

NINGHAN ZHONG

Personal Website: ivaniz.github.io

Google Scholar: <https://scholar.google.ca/citations?user=8zyHdjoAAAAJ&hl=en&oi=ao>

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EDUCATION

B.S. in Computer Science | **University of Illinois at Urbana-Champaign**

Aug 2018 - May 2022

Graduated with the Highest Honors

GPA: 3.97 / 4.0

MASc in Electrical and Computer Engineering | **University of Waterloo**

Aug 2023 - Aug 2025

GPA: 90.33 / 100

COURSEWORK

Robot Perception & Manipulation, Machine Learning, Reinforcement Learning, Algorithms & Data Structures

SELECTED PUBLICATIONS

- “Autonomous Navigation in Ice-Covered Waters with Learned Predictions on Ship-Ice Interactions”
 - **N. Zhong**, A. Potenza, and S. L. Smith
 - Under review for ICRA 2025 [[preprint](#)][[project page](#)]
- “Attentiveness Map Estimation for Haptic Teleoperation of Mobile Robot Obstacle Avoidance and Approach”
 - **N. Zhong** and K. Hauser
 - IEEE RA-L 2024 [[paper](#)]
- “Hierarchical Intention Tracking for Robust Human-Robot Collaboration in Industrial Assembly Tasks”
 - Z. Huang*, Y. J. Mun*, X. Li†, Y. Xie†, **N. Zhong†**, W. Liang, J. Geng, T. Chen, and K. Driggs-Campbell
 - ICRA 2023 [[paper](#)]
- “System Design, Evaluation and Applications of Domain Term Extraction from Engineering Videos”
 - J. Li, **N. Zhong**, R. Kooper, and L. Angrave
 - ASEE 2023 IL-IN Section [[paper](#)]

RESEARCH EXPERIENCE

Autonomous Systems Lab | Deep learning, path planning, autonomous navigations **Sept 2023 - Present**

Advisor: Prof. Stephen L. Smith

Department of Electrical and Computer Engineering, UWaterloo

- Proposed a deep learning framework that predicts the coarse dynamics of ice obstacles for ASV navigations
- Presented a novel approach that seamlessly integrates the learned model into a graph-search planner
- Designed an integrated predictive planner with a constant-factor theoretical guarantee for ASV navigations in ice-covered waters, reducing both collisions and travel distances
- Work currently under review for ICRA 2025

Intelligent Motion Lab | Mobile robot navigation, haptic control, perception

May 2022 - Aug 2023

Advisor: Prof. Kris Hauser

Department of Computer Science, UIUC

- Presented a potential field haptic control framework for mobile robot teleoperation
- Proposed a real-time human spatial attentiveness estimation model by uniquely combining visual saliency detection with computational working memory models to optimize haptic feedback

- Experiments showed the proposed framework reduced teleoperation task completion time by 11%, human control effort by 19%, and obstacle collisions by 16%
- Work published in IEEE RA-L 2024

Human-Centered Autonomy Lab | Human-intention predictions, perception **Aug 2021 - May 2022**
 Advisor: *Prof. Katherine Driggs-Campbell* *Electrical and Computer Engineering Department, UIUC*

- Assisted with developing a robot control framework with hierarchical human-intention predictions for industrial assembly tasks
- Implemented an algorithm to localize target assembly parts in the robot workspace based on vision input from the robot wrist camera
- Work published in ICRA 2023

ClassTranscribe Development | *Machine Learning, HCI, Vision* **Dec 2020 - Dec 2021**
 Advisor: *Prof. Lawrence Angrave* *Department of Computer Science, UIUC*

- Proposed a novel scene change detection model for lecture videos using a Support Vector Machine, where features are extracted and processed by a combination of Optical Character Recognition and Multi-Task Cascaded Convolutional Neural Network. The model achieves a 97% accuracy in detecting scene changes
- Researched to improve speech-to-text recognition by supplying technical keywords
- Developed a keyphrase extraction model, which significantly improves domain-specific word recognition accuracy, and increases overall speech-to-text accuracy by 9%
- Work published in ASEE 2022

INTERNSHIP

Golden Ridge Robotics | **Computer Vision & Algo. Intern** - C++, ROS, OpenCV, PCL **May 2021 - Jul 2021**

- Developed an obstacle detection and localization model for low-speed self-driving vehicles. The model combines UV disparity algorithms and point cloud projection to locate all detected obstacles and estimate their dimensions. The model achieves an accuracy of less than 30% relative error in obstacle dimension estimations and less than 12% relative error in distance estimations
- Developed a 3D autonomous navigation environment marking program that allows users to mark obstacles and driving areas with any shape in point clouds for low-speed self-driving vehicles. The marking program can mark an area as large as 25 km² with a decimeter-level accuracy

HONORS

- International Master's Award of Excellence \$12,500 CAD **University of Waterloo, Nov 2023**
- The Highest Honors at graduation **UIUC, Spring 2022**
- UIUC Dean's List (7 Semesters) **UIUC, Fall 2018 - Spring 2020, Spring 2021 - Spring 2022**
- James Scholars (2 Semesters) **UIUC, Fall 2021, Spring 2022**

PROFESSIONAL SKILLS

Software/Tools ROS, PyTorch, Mujoco, OpenAI Gym, Docker, Rviz, OpenCV
Programming Languages C++, C, Python, JavaScript, Java, C#

TEACHING EXPERIENCE

- Undergraduate Teaching/Lab Assistant **Principles of Safe Autonomy, UIUC, Spring 2022**
- Teaching Assistant **Discrete math II, University of Waterloo, Spring 2024**