

# SALIH MARANGOZ

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## EXPERIENCE

### A UK-based Tech Start-up Company | Freelancer

Sept. 2024 – Nov. 2024

Developed a Career Coach AI for a UK-based tech start-up company as a paid-project.

Remote

- Implemented an AI chatbot for students to support them with education and future career planning.
- Improved the results by connecting the AI model to the database and visualization components.
- Designed visualization functions compatible with LLM models for generating vector graphics (SVGs).

### Humanoid Robots Lab (Uni-Bonn) | Student Research Assistant

Jun. 2021 – Mar. 2024

Focused on 3D perception on agricultural tasks and developed new methods.

Bonn, Germany

- Developed a fast and robust optimization method for modeling sweet peppers using superellipsoids, achieving a 10x increase in processing speed compared to previous methods. Also, designed a fast superellipsoid surface sampling algorithm for next-best-view planning, ensuring surface points are uniformly distributed for shape completion in fruit mapping and 3D reconstruction tasks. 🔄
- Fine-tuned YOLOv8 deep learning models for real-time sweet pepper detection, segmentation, and tracking, serving as a drop-in replacement for previous models. 🔄
- Developed a depth image noise filtering pipeline specialized for the RealSense L515 RGBD camera, reducing CPU utilization by 20x and improving accuracy significantly. 🔄
- Implemented a depth image averaging and filtering solution, improving performance by 17x using OpenCL. 🔄

### Polonom Robotics | Research and Development Engineer

Jan. 2018 – Sep. 2019

Developed and optimized robot navigation, mapping, and sensor processing systems.

Istanbul, Türkiye

- Designed a robot vacuum cleaner path planning algorithm that works without an initial occupancy grid map.
- Developed an efficient 2D laser sensor filter with minimal CPU utilization for low-power development boards, achieving over a 10x speed improvement compared to open-source libraries.
- Integrated, enhanced and maintained 2D mapping, navigation, and mission planning packages for mobile robot platforms.
- Built a custom server infrastructure for source control, project management, file sharing, and backup purposes.

### YTU Probabilistic Robotics Group | Software Developer Intern

Jul. 2017 – Aug. 2017

Addressed specialized challenges in the RoboCup robotics competition.

Istanbul, Türkiye

- Optimized UI/UX, mapping, navigation, and mission controller packages for multi-robot cases.
- Achieved mission control reaction times faster than those of experienced human operators in the competition, reducing response times from minutes to milliseconds using a new approach.

### Garanti Technology | Software Developer Intern

Aug. 2016 – Sep. 2016

Developed a user interface component for ATMs that is actively used today.

Istanbul, Türkiye

- Implemented the “Account Transactions” component for the new ATM user interface project using Java, Javascript, and PL2.

## EDUCATION

### University of Bonn | Master of Science, Computer Science

Bonn, Germany | Oct. 2020 – Feb. 2024

- Thesis: DawnIK: Decentralized Collision-Aware Inverse Kinematics Solver for Heterogeneous Multi-Arm Systems 🔄
- 1.1 German Grade (Approx. 3.94/4.0 GPA)

### Yıldız Technical University | Bachelor of Engineering, Computer Engineering

Istanbul, Türkiye | Sep. 2014 – Jun. 2018

- Thesis: Developing a New Navigation Module in ROS for Dynamic Environments
- 3.09/4.0 GPA (Approx. 2.3 German Grade) | Graduated as an Honour Student
- Completed an exchange program at the Riga Technical University for one semester.

