Pranay Junare

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*Seeking internship opportunities for Summer & Fall 2025.

Education

University of Minnesota - Twin Cities — Minneapolis, MN
M.S. in Robotics (Courses-Machine Learning, Deep Learning, Robot Vision) — *Aug. 2024 – Present*

College of Engineering Pune (COEP) — Pune, India
B.Tech. Electronics and Telecommunication, 2nd degree in Computer Science; CGPA: 8.54 — *Aug. 2018 – June 2022*

Technical Skills

Programming Languages: C++, C, Python, Java

Frameworks and Tools: PyTorch, OpenCV, ROS/ROS2, PCL, MATLAB, Altium PCB Designer, Gazebo, Unreal Engine, Airsim, MavROS, PX4, OpenAI gym, Softgym, Linux, CMake

Hardware & Developer Tools: Cameras, LiDAR, Encoders, STM32, Jetson Orin, Git, Docker, Jenkins, LaTeX

Research & Industrial Experience

Research Assistant — Sept. 2024 – Present
University of Minnesota — *Minneapolis, USA*
- Currently working on multiview 3D reconstruction of smoke plume using Gaussian Splatting and NeRFs.
- Developing Vision-based algorithms for autonomous UAV swarm navigation to characterize smoke particles during wildfires.

Software Developer — June 2022 – Aug 2024
ION Trading — *Pune, India*
- Responsible for design, development and enhancement of low-latency "Trade & Risk Management" product of ION's WallStreet Suite treasury solution, which serves most Central banks and major Fortune-100 companies.
- Delivered backend features with high velocity and quality using a diverse technology stack including C++, Python, C++ Boost library, DBMS(Oracle, MS-SQL), Perl, Docker-CLI, Git, ION's internal frameworks, RESTful APIs, CI/CD pipeline, Automated testing, and with concepts such as OOPS, SOLID principles and clean code methodologies.

Research Intern - NTU-India Connect Research Fellowship — June 2021 – Aug 2021
Nanyang Technological University, Singapore — *Nanyang Avenue, Singapore*
- Developed a Collaborative UAV-UGV system for Search and Rescue Task, implementing a Octomap based 3-D mapping approach using UAV which can further be used by UGV for navigation. (Advisor: *Dr. Xie Ming*)
- Built a human detection system on the UAV using Yolo-v3 tiny model in order to detect persons to be rescued.

Research Intern - Mitacs Scholar — Apr. 2021 – June 2021
Ontario Tech University, Canada — *Oshawa, Canada*
- Worked on Autonomous electric wheelchair for children with physical disability. (Advisor: *Dr. Scott Nokleby*)
- Implemented complete navigation stack, assessed RTABMap & Octomap mapping approach using a custom simulation model of the wheelchair and built a system for detecting negative obstacles such as staircase.

Undergraduate Research Member — Mar 2019 – June 2022
Centralized Robotics and Automation Lab, COEP — *Pune, India*
- Contributed to multiple research projects, published research paper, conducted various workshops & participated in robotics competitions such as ABU Robocon. (Advisor: *Dr. Shantipal Ohol*)

Robotics Intern - Binary Robotics — Nov 2020 – Jan 2021
- Engineered & deployed end-to-end ROS navigation stack for AMR's in a dynamic environment such as healthcare facility.

Selected Projects

Self-supervised learning for Deformable object manipulation | Poster | Video | Code | Webpage
- Investigated high-velocity dynamic actions such as fling using value network based policy for the task of cloth unfolding.
- Implemented Spatial Action Maps with self-supervised learning pipeline while achieving a success rate of 95.09%.

Autonomous UAV navigation using Deep Reinforcement Learning | Video | Code
- Trained PPO and SAC RL policy network for UAV navigation through tight spaces in custom airsim environment.
- Compared the results of both the policies while achieving an average success rate of 94% for SAC policy.

Deep Learning based robotic Grasping of unknown objects | *PyTorch, Computer Vision* | Video | Report | Code | Paper
- Utilized transfer learning to build a CNN-based grasping model that predicts the 5-D grasp configuration with 83.3% accuracy
- Established end-to-end grasping pipeline with prediction of rotated bounding boxes, Moveit support, 3D grasp pose estimation, Transforms from 2D image to the base link and finally the trajectory planning of robotic arm.

Visual SLAM & Object detection for Autonomous Mobile Robot | *ROS, Perception* | Video | Paper
- Implemented RTABMap SLAM algorithm on gazebo simulator and in real world using Kinect v2 RGB-D camera
- In addition to that alongside Yolo-V3 object detection model was implemented in order to achieve task of robust perception.

Publications & Awards

- "Deep Learning based end-to-end Grasping Pipeline on a lowcost 5-DOF Robotic arm.", IEEE 19th India Council International Conference (INDICON), 2022. *(Paper)*
- "Visual SLAM combined with Object detection for autonomous indoor navigation using Kinect V2 and ROS", IEEE 6th International Conference on Computing, Communication and Automation (ICCCA), 2021. *(Paper)*
- "Development of Robotic Arm Manipulator mounted on Self Balancing Two Wheeled Mobile Robot", Aerospace and Defence Related Mechanisms Symposium (ARMS-DRDO), 2021. *(Paper)*
- Recepient of JN Tata Scholarship, MITACS GRI Award, Complete list at https://pranay-junare.github.io/