# OMER MERSIN

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## PROFESSIONAL SUMMARY

Robotics Software Engineer specializing in SLAM, perception, and autonomous navigation systems with 2+ years of professional experience developing production-grade autonomy software for UAVs and autonomous vehicles. Expertise in real-time LiDAR-inertial odometry, sensor fusion, and GPU-accelerated perception pipelines. Proven track record building mission-critical systems deployed on NVIDIA Jetson platforms. Strong background in C++, Python, ROS 2, and computer vision.

## TECHNICAL SKILLS

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|---|---|
| **Programming:** | C++ (Advanced), Python (Advanced), Java, C#, MATLAB, JavaScript, SQL |
| **Robotics:** | ROS 2, SLAM, Sensor Fusion, Autonomous Navigation, Path Planning, MAVLink (PX4/ArduPilot), State Estimation, Control Systems |
| **Computer Vision:** | OpenCV, YOLO, Image Processing, Video Stabilization, Feature Extraction, Camera Calibration |
| **ML/AI Frameworks:** | PyTorch, TensorFlow, NumPy, Pandas, Scikit-learn |
| **Hardware/Platforms:** | NVIDIA Jetson, CUDA, GPU Optimization, Embedded Linux, Docker, GStreamer, Real-time Systems |
| **Tools & DevOps:** | Git/GitHub, Docker, Linux, Qt/PyQt, CMake, Visual Studio, .NET/WPF |

## PROFESSIONAL EXPERIENCE

**Robotics Software Engineer** | Dronetools, Sevilla, Spain

*August 2024 – Present*

- Developed GPU-accelerated FAST-LIO odometry system for real-time LiDAR-inertial SLAM on NVIDIA Jetson Orin, achieving sub-10ms processing latency for autonomous drone navigation in GPS-denied environments
- Engineered LIONav autonomous navigation framework combining FAST-LIO, pose-graph optimization, and ESDF-based 3D path planning for safe autonomous flight with return-to-launch capability
- Built production-grade Smart Gimbal Manager ground control station (GCS) using C#/.NET WPF with real-time telemetry visualization, multi-protocol gimbal control (BaseCam, Viewlink, DJI), and geospatial mapping integration
- Implemented real-time video stabilization engine with GPU acceleration using GStreamer and CUDA, reducing camera shake by 85% and achieving <50ms processing latency for FPV drone operations
- Developed DJI Cloud API integration platform using FastAPI and MQTT for real-time drone telemetry streaming and command execution, enabling remote fleet management capabilities
- Designed and deployed autonomous flight control systems with MAVLink integration for mission planning, waypoint navigation, and emergency procedures on PX4/ArduPilot autopilots

**Information Technology Intern** | Goodyear, Sakarya, Turkey

*August 2022 – September 2022*

- Researched blockchain technology applications and developed a secure web-based voting platform prototype using distributed ledger technology to improve transparency and security
- Collaborated with cross-functional teams on enterprise IT infrastructure projects, gaining exposure to industrial automation systems and production environment requirements

## EDUCATION

**Bachelor of Engineering in Computer Engineering**

Duzce University, Duzce, Turkey | GPA: 3.24/4.0 | October 2020 – May 2025

**Relevant Coursework:** Algorithms, Data Structures, Operating Systems, Computer Networks, Computer Vision, Deep Learning, Artificial Intelligence, Natural Language Processing, Data Science, Embedded Systems, Object-Oriented Design

**Study Abroad – Computer Engineering**

University of Sevilla, Sevilla, Spain | January 2024 – July 2024

## KEY ROBOTICS PROJECTS

**LIONav – LiDAR-Inertial Navigation Framework** | [github.com/OmerMersin/LIONav](github.com/OmerMersin/LIONav)

- End-to-end autonomous navigation system combining GPU-accelerated FAST-LIO odometry, pose-graph SLAM backend with loop closure detection, and ESDF-based 3D path planning for safe navigation in unknown environments
- Implemented hybrid local/global planning architecture with real-time obstacle avoidance and autonomous return-to-launch safety behaviors for mission-critical operations
- Technologies: C++, Python, ROS 2, FAST-LIO, CUDA, NVIDIA Jetson Orin, MAVLink

**FAST-LIO-GPU – GPU-Accelerated SLAM** | [github.com/OmerMersin/FAST_LIO_GPU](github.com/OmerMersin/FAST_LIO_GPU)

- Ported FAST-LIO SLAM algorithm to ROS 2 with CUDA acceleration for NVIDIA Jetson platforms, achieving 3x performance improvement over CPU implementation while maintaining mapping accuracy
- Optimized point cloud processing pipeline with GPU kernels for KD-tree construction and nearest neighbor search, reducing processing time from 30ms to 8ms per frame
- Technologies: C++, CUDA, ROS 2, Eigen, PCL, Ouster LiDAR SDK

**TEKNOFEST Robotaxi – Autonomous Vehicle Competition** | Team Mekatek

***3rd Place & Best Team Spirit Award | 2021-2024***

- Led perception and decision-making software development for full-scale autonomous vehicle competing in national TEKNOFEST competition, collaborating with 15+ team members across mechanical, electrical, and software domains
- Developed real-time drivable area detection and traffic sign recognition using computer vision and YOLO object detection, achieving 95%+ accuracy in dynamic urban environments
- Implemented sensor fusion algorithms combining camera, LiDAR, and GPS data for robust localization and obstacle detection under varying lighting and weather conditions
- Technologies: Python, OpenCV, YOLO, ROS, Sensor Fusion, Path Planning

**Real-Time Video Stabilization Engine** | [github.com/OmerMersin/video-stab](github.com/OmerMersin/video-stab)

- Built GPU-accelerated video stabilization library with dual-mode RTSP streaming (passthrough/processing) optimized for low-latency UAV applications on NVIDIA Jetson edge devices
- Implemented adaptive roll correction using Canny edge detection and Hough transform, achieving 85% shake reduction while maintaining 10-20ms passthrough latency
- Technologies: C++, OpenCV, CUDA, GStreamer, gstd, DeepStream, RTSP

## LEADERSHIP & ACTIVITIES

**Software Developer & Instructor** | MEKATEK Robotics Community, Duzce University

*October 2021 – October 2024*

- Mentored 20+ students in computer vision and robotics software development, conducting hands-on workshops on OpenCV, ROS, and autonomous systems fundamentals
- Contributed to multiple competition projects including autonomous vehicle software, helping the team achieve top-3 national rankings for three consecutive years

- Developed and maintained Python-based educational materials and code repositories for onboarding new team members

## ADDITIONAL INFORMATION

**Languages:** Turkish (Native), English (Fluent - Professional Working Proficiency), Spanish (Intermediate)