SENTHIL PALANISAMY

Robotics Engineer

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

EXPERIENCE

Robotics Engineer

TartanSense

April 2019 – July 2019 Bangalore, India

- **Lead Computer Vision Engineer - Weed detection and Localisation:**Trained a weed detection model using tensorflow object detection api. Calibrated the extrinsic parameters and intrinsic parameters of the rover camera and found the 3D location of the weed (Monocular depth estimation)
- **Project Manager for data collection Rover:** Managed a team for building, testing and deploying a data collection rover, which collected image data of weeds from farms across 10 locations in India.

Sr Computer Vision Engineer

Soliton Technologies

May 2016 – Feb 2019 Bangalore, India

- **Developer - Optical Character Verification in Soliton Smart Camera:** Estimated a Euclidean transformation to align the input image with a template image based on ORB feature matching and verified the characters in the input image.
- **Developer - Image Depth Categorisation using deep learning :**Images have to be classified into one of four categories: Close-up, Medium, Long and Ultralong range shot. Generated depth maps for a given image based on pre-trained models and constructed a four channel RGBD image by appending the depth map to an RGB image.Experimented with different Deep Learning Architectures and fine-tuned a model based on ResNet-50 to achieve an accuracy of 85 percent.
- **Team Leader - Card Reader:** Guided an intern to develop a government reader application. Found the four corners of the card by detecting its edges and estimated homography for aligning image. Detected text using Stroke Width Transform (SWT), segmented characters and recognized each character using DL OCR model.
- **Developer - Auto Album Designer** Developed an algorithm that synthesizes adaptive background for a given album page by picking up colors from the photos present in the image. Developed an algorithm for placing decoration objects according to the rules defined by the aesthetics associated with each object. Came up with a mathematical formulation to measure the aesthetics and storytelling value of a picture.
- **Developer - SeatBelt detection** Constructed a sliding window detector by training an SVM classifier on HoG features. Performed Hard Negative mining and Non-Maximum suppression to the final IoU of the detector to 75 %.
- **Developer: Shape Context post-processing to improve Deep Learning HCR model** Used a Hausdroff distance based shape context features matching to override low confidence predictions from AlexNet HCR model, thereby improving the model accuracy from 90.1% to 91.2%
- **Developer: Pin Map Generation** Generated a graph representing circuit connections for a given netlist. Found the pin mapping between any two devices present in the circuit by applying shortest path algorithms on the generated graph and incorporating electronics component knowledge.

SUMMARY

"A Robotics Engineer with 3 years Experience in Computer Vision"

ACADEMIC PROJECTS

Northwestern

August 2019 – Now Evanston

- **Baxter, the lego builder:** This a RoS project where we tried to build lego blocks using Baxter. I implemented the whole node for computer vision, which detects AR blocks, red lego blocks and does inverse projection to find the 3D location of the blocks. I also setup the RoS pipeline for the whole project.
- **Object Manipulation using Youbot in Simulation** I implemented a PI feedforward controller for a 4 wheeled mobile robot with a 5 dof arm for an object manipulation task.
- **ML/AI projects:** I have implemented a UKF filters , PI controller with A star planner, Locally weighted Linear Regression, RRT algorithms.
- **Other Projects:** Servo Controlled Ball tracking using 2 DoF Pan-tilt mechanism, Dynamic simulation of a windmill impact.

EDUCATION

M.S. in Robotics - (3.9/4)

Northwestern, Illinois

2019 – 2020

B.E. in Electronics & Communication

Anna University, Chennai

2012 – 2016

TECHNICAL EXPERTISE

Areas: 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

LEADERSHIP SKILLS

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