

# MUHAMMED SEZER

## Robotics & AI Enthusiast and Engineer

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## IN THIS CV, COLOR MATTERS!

WEB DEVELOPMENT

ROBOTICS

ARTIFICIAL INTELLIGENCE

ENTREPRENEURSHIP

ACADEMIC

Also You can Click them to see me in that field. Highly Encouraged!

## EXPERIENCE

### Co-Founder & Robotics Engineer

#### Orion Robotics, Robotics Start-up

September 2021 – Present    Ankara / Turkey

- End-to-End Robotic Development:** Led the entrepreneurship initiative for the development of a modular mobile ground vehicle intended for research applications.
- ROS2 Package Design & Driver Implementation:** Acted as the primary contributor for the design of ROS2 packages, drivers, and compatibility implementations, showcasing versatility in robotics software development.
- Hardware and Software Testing:** Formulated and implemented robust testing protocols for both hardware and software aspects of the project, ensuring consistent performance and reliability.
- Simulation & Development:** Developed a comprehensive simulation environment for the mobile robot, proving instrumental in advanced testing and developmental applications.
- AI Applications:** Applied AI applications in the creation of the control systems and electronics, achieving improved autonomy and function.
- Entrepreneurship and Sales Experience:** Positioned the product for market readiness through comprehensive documentation, driving future development, usage, and troubleshooting, while facilitating effective marketing and sales strategies.
- Team Management:** Led a cross-functional team of engineers, fostering a collaborative and efficient environment to reach project goals.
- Problem Solving:** Addressed and overcame various technical and logistical challenges throughout the project, demonstrating initiative and resilience.

### Swarm Robotics Researcher

#### Middle East Technical University Robotics Center

September 2021 - Present    Ankara / Turkey

- Academic Research:** Worked under the guidance of Associate Prof. Ali Emre Turgut, engaging in voluntary contribution towards research and development in swarm robotics.
- Embedded Mapping:** Focused on embedded mapping using data from range and bearing sensors mounted on robots.
- Data Processing:** Involved in extracting key points from point cloud data, contributing to the process of mapping the environment.

## MY LIFE PHILOSOPHY

*"To play a wrong note is insignificant; to play without passion is inexcusable." - Ludwig van Beethoven*

## PORTFOLIO

CLICK TO SEE MY DIGITAL PORTFOLIO

## ACHIEVEMENTS

- #1 in Entrepreneurship competition**  
Atılım University
- #1 and #2 Artificial Intelligence competition around Turkey**  
Teknofest 2022
- #2 Young Entrepreneurs Idea Marathon**  
UNICEF 2023
- Mansion in University Students Research competition**  
Tubitak 2242

## STRENGTHS

- C++    ROS2    Gazebo    IsaacSim
- ArduPilot    PX4    Digital Signal Processing
- Dynamic Control Systems    Embedded Systems
- Ground & Aerial Robotics
- Python    NumPy    scikit-learn    PyTorch
- Real-time Image Processing    Transformers
- HTML    Django    CSS    JavaScript
- MySQL
- Problem Solving    Risk Management
- Crisis Management    Stress Management
- Avoiding Complication    Decision Making

- **Sensor Technology:** Carried out extensive work on range and bearing sensor technology.
- **Documentation:** Documented the progress and developments throughout the project on ReadTheDocs Website.
- **Project Management:** Assisted in project management, ensuring the successful and timely completion of tasks.

## Research Intern

### TED University

📅 2022, Summer

📍 Ankara / Turkey

- **Rehabilitation Robotics Research:** Conducted research on rehabilitation robotics for disabled individuals, focusing on the development and optimization of these advanced systems.
- **Hardware and Software Development:** Contributed to the development of both hardware and software for testing purposes, ensuring the effectiveness and safety of the rehabilitation robotics.
- **User Testing:** Conducted user testing with individuals to gain feedback and further refine the rehabilitation robotic systems.
- **Academic Publication:** Contributed to a research paper based on the work conducted, which was published at the TOK conference.

