SENTHIL PALANISAMY

Robotics Engineer

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*More details about all projects are available in my portfolio senthilpalanisamy.github.io

PROFESSIONAL EXPERIENCE

Sr Computer Vision Engineer

Soliton Technologies

May 2016 – Feb 2019 Bangalore, India

- **Developer - Image Depth Categorisation using deep learning :**
  - ➔ Classified images into one of four categories: Close-up, Medium, Long and Ultra long range shot.
  - ➔ Generated monocular depth maps and created a four channel RGBD image.
  - ➔ Experimented with different Deep Learning Architectures and did hyper parameter tuning to get an accuracy of 85 percent.
- **Developer - Seat Belt detection:**
  - ➔ Constructed a sliding window detector by training an SVM classifier on HoG features.
  - ➔ Performed Hard Negative mining and Non-Maximum suppression to get a final IoU of 75% for detector.

Perception Engineer

TartanSense

April 2019 – July 2019 Bangalore, India

- **Lead Computer Vision Engineer - Weed detection and Localisation:** Trained a deep learning weed detection model and localised 3D location of weed by calibrating camera extrinsic and intrinsic parameters
- **Project Manager for data collection Rover:** Managed a team for building, testing and deploying a data collection rover for collecting image data of weeds from farms across 10 locations in India.

ACADEMIC PROJECTS

Northwestern

August 2019 – Now Evanston

- **Navigation and SLAM on a Turtlebot:** Constructed a wheeled robot navigation and EKF filter based SLAM from scratch and tested on a turtlebot. Coded project in C++ inside RoS framework.
- **Survey on Visual SLAM:**
  - ➔ Read 51 papers in area of visual SLAM and wrote a report style paper by summarizing knowledge gained.
  - ➔ Focused attention to distribute papers across different SLAM frameworks and complementary sensors (inertial sensors, depth cameras)
- **Zero shot imitation:** Applied a self supervised deep learning technique to reinforcement learning problem of estimating an effective policy in pytorch to enable a Baxter to manipulate non-rigid bodies (tying a knot).
- **Baxter, lego builder:**
  - ➔ Programmed a Baxter was to build a lego pyramid in RoS.
  - ➔ Implemented a computer vision node for recognizing AR tag, red lego blocks and estimating inverse projection to find 3D location of blocks.
  - ➔ Setup RoS pipeline for whole project in python.

SKILLS

Areas: SLAM, Robotics perception, Computer Vision, 3D vision, Machine learning, Deep learning, Algorithms, and Data Structures,
Languages: Python, C , C++
OS known: Linux
Tools: Vim, Bash, Git, RoS
Libraries: Pytorch, OpenCV

EDUCATION

M.S. in Robotics - (3.93/4)

Northwestern, Illinois

2019 – 2020

B.E. in Electronics & Communication

Anna University, Chennai

2012 – 2016

LAB PROJECTS

- **Online Extrinsic camera calibration in a wheeled chair platform:** Calibrated the position of the camera with respect to robot base frame by measuring ego motions of camera (visual odometry) and robot base frame (robot odometry) based on AX=XB calibration model and Gauss-Helmert optimisation.
- **Mice Pose tracking using a 4 camera system:** Built a 4 camera image stitching system and integrated models trained on deeplabcut - A resnet-50 based network for tracking the trajectory of a mice.

LEADERSHIP SKILLS

Team Leader - Card Reader:
- ➔ Guided an intern to develop a government card reader application.
- ➔ Estimated homography for aligning card by detecting its edges in python.
- ➔ Detected text using SWT, segmented characters and recognized each character using DL OCR model.

Project Coordinator, Science: Built and managed a team of 30 volunteers for teaching science to about 150 underprivileged kids.