GPA: 3.10/4.00 — Denizli, Turkey

Pamukkale University — Aug 2016 – Oct 2020

Thesis: Image-Processing-Based Real-Time Lane Detection & Tracking for Autonomous Vehicles.

Focus: Computer Vision, Embedded Systems, and Deep Learning. Supplemented core curriculum with intensive research in autonomous vehicle simulation and control logic. (Detailed practical implementation is listed under 'Projects' section).

Professional Experience

ReklamStore (RS İnternet Pazarlama A.Ş.) — Istanbul, Turkey (Hybrid)

Research And Development Engineer — Dec 2023 – Present

Leading the backend development and AI integration for the "CreabitAI" project (TÜBİTAK-1501 supported), an automated video generation platform.

- API & Backend Development: Architected and developed scalable RESTful APIs using **Python (Flask)** to manage video generation requests and user data.
- AI & NLP Integration: Designed microservices using **OpenAI API** to automatically generate video scripts and creative content based on user prompts.
- Video Processing Pipeline: Built an automated video rendering pipeline integrating **FFMPEG**, **OpenCV**, and MoviePy to synthesize dynamic video content programmatically.
- Data & DevOps: Implemented data scraping services using Selenium/BeautifulSoup and managed data persistence with MySQL (SQLAlchemy). Orchestrated deployments using **Docker** and **GitHub Actions (CICD)** on **Linux** servers.
- R&D Reporting: Spearheaded the preparation and presentation of technical progress reports for TÜBİTAK referees, ensuring compliance with academic and industrial standards.

Oncostone (Oncostone Sağlık Hizmetleri Ltd. Şti.) Denizli, Turkey
Software Development Engineer Jan 2021 – Apr 2023
Served as the lead engineer and R&D coordinator for a medical technology startup within the Technopark, focusing on the ”Enuretic Alarm Device” project.

- Embedded Systems Development: Developed firmware for smart wristbands using C++ and ESP32 microcontrollers, implementing ANT+ protocol for low-power wireless communication.
- Signal Analysis: Engineered algorithms in Python (using SciPy) to analyze heart rate variability and movement data for deep sleep detection and incontinence prediction.
- Product Lifecycle: Managed the full development cycle from prototyping to testing, bridging the gap between hardware sensors and software logic.
- Project Management: Oversaw the company’s R&D documentation, prepared official technical reports for the Technopark administration, and managed project timelines.

Senkron R&D Engineering - *Intern Engineer* Denizli, Turkey - Summer 2020
Implemented CAN-Bus protocols for vehicle subsystems and assisted in integrating Nvidia Jetson boards with sensors for autonomous driving tasks. Developed telemetry systems using RF communication with STM32.

Kemal Ugurlu Textile - *Intern Engineer* Denizli, Turkey - Summer 2019
Developed a real-time fault detection algorithm using MATLAB and OpenCV for fabric conveyor belts. Established TCP/IP communication between PLC units and factory devices using C++.

Projects

Autonomous System Developer & Core Member Denizli, Turkey
Alatay Mobile Autonomous Team 2019 – 2020
Served as a core R&D member for the university’s autonomous racing team. I took charge of the full software development lifecycle—from simulation to real-world deployment—focusing on vision-based perception, sensor fusion, and vehicle control systems for the Teknofest Robotaksi competition.
*Ranked **4th Place** in the 2020 Teknofest Robotaxi Passenger Autonomous Vehicle Competition.* [**Link**]

- Developed real-time lane detection and path planning algorithms using C++ and Python within the **ROS** (Robot Operating System) framework.
- Integrated **Velodyne 3D LiDAR** and **ZED Stereo Camera** to implement obstacle detection and environmental mapping logic on **Nvidia Jetson TX2** and **AGX Xavier** platforms.
- Established robust **CAN Bus** communication between the high-level computing unit and the vehicle’s ECU for precise steering and throttle control.
- Designed a custom simulation environment using **Unreal Engine 4** and Microsoft **AirSim** to validate autonomous algorithms on a ”digital twin” before track testing.
- Conducted extensive Hardware-in-the-Loop (HIL) testing on 1:16 scale vehicles to optimize control parameters and sensor calibration.
- **Tech Stack:** C++, Python, ROS, OpenCV, Multithreading, 3D LiDAR, Nvidia Jetson, STM32, CAN Bus, Unreal Engine 4, AirSim, Linux.

Skills

Programming	Python (Advanced), C++, MATLAB, MySQL, Bash Scripting
ADAS & Robotics	ROS2, CAN Bus, Sensor Fusion, Kalman Filters, Path Planning, Lane & Object Detection, AirSim, TORCS, LiDAR & Camera Fusion
AI & Deep Learning	PyTorch, TensorFlow, Keras, YOLO, DRL (TD3, DDPG, PPO), XAI (SHAP), NLP (Llama, BERT, GPT)
Libraries	OpenCV, FFmpeg, NumPy, Pandas, SciPy, Scikit-learn
DevOps & Tools	Docker, Git, GitHub Actions (CI/CD), CMake, Flask, Linux (Ubuntu), Multithreading
Hardware	Nvidia Jetson (TX2, AGX Xavier), STM32, ESP32, ZED Stereo Camera, Velodyne 3D LiDAR
Soft Skills	Problem Solving, Academic Writing, Technical Reporting (TÜBİTAK), Agile/Scrum
Languages	Turkish (Native), English (Professional Working Proficiency)

Certificates

Deep Learning Specialization – Andrew Ng – Coursera [**Certificate**] 2019