

MICHAŁ DRWIĘGA

Robotics & AI Engineer | CV & SLAM | PhD

Senior Robotics & AI Engineer (PhD) with 15+ years building real-world autonomous systems. Expert in distributed systems (ROS 2), SLAM, systems architecture, Computer Vision & AI, multi-robot systems, and simulation. Proven record of delivering field-tested robotics & AI solutions from research to industry, including underwater mapping and AV perception systems.

EXPERIENCE

09/2025 – Present
Remote

Senior Computer Vision & AI Engineer

Antal Sp. z o.o.

- Built real-time **object detection and tracking pipelines** with multi-camera data processing and synchronization (OpenCV, YOLO, RT-DETR, Kafka).
- Researched, developed and deployed ML models (e.g. Vision-Language models) for human **action recognition** from video streams (PyTorch, LLM).
- Built ML pipelines for **human pose recognition** from video streams.

10/2023 – Present
Wrocław, Poland

Assistant Professor (part time)

Wrocław University of Science and Technology,
Department of Cybernetics and Robotics

- Teaching courses on distributed systems, ROS 2, graph optimization, and AI.
- Supervised 15+ student theses in robotics and AI, providing mentorship and research guidance.

11/2023 – 09/2025
Remote
HQ: Renens, Switzerland

Senior Robotics/SLAM Software Engineer

Hydromea SA

- Built **ML-based 3D reconstruction pipeline** (RGB camera) generating precise models of underwater structures, for infrastructure inspection.
- Led development and deployment of the underwater mapping solution** leveraging sonar data in challenging low-visibility conditions (C++, ROS 2).
- Developed 3D visualization module** that improved operator situational awareness by integrating real-time sensor data and 3D maps into a unified interface (Qt/Python).

06/2022 – 10/2023
Remote
HQ: Lviv, Ukraine

Senior Robotics & AI Engineer

SoftServe Inc.

- Developed real-time object detection for AV** perception pipelines, using deep learning (Nvidia TAO, PyTorch, YOLO, Azure) and synthetic data generated in Isaac Sim.
- Applied ML models for mineral prediction in bulk ore** to improve mining process efficiency (scikit-learn, ONNX, Pandas).
- Designed, modeled, and developed a simulation and control system for an underwater vehicle using ROS 2 (Python).
- Developed motion planning and control for robotic arms (ROS 2, Gazebo, MoveIt, Omniverse/Isaac Sim).
- Created real-time object detection and tracking system** for robotic manipulation using RGB-D data (OpenCV/PCL).

06/2021 – 05/2022
Remote
HQ: Warsaw, Poland

Senior Software Engineer

Robotec.AI

- Contributed to the open-source autonomous driving system Autware.Auto by designing and developing safety-related components using C++ and C#.
- Led a project focused on verifying road safety for autonomous vehicles**, including the software architecture creation (C++, ROS 2, Lanelet2, RSS).
- Developed components, including sensors, for robotics simulators (Unity, O3DE).
- Developed integration between ROS 2 and a Unity-based simulator using C#, leveraging low-level ROS 2 middleware (rmw) for communication.

Wrocław, Poland
+48 669 178 009
drwiega.michal@gmail.com
www.mdrwiega.com
in/michaldrwiega
github.com/mdrwiega



SKILLS

Software

C++, Python
Bash, C
C#, Rust, JS

Architecture:

CBSE, UML, SysML,
MVC, Layered, Event-driven

Distributed systems

ROS 2, DDS, MQTT
ZeroMQ, Kafka, TCP/UDP

Robotics & Autonomy

SLAM, Sensor fusion
Motion planning,
Real-time systems
Optimization: g2o, Ceres, gtSAM
Sensors: Camera, LiDAR, Ra-
dar, RGB-D, Sonar, IMU, GNSS

Computer Vision

OpenCV, PCL, Open3D,
Visual SLAM, Visual Odometry,
Point clouds, 3D reconstruction

AI/ML

Object Detection, Action reco-
gnition, SciPy, Pandas, PyTorch,
TensorFlow, LLMs, LangChain,
Synthetic data generation

Simulation

Gazebo, Unity, O3DE, Omniver-
se/Isaac Sim, Matlab/Simulink

MLOps & Cloud

Docker, ONNX, GitLab CI/CD,
Jenkins, Azure, GCP

Embedded

DSP, ARM: STM32, ESP32
FreeRTOS, Yocto, PCB (KiCad)

Other

Linux, LaTeX, Home Automation

LANGUAGES

English C1 (Advanced)
Polish Native

06/2020 – 06/2021

Remote

HQ: Wrocław, Poland

Senior Software Engineer

Natek

- Developed and integrated software for uplink and downlink paths on a new multi-SoC radio module for 5G networks (Linux, C++, Yocto, CMake).
- Implemented tools for analysis and visualization of digital signal (IQ) processing across multiple hardware stages (Python, DSP).
- Optimized the Yocto based system.

08/2017 – 05/2020

Remote

HQ: Taipei, Taiwan

Robotics Software Engineer

Aeolus Robotics Inc.

