OM VINAYAK GAIKWAD

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Education

M.S. in Robotics Engineering   **Aug 2022 - May 2024**
*Worcester Polytechnic Institute **GPA: 4/4***   *Worcester, MA*
Coursework: Advanced Robot Navigation, Motion Planning, Vision-based Manipulation, Deep Learning

B.Tech in Mechatronics Engineering   **Aug 2018 - May 2022**
*Symbiosis Skills and Professional University **GPA: 9.3/10***   *Pune, India*

Skills

Programming Languages: Python, Matlab, C++
Software and Libraries: ROS / ROS 2, Git Version Control, RTOS, Linux, OpenCV, RViz, PyTorch.
Hardware Interface: SPI, I2C, CAN, UART, USB, Ethernet, EtherCAT

Experience

Robotics Systems Engineer   **May 2024 - Present**
Celltrio Inc.   *Fremont, CA*
- Develop automated State Machine based validation tests on the Scara Robot and other robotics equipment to authenticate functionality and reliability.
- Troubleshoot and debug HW/SW robotic subsystems and utilize DFMEA and validation test data to find root cause and create test reports.
- Plan and deploy hands-on integration of robotic equipment and document Validation Tests.

Robotics Automation Engineer Demo | Poster   **June 2023 - Aug 2023**
Axle Informatics   *Rockville, MD*
- Collaborated with a team of six and developed an **Automated Serial Evaporator** at **NIH/NCATS** enhancing the evaporation efficiency by **3 hours per chemist per day**.
- Enhanced evaporation with the MECA500 Robotic Arm for automation, integrating **edge-detection** and **segmentation** via **camera** and **barcode** scanner to detect vials.
- Conducted system integration and **hardware interfacing** through **Continuous Integration (CI)** and developed a UI to enhance user-experience.

Robotics Software Engineer - Localization & Navigation   **Aug 2021 - Aug 2022**
RigBetel Labs   *Pune, India*
- Deployed **LiDAR, 3D cameras,** and **distance sensors** on mobile robots to facilitate **advanced mapping** and **navigation** algorithms for autonomous operations using **actionlib/pluginlib** of ROS.
- Employed **agile methodologies** in the rapid iteration and development of **localization** and **planning algorithms** on mobile robots, **enhancing team collaboration** and responsiveness to changes.

Projects

Autonomous Mobile Robot for Delivery Application GitHub | Python
- Designed and built an omni-wheeled AMR capable of **mapping** and **autonomously navigating** in indoor areas.
- Implemented real-time obstacle avoidance and **Cartographer** based **SLAM** on ROS using **LiDAR sensor**.

Vision Based Grasping Assuming Symmetry GitHub | C++
- Utilized **ROS2 PCL** for **point-cloud processing**, including down-sampling, segmentation, and normalization.
- Developed a planar **grasping algorithm** and evaluated the ideal grasp points based on the best symmetry metric.

Path Planning Algorithms GitHub | Python
- Proficient in **search algorithms**: Dijkstra, A*, RRT*, Informed RRT*, and PRM and utilized them on grid map.
- Analyzed the efficiency of these algorithms based on **nodes created, path length, and computation time**.

SCARA Robot Linear Trajectory Control in ROS2 GitHub | Python
- Developed a **ROS2** based controller of **SCARA manipulator** to follow a linear trajectory.
- Implemented a **python node** for the controller and **published efforts** using the **service-client** method.

Quadcopter Localization using Unscented Kalman Filter GitHub | Python
- Developed a **pose estimation** solution using UKF-based Nonlinear Kalman Filtering.
- Incorporated **computer-vision** techniques for precise tracking and **orientation measurement** through **AprilTags**.

Publications

- **Gaikwad Om**, et al. "Development of Low-cost LiDAR Scanner for Indoor Mapping" *IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 8 Issue 12, December 2021*   Paper.