Hrushikesh Budhale

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EDUCATION

M Eng Robotics, University of Maryland, College Park, MD **August 2021 - Present**
Relevant Coursework: Robot Modelling and Control, Software Development, Control of Robotic System

B Tech Electronics, Walchand College of Engineering, MH, India **May 2019**
Relevant Coursework: Industrial Engineering, Control System, Digital Signal Processing, Embedded System Design

TECHNICAL SKILLS

Programming Languages: C, C++, Python, Matlab, Javascript, HTML, CSS, SQL
Frameworks/Tools: Docker, ROS, Unix, Git, Flask, Flutter, Vue
Software: Gazebo, R-Viz, Coppelia sim, Matlab, Simulink, SolidWorks, Eagle (PCB design), Proteus

EXPERIENCE

Flytbase Inc. **Pune, India**
Robotics Engineer *January 2020 - August 2021*

- Programmed Visual Localization for autonomous quadrotor using onboard monocular camera. The application developed using the combination of Particle filter, SLAM and DL approach, was able to achieve 20 cm localization accuracy in a GPS denied environment within 80m^2 field.
- Developed ROS compatible trajectory planner by implementing 3 Dimensional A* path planner for the fleet of drones to efficiently reach multiple locations while avoiding collisions with other drones.
- Effectively used LaneNet Deep Learning model to localize the drone in the environment with dynamic lighting condition.
- Designed electronics for the Charging Pad of quadrotor with features like reverse polarity and short circuit protection.

CS Dept., Indian Institute of Technology **Mumbai, India**
Software Development Intern *June 2018 - August 2018*

- Worked on dynamic Path planning for MAVs which involved planning a path for a quadcopter and following it in an indoor environment while avoiding moving obstacles.
- Implemented robust controller for stability of drone while tracking the drone pose using fixed overhead camera.
- Developed method was robust enough to make the drone fly through 40cm diameter hoops. RRT* Path planner was used to avoid moving obstacles.
- Effectively used simulation software (coppelia sim) to emulate the real scene and plan the trajectory accordingly.

PROJECTS

FPGA based microprocessor | Electronics and Hardware *2019*

- Designed and Built processor trainer kit for custom 32-bit RISC processor. Added web-based GUI to wirelessly upload and execute assembly language program using Flask in the backend. Implemented assembler in python to convert assembly language programs into binary/hex files.
- Implemented Instruction Set Architecture on FPGA with 30 supporting instructions. Technologies/Concepts – FPGA programming, Xilinx (software), Python programming, ESP32 microcontroller, Web GUI design, RISC processor.

Collector Robot | Vision and Control *2018*

- Worked on a project based on a theme in which a ground vehicle detects and collects scattered dummy fruits in the arena and places them on a small scale moving truck.
- Implemented A* path planning algorithm to avoid static obstacles.Used an overhead camera to identify fruits and track the robot position using Aruco markers.
- Designed and constructed innovative vehicle structure for efficient operation. Implemented PID control to follow the computed path.Effective use of Image Processing (OpenCV), Embedded Programming, V-REP (software), Path Planning, Hardware design.

Digital pen using gesture recognition | Algorithms and Data Analytics *2018*

- Developed a digital pen for creating the digital copy of the hand written notes, using onboard MPU6050 gyro sensor.
- Collected and analyzed data of hundreds of samples of motion during writing numbers.Used DTW (Dynamic Time Warping) algorithm to get high accuracy over collected data as testing dataset.

ACADEMIC/VOLUNTEER EXPERIENCE

Volunteered in a campaign to teach school kids in nearby villages about computers. *2019*
Mentor: Chief coordinator of the college festival in the Robotics committee. *2019*
Leadership: Led college team of 15 students in International Robotics competition ‘Robocon’. *2018*
Leadership: Served as team leader of Semi-finalist Team in National level robotics competition. *2017*