Suhail Pallath Sulaiman

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EDUCATION

NORTHWESTERN UNIVERSITY
MS in Robotics
Expected Dec 2018 | Evanston, IL

MAHATMA GANDHI UNIVERSITY
B-Tech in Mechanical Engineering
Graduated June 2014 | Kerala, India

LINKS

Github:// **suhailpallathsulaiman**
LinkedIn:// **suhailpallathsulaiman**
YouTube:// **zulusvideo**

SKILLS

PROGRAMMING
C++ • Python • C • C# • Matlab • VB.Net • Typescript • HTML/CSS • Mathematica

PACKAGES & LIBRARIES
PCL • OpenCV • Boost • ROS • Gazebo •Tensorflow • Open3D • RViz • Angular • CAA

TEAM COLLABORATION
Git • TFS • SVN • Gerrit • JIRA

IDE
QtCreator • PyCharm • Boost • Visual Studio • Code •Eclipse • Sublime

DATABASE
SQL • Firebase

HARDWARE
Baxter • Sawyer • Depth cameras • IMU • Raspberry Pi • Force sensors • Laser cutting • Microcontrollers • 3D Printing

OS
Linux • Windows

DESIGN SOFTWARES
Catia • Creo • Solidworks • AutoCAD

EXPERIENCE

HERE TECHNOLOGIES | Computer vision Intern - 3D vision
Highly Automated Driving unit
Jun 2018 - Sep 2018 | Chicago, IL

- Worked on segmentation of 3D lidar data using 2D deep learning predictions to segment roadside barriers and localization objects.
- From the segmented lidar data of traffic lights, extracted bounding box, orientation, count, position and dimension of individual lights
- Generated depth images using the lidar data and the perspective images, to improve the performance of 2D deep learning predictions.
- Participated in agile scrum ceremonies like daily stand up, sprint planning, sprint review and retrospective,and in design discussions and code reviews

INFOSYS TECHNOLOGIES | Senior Systems Engineer
The Boeing unit
Nov 2014 - Aug 2017 | Mysore, India

- Developed several applications focusing on automation of 3D CAD model generation of aircraft components and automated comparison of 2D images and sketches with 3D CAD models, mainly using C++ and C#.
- Involved leading teams, meeting milestones, interacting with clients, testing and documentation.
- Lead a team of 10 in successfully delivering a project with critical deadline.
- Clear understanding of SDLC , Agile Scrum.

RELEVANT PROJECTS

3D SEMANTIC SEGMENTATION USING 2D SEMANTIC DEEP LEARNING | Here Technologies

The goal of this project was to segment 3D Lidar data using 2D semantic segmentation. 2D segmentation masks generated by deep learning models were used as input.

- The 3D lidar data was projected on to the perspective image to generate projection tables, having 2D pixel values corresponding to each 3D point.
- The 2D segmentation mask was used to filter the projection tables, to filter out the 3D points belonging to the object of interest
- Some post processing was done on the segmented pointcloud to remove outliers.
- Incase of continuous features like curbs, guardrails, jersey barriers, walls fences etc a polyline representing the top part of the feature closest to the road was extracted, so as to integrate the extracted data into the HD map being developed by the company.
- Skills: PCL, C++ , Python, OpenCV, JIRA, Gerrit, Linux.

TRAFFIC LIGHT SHAPE EXTRACTOR

| Here Technologies

The goal of this project was to extract the bounding box, orientation, position, count and dimensions of each light on traffic lights

- Points representing traffic lights were segmented out from lidar data using the 3D semantic segmentation explained before.
- Different segmentation and clustering techniques along with some new algorithms developed were used to successfully extract all required details
- Skills: PCL, C++ , OpenCV, JIRA, Gerrit, Linux.

SYNTHETIC DATASET GENERATION FOR MACHINE LEARNING

| Northwestern University individual winter project Demo

The goal of this project was to generate a huge dataset of fake simulated images of any object scanned, so that machine learning models could be trained on a variety of data to make them more robust. The project package performs following tasks:

- Collect point clouds of an object using depth camera from different angles.
- Stitch the point clouds together to create a 3D point cloud of the object scanned.
- Create a colored 3D model from the 3D point cloud using surface reconstruction
- Generate fake images of the object by simulating different lighting conditions, pose, scale etc of the object using Gazebo and adding different backgrounds using OpenCV.
- Train a Tensorflow object detection model on the images generated.
- Detect the object and its location in a camera feed after training.
- Skills: PCL, Open3D, Gazebo, ROS, Python, C++, Tensorflow, OpenCV

EXCAVATOR BUCKET TOOTH DETECTION

Demo

The goal of this project was to train a custom machine learning model that identifies and locates each tooth on an excavator bucket.

- Used tensorflow object detection API to create an object detection model.
- Trained the model on several images of excavator buckets and tooth
- The model was able to locate and identify each tooth on excavator buckets.
- Skills: Python, Tensorflow, OpenCV.

BAXTER ROBOT CONSTRAINED MOTION

Demo

The goal of this project was to have Baxter locate and handle containers having liquid in it. The project performs the following.

- Sweep the table to locate the container using the camera vision and IR sensor on the limb of Baxter.
- Once the container is located, baxter will grab it and then start tracking the right hand of the person standing in front of him using skeleton tracker on 3D data from the depth camera mounted on the head of baxter.
- Then baxter will keep following the right hand of the person with the container until the cup is handed over to the user. Once the user pulls the cup baxter will sense the pull and release the gripper and the hand will go back to home position
- Skills: Python, ROS, OpenCV, Git.

AUTONOMOUS QUADROTOR DESIGN

This project was done as a part of Applied Mechanics course

- Initially all the code required for controlling the quadrotor (roll, pitch, yaw and thrust) using a joystick was done.
- Later autonomy was applied by programming the quadrotor to sync with feedback from a vive sensor to stabilize itself in mid air.
- Fused the data from the IMU and vive sensors to give accurate controls
- Raspberry Pi was used for on-board computing and was programmed in C.