

Ibrahim Ibrahim

MSc Field Robotics Student | Erasmus Mundus Scholarship

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Girona, Spain

 GitHub •  LinkedIn

Personal statement

Passionate robotics student with a strong background in computer science and a master's in Intelligent Field Robotic Systems. Skilled in motion planning, computer vision, and autonomous systems, with hands-on experience in ROS, ML, and robotic simulation. Seeking research or engineering roles in autonomous systems and AI-driven robotics.

Education

MSc Erasmus Mundus in Intelligent Field Robotics | University of Girona / ELTE / Zagreb

Girona, Spain; Zagreb, Croatia; Budapest, Hungary | September 2024– June 2026

- Erasmus Mundus Joint Master's Degree focused on autonomous systems, AI, and field robotics.
- Comprehensive coursework in robotic perception, machine learning, control systems, and multi-robot collaboration.
- Hands-on experience with real-world robotics applications, including marine, aerial, and ground-based robotics.
- Multicultural academic experience across three leading European universities, fostering international collaboration and research.

BSc Computer Science | University of Pécs

Pécs, Hungary | September 2021– June 2024

- Stipendium Hungaricum Scholarship recipient due to my exceptional academic performance in secondary school.
- Thesis topic: Machine Learning Force Fields for Transition Metal Complexes.
- Notable Modules: Data Analysis, Algorithms and Data Structures, Probability and Statistics, Control Technology.

Work Experience

Automation & Data Engineer intern | DATelite Ltd

Pécs, Hungary | October 2023 – April 2024

- Established automation workflows using Airflow, streamlining data pipelines for enhanced efficiency.
- Designed and executed ETL processes, developing Python functions for discrete ETL steps.
- Implemented statistical modelling and visualization plotting to derive meaningful insights from data.

Stipendium Hungaricum Mentor| SHMN

Pécs, Hungary | July 2022 – July 2023

Welcomed international students to the university and provided up-to-date information about their studies and administrative tasks.

- Demonstrated good organization skills and the ability to plan ahead for 10-15 students.
- Demonstrated high adaptability and the ability to find alternative solutions.
- Proven ability to meet deadlines and handle multiple tasks simultaneously.

Projects

My Portfolio:

- Showcase my best work, personality, and talents.
- Built with React, and tools like Git & GitHub, and GitHub Pages for deployment.
- Optimized performance and ensured responsiveness and compatibility across all devices and browsers.

Thesis Project:

- Machine Learning Force Fields for Transition Metal Complexes
- Developed machine learning models to predict the HOMO-LUMO gap in transition metal complexes.
- The models were trained on the tmQM dataset.
- Results showed that gradient boosting models outperformed neural networks. XGBoost, achieved a MSE of 0.0004.

Robot Localization using Particle Filter:

- Implemented a Particle Filter for robot localization, estimating position based on sensor data and motion models.
- Developed in Python using NumPy and Matplotlib, with simulation in a 2D environment.

Map-Based Localization using Extended Kalman Filter (EKF):

- Designed an Extended Kalman Filter (EKF) for accurate localization using landmark-based measurements.
- Implemented motion and measurement models for real-time state estimation.

Feature Extraction & Image Registration:

- Developed a feature-based image registration pipeline using SIFT, ORB, and RANSAC.
- Applied transformation matrices to align images in multi-view vision applications.

Stereo Visual Odometry:

- Designed a visual odometry pipeline using stereo camera images for motion estimation.
- Extracted key points, tracked features, and estimated camera movement in 3D space.

Reinforcement Learning for Robotics:

- Implemented Deep Q-Learning (DQN) and Policy Gradient methods for robotic control.
- Trained an agent to navigate an environment using reinforcement learning techniques.

Explainable AI (XAI) for Model Interpretability:

- Developed techniques to improve transparency and interpretability of machine learning models.
- Implemented SHAP, LIME, and Grad-CAM to explain decisions of deep learning models.
- Applied XAI methods to analyze feature importance and decision boundaries in AI-driven systems.

Skills

- **Robotics & Automation:** Path planning, autonomous navigation, SLAM, Probabilistic robotics.
- **Artificial Intelligence & Machine Learning:** Deep learning, reinforcement learning, Explainable AI.
- **Embedded Systems & Programming:** C++, Python, ROS (Robot Operating System), Matlab and SQL.
- **Mechatronics & Control Systems:** Motion planning, kinematics, and real-time control.
- **Databases:** DB Modeling, MySQL, MSSQL Server and PostgreSQL.
- **Tools:** Git & GitHub, Heroku, LabVIEW, Docker and Linux, Gazebo and Stonefish.

Certificates, Courses and Awards

- Stipendium Hungaricum Scholarship.
- Erasmus Mundus Joint Masters Scholarship.
- AWS Cloud Practitioner Essentials.
- Simonyi International Hackathon
- K&H Hack3 Hackathon
- Stipendium Hungaricum Mentor justification

Languages

- Arabic: Native
- English: Fluent
- Hungarian: Beginner
- Spanish: Beginner