Hersh Vakharia

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Education

University of Michigan — Ann Arbor, MI
Master of Science in Robotics — *Aug. 2022 – May 2024*
- GPA: 4.00/4.00
- Perception and Sensing Focus

University of Michigan — Ann Arbor, MI
Bachelor of Science in Computer Engineering, Minor in Mathematics — *Aug. 2018 – May 2022*
- GPA: 3.67/4.00

Publications

H. Vakharia and X. Du, "Efficient Multi-Resolution Fusion for Remote Sensing Data with Label Uncertainty", *2023 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Pasadena, California, 2023.

H . Vakharia and X. Du, "Bi-Capacity Choquet Integral for Sensor Fusion with Label Uncertainty," 2024 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Yokohama, Japan, 2024.

Experience

Microsoft - Surface Imaging and Provisioning — Redmond, WA
Software Engineer — *Aug. 2024 – Present*
- Develop Surface factory provisioning packages as a product dev owner

University of Michigan Robotics - Ford Center for Autonomous Vehicles — Ann Arbor, MI
Graduate Research Assistant — *Aug. 2022 – Dec. 2024*
- Researched fuzzy-measure based multi-modal and multi-resolution sensor fusion with label uncertainty
- Formulated label uncertainty with Multiple Instance Learning
- Developed python fuzzy-measure optimization with evolutionary algorithms, quadratic programs, and quasi-newton methods
- Applied fusion to Multi-spectral, Sonar, LiDAR, and Depth sensing modalities
- Formulated experiments with pedestrian, building, and object detection

Microsoft - Surface Org — Redmond, WA
Software Engineer Intern (x3) — *Summer 2021, 2022, 2023*
- Developed prototype website in Blazor/C# that communicates with windows service to image and provision Surface Devices
- Developed and tested UEFI image based on open-source EDK2 platforms
- Developed and documented Surface Duo dual-screen android apps

Lucid Drone Technologies — Charlotte, NC (Remote)
Embedded Systems Engineering Intern — *May 2020 – Aug. 2020*
- Developed C++ ROS package to read MPU6050 IMU data via I2C
- Engineered and calibrated a ROS camera-IMU synchronization sensor for Robust Visual Inertial Odometry Framework

University of Michigan Autonomous Robotic Vehicle Team — Ann Arbor, MI
President / Sensors Lead / Sensors Member — *Sept. 2018 – June 2022*
- Led 40 member team in development of autonomous robotic vehicle for the 2022 Intelligent Ground Vehicle Competition
- Developed Extended Kalman Filter based odometry in ROS/C++ from IMU and wheel encoder data
- Configured Simultaneous Localization and Mapping (SLAM) from odometry, LiDAR, and IMU

Projects

SNACBot | *Python, C++, ROS, MoveIt, Computer Vision, YOLOv5, Inverse Kinematics*
- Designed custom 3D-printed 5-axis robot arm
- Configured low-level control, inverse kinematics, and motion planning in ROS and MoveIt
- Developed YOLOv5 based food object detection using gripper-mounted Intel Realsense depth camera

Robot Laser Tag | *Embedded C, STM32, UART, I2C*
- Engineered STM32-based omni-directional tilt-controled robots with motorized turrents for IR laser tag
- Developed embedded-c drivers for LCD, motor H-bridge, IMU, and IR emmitters/receivers

Visual Underwater SLAM | *Python, GTSAM, ROS, SLAM, Docker*
- Developed visual-inertial underwater pose-graph SLAM formulated in GTSAM with ORB feature detectors
- Enabled ROS compatibility and tested on real-world underwater data

Technical Skills

Languages: Python, C, Embedded C, C++, C#, MATLAB
Frameworks: Robot Operating System (ROS, ROS2), MoveIt, Android SDK
Libraries: NumPy, Matplotlib, PyTorch, Python Multiprocessing, OpenCv, GTSAM, CUDA
Other: Linux, Docker, Conda, Arduino, Raspberry Pi, LaTeX