Charvi Mendiratta

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Education

UIET, Panjab University **May 2016 – May 2020**
Bachelor of Engineering in Electronics and Communication Engineering GPA - 8.21/10 *Chandigarh, India*

Research Experience

Robotics Research Center, IIIT Hyderabad **July 2023 – Present**
Research Associate under Dr. Harikumar Kandath and Dr. Ravi Kiran *Hyderabad, India*

- Working on the project "Drone base Civil Structures Assessment", aimed at developing reliable vision pipeline to estimate critical structural parameters using computer vision and deep learning algorithm. **[Project]**
- Implemented and presented research work on "Building's Tilt Estimation" and "Crack Detection in Buildings" modules at IHub National Meetup. **[Poster]**

Design Innovation Centre, Panjab University **May 2018 – June 2018**
Summer Intern under Dr. Naveen Aggarwal *Chandigarh, India*

- Worked on research project "Autonomous Surface Vehicle" designed to monitor the ecological health of water bodies and assess the well-being of aquatic life. **[Video]** **[Report]**

Industry Experience

Flux Auto **June 2021 – June 2023**
Robotics Software Engineer - Mapping and Localization *Bangalore, India*

- Worked on research and development of 3D lidar based SLAM algorithms (NDT, LOAM, Slamtoolbox) for generating poincloud and occupancy grid maps for autonomous vehicles in warehouses.
- Worked on developing mapping and localization utilities that includes runtime map switching, maps origin shifting, pre and post processing pcl data and implementing relocalization using lidar and odometry data.
- Developed the software stack for generating local and global costmaps for tracking the dynamic obstacles and updating the occupancy grid maps in runtime, to explore dockers or other unknown areas in warehouses.
- Developed from scratch Mapping Data Collection tool using PyQt to ease the process of sensors setup and data collection at different client locations.

Git **December 2020 – March 2021**
Outreachy Software Developer Intern *Remote*

- Developed the new feature for existing "git commit –fixup" command that allows to prepare the "amend!" and "reword!" commit, as an alternative to the existing "fixup!" commit. **[Merged-Patches]**
- Added the options '-c' and '-C' to the present fixup command in the git interactive rebase.
- Collaborated with git developers on mailing system for implementing new features and worked in patches based workflow for development and merging code.
- Gitlab's blog post on "Technology internships meet open source in Outreachy", sharing the internship experience and features implemented.

Black Coffee Robotics **January 2020 – July 2020**
Robotics Software Developer Intern *Pune, India*

- Developed communication layer using ROS2 framework (cyclone DDS) to share the data between server and multiple clients running on ROS1 based software stack and carried out performance testing in lossy networks.
- Worked on sensor fusion algorithms - Kalman filter, Extended Kalman filter, Bayesian Networks for fusing different sources of odometry.

- Explored existing occupancy map building and localization algorithms, and performed comparison on large dynamic factory environment with moving obstacles built in Gazebo simulator. Developed utility to mark ground truth and actual pose on the built map which helps to find the localization failing regions in large environments.

Jmoon Labs **June 2019 – July 2019**
Robotics Software Developer, Summer Intern *Delhi, India*

- Worked on Turtlebot3 open source robot, built its ROS package for the teleoperation of the Multiple Turtlebots.
- Tested Navigation algorithms on Turtlebot3 and implemented waypoint follower. **[Video1]** **[Video2]**

Selected Projects

Comparison of SLAM Algorithms | *C++, Python, ROS* **April 2021**

- Performed comparison of the existing SLAM approaches and benchmarked the results based on measuring the error in pose data for different simulated environments. **[Report]**

Ant Bot, eYRC IIT Bombay | *Algorithm design, OpenCv, I2C, Firebird V* **Sept 2018 - Mar 2019**

- Built Ant Bot from scratch using firebird V robot kit and raspberry pi using SFM based line following algorithm. Implemented segmentation based object detection and decision making algorithm based on aruco markers. **[Video]** **[Code]** **[Poster]**

Tele-op Surveillance Bot | *Python, Rosserial, OpenCv, SSH, PiCam* **May 2019**

- Developed a prototype of wireless remote-operated surveillance bot for environmental monitoring, demonstrating applications in surveillance and data collection. **[Video]** **[Code]**

Password Based Security system | *8051 mC, Embedded C* **July 2018**

- Created a password-based security system for restricted access control, enhancing security measures by selectively limiting entry to authorized individuals. **[Video]**

Age and Gender Detection Estimation, AI Saturdays | *Python, keras, opencv* **Dec 2018**

- Implemented a Convolutional Neural Network on the IMDB dataset to predict age and gender, highlighting the application of deep learning in image-based demographic analysis.

Technical Skills

Languages: C/C++, Python, MATLAB, Shell Script, Latex
Tools/Technologies: ROS1/ROS2, Gazebo, Ubuntu/Linux, VS Code, Git, Docker, Arduino, Raspberry Pi, AVR mC, 8051 mC, Pspice, Fritzing
Libraries: PCL, Eigen, STL, Boost, OpenCV, Numpy, Keras, Pytorch, Open3D, Scipy, Matplotlib, PyQt

Achievements and Extracurricular Activities

- **ROSCON Diversity Scholarship Awardee 2019**, attended conference held at Macau
- **Winner of Smart India Hackathon 2019** by Kokuyo Camlin, held at IIT Hyderabad
- **Awardee for Excellence in Technology field** by Mrs. Kirron Kher (MP, Chandigarh)
- **Third Position** in **Ennovate Hackathon**, UIET
- Qualified the **Quaterfinals** round of the **Texas Instruments IICDC**, 2018
- **Poster Presentation** on **"Line Following Algorithm using FSM"** during the 13th Chandigargh Science Congress held at Panjab University, Chandigarh
- **Student Mentor** in category of **Electronics and Programming** for designing projects under **UIET Tinkering Labs**
- **Student Head** at **Eyantra Robotics Lab, UIET** (2017-2020) and member of **Programming Club, UIET**
- **Talk at ROS India Meetup** held at UIET discussing on Open Robotics and about ROS framework
- **Volunteer** during **Technoxian'18** held at Thyagaraj Stadium, New Delhi