Pruthvi Sanghavi
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Hyattsville, MD

Education

University of Maryland, *Master of Engineering in Robotics; GPA: 3.6/4.0* *College Park, MD|* ***08/2019 – 05/2021***
Relevant Coursework: Software Development, Motion Planning, Perception, Statistical Pattern Recognition, Robot Modeling and Control

L.D.R.P Institute of Technology and Research, *Bachelor of Mechanical Engineering; GPA: 8.56/10.0* *Gandhinagar, India |****05/2019***
Relevant Coursework: Machine Design, Thermodynamics, Finite Element Analysis, Material Science, Engineering Physics, Electronics

Projects

Motion Planner: A Python package for a Turtlebot robot which uses Dijkstra's and A-Star algorithms to plan an obstacle free path in the Gazebo environment.
Tennis Ball Robot: An Open-Source ROS Package to autonomously navigate Turtlebot in an unknown map while detecting and collecting tennis balls from the field. Developed in C++11 with 100% code coverage under 3 sprints by adopting the Agile Iterative Process.
Visual Odometry: A Python based application which follows sfm pipeline to locate the vehicle using visual information. Benchmarked the output with built-in OpenCV functions; enforced RANSAC algorithm for finding the best fundamental matrix which improved the accuracy of the output by 30%.
Interceptor Robot: An ongoing research project to track down and intercept an object mid-air using estimation and filtering techniques.
Pick it Up: A ROS package to plan the path of a Baxter Robot and manipulate objects using Move-it library and Python.
Graphics Processing: A C++11 ray tracer to create an image using image noising, linear interpolation, shaders, and displacement mapping.

Professional Experience

University of Maryland, *Graduate Research Assistant* *College Park, MD |* ***01/2020 – Present***
Working on the development of a retrofittable Hardware and Software package for an Autonomous Electric Scooter.

- Conducted hardware in loop test experiments by building an autonomous vehicle test bench through the integration of sensors (Intel RealSense Depth and Tracking Camera) for SLAM, and actuators (ODrive BLDC Motors & CPR Encoders) for propulsion.
- Developed autonomy software, specified component requirement based on the pipeline design and conducted software testing through 3D simulations.
- Successfully estimated the position of the autonomous electric scooter within an accuracy of 0.5 meters by fusing the GPS, IMU and Visual Odometry data streams using an Extended Kalman filter.
- Supported the research team in data accumulation, data annotation, 3D virtual environment creation and optimization of the codebase.
- Assisted in designing a perception pipeline in Python that detects e-scooter parking lots on sidewalks and propels the scooter into the spot.

Void Robotics, *Robotics Engineering Intern* *Boston, MA |* ***06/2020 – 08/2020***
Worked on the navigation package for the autonomous ground and Aerial Robots.

- Designed a package delivery robot in Solidworks, equipped the robot with sensors, controller and simulated the robot in ROS - Gazebo.
- Eased up the installation process of the navigation software on UNIX and Linux OS by packaging it and publishing it on a Debian Package Repository (dpkg) and automated the file editing and simulation workflows in ROS packages using bash scripts.
- Worked on Communication Protocols and established a wireless connection between the Robot Host and the Client Computers.

Team Projects

NASA Rover Challenge (Team VROAS), *Robotics Team Member* *College Park, MD |* ***06/2020 – 07/2020***

- Designed and simulated a Mechanical Obstacle Avoidance Sensor for the Venus Rover which can detect and avoid obstacles and valleys on the Venusian soil. Designed Safety Mechanisms to deal with electromechanical, thermal and the material bottlenecks.

DRDO Surveillance Robot Project, *Team Lead & System Designer* *Ahmedabad, India |* ***01/2018 – 04/2018***

- Qualified amongst top 30 out of 200 robotics teams in DRDO (DARPA equivalent) Robotics Challenge in the West – India zone for the development of a Surveillance Robot. [Provisional Patent Completed]
- Facilitated the generation of 2d Drawings, 3d Design Assemblies and creation of prototype of a surveillance robot by integrating a quadrotor, differential drive cart and a buoyancy unit (floater system) in a single spherical chamber.
- Designed testing platforms and procedures and conducted hardware and software test on various submodules.
- Optimized the dimensions of the robot by 30% by designing a BLDC motor gearbox to fold-unfold the propellers automatically.

Technical Skills

Programming: Python, C++, Matlab, Bash, VHDL, Fortran, MbDyn (Multibody toolbox) | **CAD Tools:** Fusion360, SolidWorks, Creo
Frameworks and Technologies: ROS, OpenCV, OpenGL, Eigen, CMake, Git, Pytest, Docker, GMock, Unity3d, Simulink, Arduino, Jetson Nano
Other: Drilling, Soldering, 3D Printing: FDM