Praveen Paidi

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Determined and technically shrewd Robotics Master's Student with Bachelor's in Mechanical engineering equipped with 2 years of industry expertise and looking for full time and internship opportunities.

EDUCATION

Masters of Science in Robotics and Autonomous systems   **Aug 2022 - May 2024**
Arizona State University, Tempe, Arizona   CGPA: 4.0/4.0
Bachelor of Technology in Mechanical Engineering   **2016 - 2020**
National Institute of Technology Jalandhar, Punjab, India   CGPA: 7.52/10

SKILLS & SOFTWARE

- Languages and Firmware: Python, C/C++, TensorFlow, Pytorch, ROS, MATLAB, Gazebo, Simulink, LINUX, Open CV, Arduino.
- Coursework: Machine Learning, Deep learning, Computer vision, Controls of Robotics, Motion Planning, Pattern Recognition.

WORK EXPERIENCE

Research Volunteer: https://github.com/PraveenPaidi/Point_Cloud_NERF   **May 2023 – Present**

- Implemented a pipeline outperforming NeRF using point cloud based NeRF by including depth loss function.
- Implemented pipeline of ResNet and VGGNet for image processing and trained on CIFAR 10 datatset.
- Implementation of ICP point cloud registration, pruning techniques and developing neural point clouds.
- Improved density of point cloud using Recurrent Neural Networks and

Testing Engineer R&D I Suzuki MotoCorp - Maruti Suzuki India Ltd I   **July 2020 to July 2022**

- Identified anomaly case in testing by training on imbalanced data with 5% minority using logistic regression.
- Implemented XG Boost, SVM, Neural Networks to find the best F1 score of 0.71 on testing dataset.
- Developed real time test data graph generation of Measured data and curve fitting using recursive least squares.
- Applied Kalman filter to predict the performance factors of engine in accelerated aging testing
- Developed Automation tests for the Engine validation using Python and VBA in PUMA alongside Bosch AVL Team.
- Measured length by rotary encoders and calibrated to Arduino code to deliver tested products with budget cut by 40% for customer needs by benchmarking market specifications.
- Managed to develop timer by LDR and Laser setup for calculation of vehicle acceleration with the Arduino RS 232.
- Simulated CVT in MATLAB for optimal acceleration by reducing lag of 0.5 sec and validated for different terrains.
- Implemented feature generation for more real time test data for predicting failure cases in real time production.

PROJECTS

Face Mask Detection using Neural Networks: (https://praveenpaidi.github.io/Robotics_Deployment/)

- Real time face mask detection using Deep neural networks by OAK - D camera and movement of bot using ROS nodes.
- Created dataset of 2000 images using stereo camera and developed pipeline for feature generation of the face mask in frame.
- Deployed Python code using ROS nodes for movement of bot towards goal after face detection with latency below 1 sec.
- Published velocity and pose of mask using publisher node to subscriber and real time topic subscription for bounding box.

Swarm Navigation: https://github.com/PraveenPaidi/Swarm_Robot_Navigation

- Developed swarm robot navigation technique for surveillance using utility maps and correlation density mapping.
- Developed A-star and dijkstra algorithms for path shortest path generation from maze start to end and weighted branches.
- Developed trade-off between cost and time, negotiated dynamic obstacles by shape navigation and Artificial potential fields.

Turtle Bot 4: https://github.com/PraveenPaidi/Turtlebot4

- Collected IMU data and implemented Kalman filter and FIR filter for the velocity and acceleration prediction.
- Calibrated camera of turtle Bot using intrinsic and extrinsic parameters by Zhang's method and created surrounding map.
- Implemented Probability edge detection algorithm from scratch resulting better than canny and Sobel detectors.

Semantic Segmentation: https://github.com/PraveenPaidi/Semantic-Segmentation

- Fused image data and depth data to convert into 3D point cloud and classified the images clustering algorithms.
- Performed semantic segmentation to detect the objects after down sampling and noise reduction using ransac by training data.
- Implemented color thresholding and made a map of traversable path for bot and created whole map in robot perspective.

State estimation: https://github.com/PraveenPaidi/State_Estimation-and-Localization

- Estimated position and velocity of the vehicle using LIDAR data, IMU and GNSS by implementing Kalman and EKF.
- State estimation of robot arms of 6 DOF using control using extended and ensemble Kalman filters.
- Developed code for robotics arm to traverse in a cluttered environment and avoiding static obstacles.
- Implemented PID control for the mambo parrot drone to navigate and follow the line follower and taking turns.
- Implemented open loop, PID, LQR control for control of position of planar drone.

Pattern Recognition: https://github.com/PraveenPaidi/Machine_Vision_Pattern_Recognition

- Implemented color thresholding and made a map of traversable path for bot and created whole map in robot perspective.
- Implemented image stitching using Harris corners, SIFT, feature matching and warped using alpha blending.
- Developed Multi resolution blending for features using Laplacian and Gaussian pyramid.
- Implemented bundle adjustment for minimizing the reprojection error for the 3D image reconstruction below 0.5.