

Minghan Wei

Phone: (+1) 6122448704 | Email: weim@fau.edu
Website: <https://faculty.eng.fau.edu/weim/>

Education

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| University of Minnesota, Twin Cities, USA <ul style="list-style-type: none">• Ph.D. in Computer Science; GPA: 3.85/4.00• Advisor: Prof. Volkan Isler• Thesis: Energy Mapping and Energy-aware Path Planning for Field Robots | 08/2016 - 01/2022 |
| Australian National University, Australia <ul style="list-style-type: none">• Exchange program, Computer Science | 07/2014 - 12/2014 |
| Nanjing University of Science and Technology <ul style="list-style-type: none">• Bachelor of Engineering in Computer Science; GPA: 3.79/4.0 | 09/2012 - 07/2016 |

Professional Experience

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| Florida Atlantic University
<i>Assistant Professor</i> <ul style="list-style-type: none">• Research area: robotics perception, mapping, planning, and control | 08/2023 - Present
<i>Boca Raton, FL</i> |
| Google LLC
<i>Software Engineer</i> <ul style="list-style-type: none">• Developed methods to improve the localization and tracking algorithms for Google's Augment Reality products. | 06/2022 - 06/2023
<i>Mountain View, CA</i> |
| iRobot
<i>Senior Robotics Software Engineer</i> <ul style="list-style-type: none">• Developed and implemented mapping, navigation solutions for indoor robots• Improved the efficiency of existing vacuum cleaning and mopping robots | 01/2022 - 06/2022
<i>U.S. Remote</i> |
| 3M Company
<i>Data Science intern</i> <ul style="list-style-type: none">• Worked in a research team to build machine learning models for predicting the future status of some chemical or biological processes | 06/2021 - 08/2021
<i>St Paul, MN</i> |
| Samsung Research America Inc
<i>Research Intern</i> <ul style="list-style-type: none">• Implemented basic functionalities for a ground robot platform, including odometry, occupancy mapping, closed-loop navigation control.• Conducted the research project: Occupancy map inpainting for robot online navigation<ul style="list-style-type: none">• Used deep learning to predict the occupancy of unseen parts of a map for robot navigation• Tested the network prediction performance with both simulated and real data• Applied the prediction network to robot navigation and demonstrate shorter paths to goals• Published the results as an academic paper. | 06/2021 - 08/2021
<i>New York, NY</i> |

Publications

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- C. Peng, **M. Wei**, and V. Isler, 'Stochastic Travelling Salesperson Problem with Neighborhoods for Object Detections', IEEE International Conference on Robotics and Automation (ICRA), 2023.
 - **M. Wei**, and V. Isler, 'Predicting Energy Consumption of Ground Robots on General Terrains', IEEE Robotics and Automation Letters, 2021.
 - **M. Wei**, D. Lee, V. Isler, and Daniel. D. Lee, 'Occupancy Map Inpainting for Online Robot Navigation', IEEE International Conference on Robotics and Automation, 2021.
 - **M. Wei**, and V. Isler, 'Building Energy-Cost Maps from Aerial Images and Ground Robot Measurements with Semi-Supervised Deep Learning', IEEE Robotics and Automation Letters, 2020.

- **M. Wei**, and V. Isler, ‘Energy-efficient path planning for ground robots by combining air and ground measurements’, Conference on Robot Learning, 2019.
- **M. Wei**, and V. Isler, ‘Air to ground collaboration for energy-efficient path planning for ground robots’, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019.
- **M. Wei**, and V. Isler, ‘A log-approximation for coverage path planning with the energy constraint’, International Conference on Automated Planning and Scheduling (ICAPS), 2018.
- **M. Wei**, and V. Isler, ‘Coverage path planning under the energy constraint’, IEEE International Conference on Robotics and Automation, 2018

Selected Projects

Energy Mapping and Energy-aware Path Planning for Field Robots

01/2017 – 01/2022

Ph.D. thesis topic

- Energy-aware Coverage Path Planning
 - Developed path planning algorithms for covering a given environment with the minimum energy consumption
- Energy-efficient Navigation for Ground Robots
 - Used learning methods to efficiently build energy-cost maps from aerial and ground robot measurements for large, field environments
 - Implemented the functionality for robots to autonomously navigate to goal positions energy-efficiently based on the energy-cost maps

Agricultural Weed Control Using Autonomous Mowers

07/2018 - 01/2022

Sponsored by Minnesota LCCMR program

- Autonomous robotic mowers can keep fields organic and free from harmful chemicals
- Developed an autonomous robotic mower for agricultural pastures
- Developed a small-sized ground robot to navigate narrow corn rows for weed control
- Worked on the environment perception, planning, and navigation control of this project
 - Designed algorithms to plan energy-efficient paths to cover the field
 - Implemented controllers to make the robots follow the planned paths and avoid obstacles
- Tested the system in pastures and corn fields

Raspberry Picking with a Robot Arm

01/2018 - 05/2018

Course project of Sensing and Estimation in Robotics

- Implemented the controller for a manipulator to pick raspberries
 - Used visual inputs (camera) to move the gripper for picking
 - Closed the gripper for picking and use force feedback sensors to avoid damaging the fruit
- Demonstrated the results in class and submit a project report.

Apple Diameter Estimation using RGB Images

01/2017 - 05/2017

Course project of Computer Vision

- Develop a method to estimate the diameter of apples using a pair of close-up RGB images
 - Found the correspondence between two apple images based on epi-polar geometry
 - Estimation accuracy was within two centimeters.
- Presented the results in class and submitted a project report

Vehicle Detection Based on Smartphone-collected Images

06/2015 - 09/2015

Robotics Institute Summer Scholar (RISS), Carnegie Mellon University

- Implemented a detection and tracking algorithm to detect vehicles in smartphone images
 - The phone was mounted behind the windshield of a car.
- Published results at *RISS Working Papers Journals* and demonstrated in a poster session

Patent

- **M. Wei**, D. Lee, V. Isler, and Daniel. D. Lee, ‘Method of predicting occupancy of unseen areas for path planning, associated device, and network training’, US Patent App (US17/131,194) 2020.

Teaching

COP 3530: Data Structure and Algorithm Analysis **08/2023 – 12/2023**

- Role: Instructor at Florida Atlantic University

CSCI 2033: Elementary Computational Linear Algebra **08/2016 – 01/2017**

- Role: Teaching assistant at the University of Minnesota
- Led recitation sections; Lectured three times when the professor was not available; Grading
- Received the *Best TA award* of the department

Services

Reviewer for journals and conferences

- IEEE Robotics and Automation Letters (RAL)
- Journal of Field Robotics (JFR)
- Autonomous Robots
- IEEE Transactions on Automation Science and Engineering
- IEEE Transactions on Intelligent Transportation Systems
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Acoustics, Speech, and Signal Processing
- IEEE International Conference on Multimedia & Expo

Skills

- Programming Languages: C/C++, Python, Java, Matlab
- Deep-learning libraries: Keras, PyTorch
- Technical writing