Adithyakrishna Venkatesh Hanasoge

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Education

University of Pennsylvania Philadelphia, PA
MS in Robotics 2023
Coursework: Machine Learning | Computer Vision | Advanced Perception | Principles of Deep Learning | Learning in Robotics (State Estimation, Kalman Filter, SLAM, etc.) | Advanced Robotics (Path Planning and Control)

PES University, Karnataka Bengaluru, India
Bachelor of Technology in Mechanical Engineering May 2018
Coursework: Mechatronics and Automation Laboratory | Automotive Electronics | Java | C

Skills

- **Application Software - Frameworks:** ROS, ROS2, PyTorch, TensorFlow, OpenCV, Gazebo, Solidworks
- **Programming Languages:** Python, C++, C, Java, Data Structures and Algorithms, JIRA; **Version Control**: SVN, Git

Professional Experience

XITADEL CAE September 2018 - July 2021
Software Engineer – Process Automation

- Developed proprietary software namely XpressPL and XIPA used by major Automotive manufacturers using Python libraries, Python OOPs, Computational Geometry Algorithms, and 3D Geometry Algorithms
- Worked on automating CAE (Finite Element) mesh generation processes for automotive components for analyses in NVH, crash safety and durability, thereby significantly reducing manual modeling time by at least 50%
- Developed time effective functions and modules resulting in reduction of computational resource for mesh generation of complex plastic features

Projects

Object Detection and Image Segmentation 2022

- **SOLO (**here**)**
  - Implemented the network proposed in the paper SOLO: Segmenting Objects by Locations to predict instance segmentation masks for 3 categories – vehicles, people, and animals on COCO Dataset
- **Faster-RCNN (**here**)**
  - Built a 2-stage RCNN based object classifier including training the first stage Region Proposal Network and second stage regressor, and classifier. Achieved a MAP of 0.66
- **YOLO (**here**)**
  - Built YOLO-v1 from scratch for bounding box prediction and classification on 3 classes – (people, vehicles, and traffic lights) MAP: 0.3

Machine Learning - Drowsiness Detection (here**)** 2021

- Used KNN, Logistic Regression, LSTM, Random Forests, VGG16, Resnet50, and other neural network architectures
- Face Detection using Yolo; Eye and mouth face landmarks extracted using OpenCV

3D Path Planning (here**)** 2022

- Built a trajectory generator for a CrazyFlie Quadrotor using Dijkstra's and A* algorithm avoiding obstacles in the path
- Built a Geometric Nonlinear controller using quadrotor dynamics to ensure quadrotor follows path

Estimation, Localization and Mapping (SLAM) 2022

- Built a 2-stage estimator to first estimate vehicle state and subsequently estimate road friction for an F1/10th car
- Built an Extended Kalman Filter and Unscented Kalman Filter given IMU input and Vicon data
- Built a gap follow algorithm for an F1/10th with Ackermann steering car using C++ and ROS2 on NVIDIA Jetson
- Built an elevation map for UGV using Lidar range data in ROS

Pick and Place Knockout Challenge – 1st Place - Franka Panda Arm (here**)** 2021

- Autonomously controlled Franka Panda (7DOF) Arm to pick and stack static and dynamic blocks
- Developed RRT and A* in configuration space for Robot arm avoiding obstacles in the path

ADAS Vision Based Driver Assistance System using Dashcam (here**)** 2022

- Lane Detection, Lane Centering using Edge Detection and Hough Transforms
- Object tracking using DeepSORT, Speed estimation using Optical Flow
- Built Pure Pursuit algorithm using Pose-Graph based SLAM Algorithm on NVIDIA Jetson for F1/10th car

Developed Computer Vision Algorithms and Projective Geometry Algorithms 2022

- 3D Scene Reconstruction, 3D Pose Estimation, P3P, Multi-view Geometry, Canny Edge Detection, Image Stitching Algorithm, Image Blending Algorithm and other Projective Geometry Algorithms

Honors and Awards

- 1st place in the Pick and Place Challenge (Franka Panda Robot Arm) at UPenn
- *CNR RAO Merit Scholarship* twice for being among the top 20% of the department of Mechanical Engineering at PESU