## Part-Time Engineer

### TUBITAK

📅 September 2021 - September 2022 📍 Gebze / Turkey

- **Image Processing Algorithms:** Contributed to the development of various image processing algorithms, enhancing the capabilities of the department's projects.
- **Text Extraction and Data Utilization:** Focused on extracting text from given images using OCR Tesseract and various filters from OpenCV, improving data utilization from images.
- **Data Evaluation and Processing:** Worked within the Veri Kıymetlendirme Bölümü, contributing to key projects and gaining valuable experience in data evaluation and processing.

## PROJECTS

### Teknofest Artificial Intelligence Competition

#### Self-organized Team

📅 2021 - 2023

📍 Istanbul / Turkey

- **Team Leadership:** Led the establishment of a competitive team focused on participating in the Teknofest Artificial Intelligence competition.
- **Achievement in AI Competition:** Achieved 1st and 2nd place in the competition, setting an all-time best score in the process.
- **Data Preparation:** Undertook the creation of a comprehensive dataset consisting of 300,000 labels and 25,000 images, serving as the foundation for our competition entry.
- **Algorithm Development:** Developed an object tracking algorithm, contributing to the advanced functionality of our AI model.
- **Implementation of AI Tools:** Successfully implemented the SAHI algorithm into the YOLOv5 framework, enhancing our AI model's detection capabilities.
- **Tool Development:** Built an automatic benchmark tool to continuously evaluate the performance of our AI model and algorithms.

Teaching

MS Office Tools

Latex

## LANGUAGES

Turkish

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English

● ● ● ● ●

Russian

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## EDUCATION

B.Sc. in Electrical & Electronics Engineering

Middle East Technical University

📅 2017-2023

## REFEREES

Prof. Klaus Werner Schmidt

@ Electrical Electronics Engineering

✉ schmidt [at] metu.edu.tr

Middle East Technical University

Prof. İlkey Ulusoy

@ Head of Electrical Electronics Engineering

✉ ilkey [at] metu.edu.tr

Middle East Technical University

Ali Rıza Küçük

@ Intel - Former Regional Consumer Sales Director

✉ www.kendikocunol.com

- **Data Visualization:** Automatically generated HTML Website tables to provide a comprehensive overview of the model's and algorithms' performance on the test dataset.
- **Public Contribution and Mentorship:** Following the competition, took the initiative to publicly share the dataset, providing a valuable resource for future competition entrants and AI enthusiasts. Offered free mentorship to nearly 15 different teams, sharing expertise and guidance to aid their progress in the AI field.

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## Mobile Robotic Vehicle Development

### Self-managed Project

📅 September 2019 - September 2022 📍 Ankara / Turkey

- **End-to-End Robotic Development:** Engaged in the conceptualization, design, and production of a mobile robotic vehicle over the course of three years.
- **CAD Design & 3D Modeling:** Utilized CAD software to design the 3D model of the robot, ensuring optimal design for functionality and ease of production.
- **Production Skills:** Employed 3D printing technologies and wood-working skills to physically produce the robot based on the CAD designs.
- **Custom Circuit Board Design:** Contributed to the design and manufacturing of a custom circuit board to control and operate the robotic vehicle.
- **Control System Implementation:** Leveraged expertise in electronics and embedded systems for the implementation of the robot's control system.
- **ROS2 Development:** Developed ROS2 packages and defined custom message types to facilitate intercommunication between different components of the system.
- **Autonomous Navigation:** Integrated Navigation2 (Nav2) into the robotic vehicle, allowing for sophisticated autonomous navigation capabilities.
- **Performance Optimization:** Tested and optimized the robotic vehicle's performance in various conditions, ensuring its robustness and reliability.
- **Remote Control & Monitoring:** Authored a dedicated ROS2 package for a desktop PC to remotely control and monitor the robotic vehicle.
- **Comprehensive Documentation:** Documented all stages of the project, from design to production, facilitating potential reproductions and further improvements.

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## PUBLICATIONS

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### 📄 Journal Articles

- E. Muslu, M. Sezer, A. Okasha, A. E. Turgut, and K. B. Arıkan, "Effect of adaptive assisted exoskeleton control system on motor learning skills," *Fırat Üniversitesi Uzay ve Savunma Teknolojileri Dergisi*, 2022.
  - Ş. Dikkaya and M. Sezer, "Remote sensing in traffic dataset," *GitHub repository*, 2021.
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