MICHAŁ DRWIĘGA

Software Engineer, Roboticist

Wrocław, Poland
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EXPERIENCE

06/2022 – ongoing
Remote

Senior R&D Robotics Engineer

SoftServe

- Robotic arm motion planning and simulation (ROS2, Gazebo, MoveIt).
- Industrial systems simulation with ML models.

06/2021 – 05/2022
Remote

Senior Software Engineer

Robotec.AI

- Developed software for autonomous vehicles (C++, C#, Autoware.Auto).
- Leading the project related to road safety checking by autonomous vehicles (C++, ROS2, Lanelet2, RSS).
- Developed features (e.g. sensors) for robotics simulators (Unity, O3DE).

06/2020 – 06/2021
Remote

Software Developer

Natek

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

08/2017 – 05/2020
Remote
Headquarter in Taipei

Robotics Software Engineer

Aeolus Robotics, Inc.

- The development of a mobile robot navigation software (ROS, C++).
- Created tools to complex environments models creation (Python, Qt).
- Set up and tuned a localization/SLAM system (Cartographer, MRPT).
- Integrated motion capture system to evaluate SLAM methods.
- Implemented a validation method for navigation system capabilities.
- Developed a depth processing method for obstacles detection purposes.

10/2017 – 12/2020
Wrocław

Researcher/Executor (NCN project)

Wrocław University of Science and Technology

- Designed and implemented the multi-robot system based on ROS and Turtlebots robots.
- Developed algorithm to integrate 3D octomaps from multiple robots.

07/2016 – 08/2017
Wrocław

Embedded Software Developer

Nokia

- The development of a radio module control software in C++, with test coverage (gtest) in Yocto based system.

01/2015 – 07/2016
Wrocław

IT Specialist (Department of Cybernetics and Robotics)

Wrocław University of Science and Technology

- Developed the navigation system of a mobile robot in EU project ReMeDi (Remote Medical Diagnostician)(ROS, C++, Python).
- Set up and tuned a **localization/SLAM** system with a motion capture.
- Developed methods for obstacles detection based on RGB-D data (PCL).

02/2014 – 12/2014
Wrocław

Robotics Laboratory Technician

Wrocław University of Science and Technology

- Technical support/maintenance in laboratories of mobile robotics.
- Set up the equipment in new mobile robotics laboratory (Pioneer, NAO).

SKILLS

Domains

Robotics, Telecommunications, Autonomous Vehicles

Software Development

C++(17)
Python, Bash, C
Rust
C# (certificate)
JSON, XML, YAML
C++ libs: opencv, gtest, Eigen, Qt, PCL
Tools: CMake, Docker, Jenkins, Yocto
Git
Methodologies: TDD, Agile
Architecture: UML, MVC, layered

Mobile Robotics

Systems architecture design
SLAM, Navigation, Sensors
Multi-Robot Systems
RGB-D data processing
3D Feature Matching
Octomaps
Tools: Motion Capture, Orocos
ROS/ROS2
Simulation: Gazebo, Unity, O3DE
Matlab/Simulink, Scilab/Xcos

Embedded Systems

HW/SW Design, DSP
Microcontrollers (ARM, AVR)
FreeRTOS, PCB (KiCad)

Data Science

ML, numpy, matplotlib, pandas

Operating Systems

Linux
Windows

Other

LaTeX, LabVIEW (CLAD)
Home Assistant

LANGUAGES

Polish
English

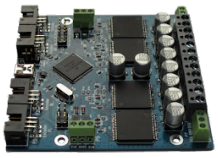
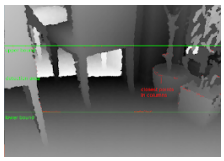
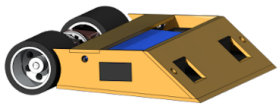
EDUCATION

2015 – 2022 **Ph.D.**, *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)
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)
Thesis: Application of sensor fusion to wheeled robot localization

PERSONAL PROJECTS

2015+ ROS tools for mobile robots navigation based on data from RGB-D sensors.
2015+ Motors controller for wheeled mobile robots (ARM, USB) with ROS support and UI (Qt).
2013+ Four wheeled mobile robot with the autonomous navigation system in ROS framework.
2013 Sensorless BLDC motor controller.
2012 Mobile robot for minisumo competition.

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

2019 Conference M. Drwięga. *Feature Matching based Merging of 3D Maps in Multi-Robot Systems*. Conference on Methods and Models in Automation and Robotics

2018 Conference M. Drwięga. *Efficient integration of octree based maps in multi-robot system*. 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. Domski, 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 M. Drwięga, J. Jakubiak. *Zestaw narzędzi wspomagających nawigację kołowym robotem mobilnym wyposażonym w sensor głębi*. Krajowa Konferencja Robotyki

2016 Conference J. Jakubiak, M. Drwięga, A. Kurnicki. *Developement 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