Tarun Ramakrishnan

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EDUCATION

SRM Institute of Science and Technology | Chengalpattu, India **Sep 2020***

- Bachelor of Technology in Mechatronics Engineering*; GPA:* 8.34/10.00
- *Coursework:* Robot Kinematic & Dynamics, Calculus & Linear algebra, Linear and digital Control systems, Machine Design.

ACADEMIC PROJECTSs

Autonomous Wheelchair for Indoor and Outdoor Applications, *Funded by Centre for Immersive Technologies*

- Coded EKF based system to fuse GNSS data from mobile phone with ZED stereo camera's visual inertial odometry for global localization. Resulted in centimetre-level accuracy with less than 5% drift.
- Implemented a local SLAM using 'slam_toolbox', where ZED's point cloud data is converted to laser scan to create an occupancy grid map, working on a feature extraction-based technique to differentiate obstacles. A solid-state LiDAR coded in python 3, is used for ground-level obstacle avoidance, resulting in flawless depth sensing. [video]
- Graduate level course work in progress: Robot mapping, Probabilistic Robotics by Prof. Dr. Cyrill Stachniss
- The waypoint navigation is handled by ros2 middleware for nav2 stack which is visualized in Rviz.
- Fabricated the wheelchair chassis from ground up with linear actuator for steering with rack & pinion based feedback system and a 250W brushed motor for linear motion, homing and control of the actuator are sent through Arduino Nano connected to proprietary motor drivers, which is intended to be controlled using 'ros2_control' stack.
- Project is developed with scalability and robustness in mind, as planning to incorporate multi-camera VSLAM.

Autonomous navigation of mobile robot in Gazebo environment using ROS 2

- Implemented 360 LiDAR-based SLAM using the 'slam_toolbox' and 'nav_2' stack in ROS2 Humble Hawksbill for precise navigation in unfamiliar environments, employing a custom-modelled chassis controlled through a 'ros2_control' stack.
- Executed navigation procedures were visualized in Rviz2 and Gazebo for simulation, where the robot achieved an excellent accurate mapping and navigation.

Cloud-based Lab Equipment Loan System, *Funded by the Centre for Immersive Technologies*

- Developed a hybrid system using RFID and face authentication coded using OpenCV Haar Cascade Classifier for loaning lab equipment's fitted with QR code to implement in the SRM Institute of Science & Technology.
- Utilized Raspberry Pi to extract user data and log onto Google Workspace, eliminating the need for paper.

PUBLICATIONS

R. Tarun and B. P. Esther, "Real-time regional road sign detection and identification using Raspberry Pi," 2023 International Conference on Networking and Communications (ICNWC), Chennai, India, 2023, pp. 1-5, doi: 10.1109/ICNWC57852.2023.10127370. [IEEE link]

R. Tarun and B. P. Esther, "Traffic Anomaly Alert Model to Assist ADAS Feature based on Road Sign Detection in Edge Devices," 2023 4th International Conference on Electronics and Sustainable Communication Systems (ICESC), Coimbatore, India, 2023, pp. 824-828, doi: 10.1109/ICESC57686.2023.10193442. [IEEE link]

SKILLS

Software SOLIDWORKS, Ansys, ROS 1 &2, Gazebo, Simulink, LabVIEW, Docker, Git, TensorFlow.
Programming languages C/ C++, Python, MATLAB, Latex, Google App Scripts, BASH.
Edge devices/ Sensors NVIDIA Jetson TX1, Jetson Nano, Raspberry Pi, Arduino, Duckiebot, PixHawk Flight controller, ZED 2i Stereo camera, CE 30-C LiDAR, GNSS RTK ZED-F9P.

WORK EXPERIENCE

Drivetrain Engineer | Team 1.618 | Chengalpattu, India **Nov 2020 – Aug 2022**

- Led drivetrain engineering efforts for a 30-member student team, tasked with designing and fabricating a Hybrid Formula student car for National and International competitions.
- Spearheaded the design and fabrication of a Planetary coupling system, optimized an eccentric chain tensioner, and managed sponsor relationships.
- Secured Overall Champions title in the 7th season of Formula Imperial 2021 organized by ISIEINDIA.
- Achieved Dassault Systèmes certification for Mechanical Design at the ASSOCIATE level.

Research Intern | Chengalpattu, India **Dec 2022 – Jan 2023**

- Contributed to the research titled "A Study on Different Types of Convolutions in Deep Learning in the Area of Lane Detection," focusing on lane annotation and segmentation techniques.
- Explored methods ranging from early CNN-based approaches to pixel-level semantic segmentation for improved localization.