- Prepared a **demo of the indoor navigation system for CES 2019**, showcasing SLAM and path planning capabilities in a real-world scenario.
- Designed and developed a system for modeling complex multilevel buildings (ROS, C++, Python, Qt).
- Designed and optimized a SLAM system (Cartographer, MRPT, Kalman filter, Particle filters), improving pose estimation accuracy in diverse environments.
- Integrated and calibrated a motion capture system to benchmark and validate SLAM accuracy.
- Created a validation method using visual landmark detection to assess the navigation system's capabilities, used in **mass robot production** for quality assurance and system calibration.
- Engineered **real-time obstacle detection system** for RGB-D sensors, enabling safe navigation in dynamic environments.

10/2017 – 12/2020

Wrocław, Poland

Researcher (part time)

Wrocław University of Science and Technology

- Project "Automation of Control Synthesis for Mobile Robot Systems" supported by the National Science Centre (NCN) under the OPUS program.
- Designed and deployed a distributed multi-robot system using ROS and TurtleBot robots, enabling decentralized task execution and map sharing.
- Developed an algorithm to integrate 3D octomaps from multiple robots.

07/2016 – 08/2017

Wrocław, Poland

Embedded Software Developer

Nokia

- Developed embedded control software for radio modules using C++ on a Yocto Linux platform.
- Coordinated software fault handling in a radio control team.

01/2015 – 07/2016

Wrocław, Poland

IT Specialist

Wrocław University of Science and Technology

Department of Cybernetics and Robotics

- Developed an **autonomous navigation system** for a mobile robot in the EU project ReMeDi (Remote Medical Diagnostician) using ROS, C++, and Python.
- Developed obstacle detection methods leveraging RGB-D data (PCL).
- Conducted real-world experiments with the robot in a hospital environment.

02/2014 – 12/2014

Wrocław, Poland

Robotics Laboratory Technician

Wrocław University of Science and Technology

- Maintained and supported mobile robotics lab infrastructure, including platforms such as Pioneer, NAO, and Khepera.

EDUCATION

2015 – 2022

PhD, *Automatics and Robotics*

Wrocław University of Science and Technology

Thesis: Localization and mapping in multiple mobile robot systems

2014 – 2015

M.Sc.Eng., *Automatics and Robotics*

Wrocław University of Science and Technology

Grade: excellent (5.5/5.5)

Thesis: Collision-free indoor navigation of a mobile robot equipped with the Kinect sensor

2010 – 2014

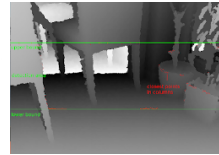
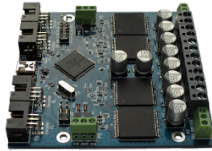
B.Sc.Eng., *Automatics and Robotics*

Wrocław University of Science and Technology

Grade: excellent (5.5/5.5)

Thesis: Application of sensor fusion to wheeled robot localization

OTHER PROJECTS



📅 2015+

🔗 **depth_nav_tools** - ROS tools for mobile robots navigation based on data from RGB-D sensors (GitHub link)

📅 2015+

🌐 **md_drive** - Motors controller for wheeled mobile robots (ARM) with ROS support and UI (Qt).

📅 2013+

🌐 **tacbot** - Autonomous wheeled robot with ROS-based navigation.

📅 2013

🌐 **BLDC controller** Custom sensorless BLDC motor controller.

SELECTED PUBLICATIONS

📅 2022 Chapter

M. Drwięga, E. Roszkowska. *Multi-Robot Mapping Based on 3D Maps Integration*, in *Autonomous Mobile Mapping Robots*. IntechOpen, 2022

📅 2022 Article

M. Drwięga. *3D Maps Integration based on Overlapping Regions Matching*. Journal of Automation, Mobile Robotics and Intelligent Systems

📅 2021 Conference

M. Drwięga. *Incremental 3D Maps Server Based on Feature Matching for Multi-Robot Systems*. Conference on Methods and Models in Automation and Robotics

📅 2017 Article

M. Drwięga, J. Jakubiak. *A Set of Depth Sensor Processing ROS Tools for Wheeled Mobile Robot Navigation*. Journal of Automation, Mobile Robotics and Intelligent Systems

📅 2017 Article

K. Arent, M. Cholewiński, Ł. Chojnacki, W. Dowski, M. Drwięga, J. Jakubiak et al. *Selected Topics in Design and Application of a Robot for Remote Medical Examination with the Use of Ultrasonography and Auscultation from the Perspective of the REMEDI Project*. Journal of Automation, Mobile Robotics and Intelligent Systems

📅 2016 Conference

J. Jakubiak, M. Drwięga, A. Kurnicki. *Development of a mobile platform for a remote medical teleoperation robot*. Methods and Models in Automation and Robotics

📅 2016 Conference

K. Arent, J. Jakubiak, M. Drwięga, M. Cholewiński, G. Stollnberger, M. Giuliani, M. Tscheligi, D. Szcześniak-Stańczyk, M. Janowski, W. Brzozowski. *Control of mobile robot for remote medical examination: design concepts and users' feedback from experimental studies*. Human System Interaction, 9th International Conference on

📅 2015 Conference

J. Jakubiak, M. Drwięga, and B. Stańczyk. *Control and perception system for ReMeDi robot mobile platform*. Methods and Models in Automation and Robotics