## SKILLS

**Programming:** Python, C/C++, SQL, Linux, Qt, Docker, CI/CD, OpenCL, Eigen, STL, Boost

**Machine Learning:** Numpy, Seaborn, Matplotlib, Pandas, SciPy, Scikit-Learn, PyTorch, Wandb, Optuna, Langchain, OpenAI

**Robotics:** ROS, MoveIt, Gazebo, PCL, OpenCV, Ceres Solver, Arduino, Raspberry Pi

**Personal Skills:** Flexibility, Creative Thinking, Active Learning, Problem Solving, Time Management, Data Analysis, Research, Probability and Statistics, Linear Algebra, Pattern Recognition

**Team Skills:** Collaboration, Teamwork, Pair Programming, Decision Making, Brainstorming

**Languages:** English (Fluent), Turkish (Native), German (Beginner)

## PROJECTS

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### **TurtleBot Maze Solver** | C++, ROS, Qt, Eigen, PCL, OpenCV

Spring Semester 2022

- Solved the “find the object in maze” problem with real and simulation robots with the highest grade (1.0).
- Implemented 2D grid mapping, costmap generator, A\* path planning, pure pursuit steering, and mission controller.

### **Stereo Depth Estimation** | Python, PyTorch, Tensorboard, Optuna

Spring Semester 2021

- Implemented PSM-Net and GC-Net state-of-the-art deep learning models and trained using SceneFlow and KITTI datasets.
- Achieved 65% higher performance compared to the base-line model and attained the highest grade (1.0).

## CERTIFICATES

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### **Deep Learning Specialization** by deeplearning.ai on Coursera

Apr. 2019

- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Convolutional Neural Networks
- Neural Networks and Deep Learning
- Sequence Models

## EXTRACURRICULAR

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### **Yıldız Team**

Oct. 2015 – Jun. 2018

Developer

Yıldız Technical University

- Developed an operator UI/UX for operating real/simulation robots in competitions, including real-time video transmission, sensor data visualization, multi-robot management features, and quick hotkeys.
- Built a double Ackermann RC car that can drive sideways and implemented a custom controller for driving using ROS.
- Took an active part in RoboCup 2017 (Nagoya), RoboCup German Open 2017 (Magdeburg), and RoboCup, 2016 (Leipzig).

## PUBLICATIONS

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- S. Marangoz, R. Menon, N. Dengler, and M. Bennewitz, “Dawnik: Decentralized collision-aware inverse kinematics solver for heterogeneous multi-arm systems,” in *2023 IEEE-RAS 22nd International Conference on Humanoid Robots (Humanoids)*, pp. 1–8, IEEE, 2023
- S. Marangoz, T. Zaenker, R. Menon, and M. Bennewitz, “Fruit mapping with shape completion for autonomous crop monitoring,” in *2022 IEEE 18th International Conference on Automation Science and Engineering (CASE)*, pp. 471–476, 2022
- S. Marangoz, M. F. Amasyalı, E. Uslu, F. Çakmak, N. Altuntaş, and S. Yavuz, “More scalable solution for multi-robot–multi-target assignment problem,” *Robotics and Autonomous Systems*, vol. 113, pp. 174–185, 2019
- S. Marangoz, E. E. Ergün, E. Uslu, F. Çakmak, N. Altuntaş, *et al.*, “A fast 3d exploration algorithm for autonomous aerial robots,” in *2017 25th Signal Processing and Communications Applications Conference (SIU)*, pp. 1–4, IEEE, 2017
- E. Uslu, F. Çakmak, N. Altuntaş, S. Marangoz, M. F. Amasyalı, and S. Yavuz, “An architecture for multi-robot localization and mapping in the gazebo/robot operating system simulation environment,” *Simulation*, vol. 93, no. 9, pp. 771–780, 2017
- F. Çakmak, E. Uslu, N. Altuntaş, S. Marangoz, *et al.*, “Deformable part model and deep learning comparison on victim detection,” in *2016 24th Signal Processing and Communication Application Conference (SIU)*, pp. 1513–1516, IEEE, 2016
- M. Balcılar, E. Uslu, F. Çakmak, N. Altuntaş, S. Marangoz, *et al.*, “An architecture for multi-robot hector mapping,” in *2016 International Symposium on INnovations in Intelligent SysTems and Applications (INISTA)*, pp. 1–5, IEEE, 2016