# Emirhan Küçük

Izmit, Kocaeli
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## Education

**Kocaeli University | 4th year | 2021 - 2025(Expected)**
B.S. in Mechatronics Engineering GPA: 2.98

**Bolu Science High School | 2016 - 2020**

## Work Experience

**Robotics Software Engineer Intern | ROBSEN Robotics**
Kocaeli, Turkiye | July 2025 – Sep. 2025 (2 Months)

- Fanuc TPP, Karel, Roboguide, Self-balancing robot, PID control, Machine learning, Isaac Sim, HALCON, Robotics simulation, PCB design

**Autonomous Driving Technologies Expertise Program (Asynchronous) | National Technology Academy**
Kocaeli, Turkiye | Nov. 2024 – Aug. 2025 (9 Months)

- AI/ML, Neural Network, System modelling, LIDAR

**Paint Process Engineering Intern | Hyundai Assan**
Kocaeli, Turkiye | Sept. 2024 – Oct. 2024 (1 Month)

- Production environment and factory culture, understanding PLC infrastructure.
- Understanding automotive painting process.
- I gave a technical presentation at the end of the internship.

**Part Time Student Assistant | Kocaeli University**
Kocaeli, Turkiye | Nov. 2023 – June 2024 (8 Months)

- Assisted the primary instructor in implementing laboratory curriculum.
- Provided constructive feedback to students to aid in their learning process.

**Participant | Google Game and Application Academy**
Remote | Dec. 2021 – July 2022 (9 Months)

- Agile project development, Bootcamp, Project Management, App Development with Flutter and Technology Entrepreneurship.

## Skills

- English (Professional)
- STM32 (UART, PWM, ADC, TIM, CAN) · C/C++ · PID–LQR–Fuzzy control · ROS2 · ROSserial · MoveIt2 · Gazebo · Python · YOLOv5/v8 · OpenCV · TF · Point Cloud Processing · Depth Estimation
- Fanuc ROBOGUIDE, TPP, Karel (beginner), ML/DL

# Project Experience

### Realtime Control of Inverted Pendulum System with ROS2 integration

- The inverted pendulum's mechanical model was simulated in the ROS2 environment.
- A digital twin was implemented using real-time feedback through bidirectional communication between the NucleoF401RE board and a computer.
- Various controllers, including PID, fuzzy logic, and LQR, were developed in Python within the ROS package.
- The system can be executed in both simulation (Gazebo) and real-world environments with seamless controller integration.

### Python Script for Microsoft Word Automation

- A selected word or text can be changed as desired for the whole document.
- Some formatting and style adjustments can be made.
- Changes can be made to multiple Word files at the same time.

### Tomato Harvesting with 6-axis Robot

- A CAN communication line was established between each motor in the 6 joints.
- A Digital Twin of the robot was created in the ROS2 environment.
- Trajectory planning for the robot was done using MoveIt 2 package.
- Tomato detection was performed using the YOLO object detection algorithm.
- Filtered point cloud data to detect tomatoes and obstacles for use in RRT obstacle avoidance algorithm.

### Industrial Autonomous Mobile Payload Robot

- Collaborated within a team to design and develop a mobile robot capable of transporting cargo.
- Contributed to the programming efforts, focusing on integrating various sensors including QTR, IMU, and encoders using C/C++ language on a STM32F4.
- Developed and implemented a PID line-following control algorithm by modifying and optimizing a pre-existing library to suit project requirements.
- Utilized ROS (Robot Operating System) and ROSserial protocol to enable seamless communication between sensors and the main computer.

### Interfacing Stepper Motor using PIC16F877A

- Potentiometers in the control panel can be used to adjust motor speed and position parameters which are toggled by a button.
- An LCD display was used to provide real-time feedback on motor speed and position data.
- Data for buttons and potentiometers is stored in the Firebase Realtime Database.
- A front-end application was developed using HTML, CSS and JavaScript to control motor settings via a website interface.

### Design and Production of a Slider-Crank Mechanism

- Conducted calculations and simulations for a slider-crank mechanism to analyze its motion characteristics.
- Created a SolidWorks model that reflects the design specifications of the crank mechanism.
- Produced a functional prototype through 3D printing.

# Volunteering Experience

### Volunteer Part Time Student Assistant | Kocaeli University

(Kocaeli, Turkiye) Nov. 2022 – May 2023

- Assisting the primary instructor to help freshman to understand the working process of the laboratory curriculum.

# References

- **Haluk Özakyol**
  Research Assistant, Kocaeli University
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