Suhail Pallath Sulaiman

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EDUCATION

Northwestern University, Evanston Graduation - December 2018
— *MS Robotics*

Mahatma Gandhi University, Kottayam Graduation - August 2014
— *BTech Mechanical*

EXPERIENCE

Infosys Technologies Ltd, Mysore,India
— *Senior Systems Engineer*

November 2014 - August 2017

Developed several applications focussing on automation of design software using mainly C++ and C#. Involved leading teams, meeting milestones, interacting with clients, testing and documentation. Experienced in Agile and Scrum development environments

PROJECTS

Synthetic Dataset generation for Machine Learning
— *Northwestern University Winter Project*

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 RGBD camera from different angles.
- Stitch the point clouds together to create a 3D point cloud of the object scanned.
- Create a 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.
- 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

SKILLS

Programming Languages: C++ , Python, C, C#, Matlab, VB.Net, Typescript.

Packages and Libraries: ROS, OpenCV, Gazebo, Tensorflow, CAA, PCL, Open3D, RViz, Angular

Design Softwares: Catia, Creo, Solidworks

Version Control: Git, TFS, SVN

IDE: PyCharm, Visual Studio, Sublime, Visual Studio Code, Eclipse.

Database: SQL, Firebase

Hardware: Baxter, Sawyer, depth cameras, IMU, raspberry Pi, force sensors, Laser cutting, microcontrollers, 3D Printing,

REFERENCES

Dr. Todd Murphey
Director - MS in Robotics
Professor in Mechanical Engineering
Northwestern University
t-murphey@northwestern.edu

Dr. Jarvis Schultz
Asst. Director - MS in Robotics
Lecturer in Mechanical Engineering
Northwestern University
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Cat Excavator bucket tooth detection

Demo

The goal of this project was to create a 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 teeth 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 in the limb 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 data from the kinect 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.

Single Legged Hopping Robot

The goal of this project is to design a hopping robot for a NASA project that investigates legged locomotion on soft ground. This is a group project currently in progress and will be completed by spring 2018.

- The robot is a planar 3- DOF robot mounted on a boom. All the 3 DOF will be actuated.
- The robot will be able to jump in place and also locomote forward/backward
- The robot will be equipped with 3-axis force sensor that measures forces generated in the foot.
- The robots motion could be controlled using Matlab and python plugins.

Autonomous Quadrotor design

This project was done as a part of Applied Mechanics course.

- Initially all the code required for calibrating the IMU data and 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 stabilise itself in mid air.
- Raspberry Pi was used for onboard computing and was programmed in C.

Catia Customised API Library — *Client: BOEING*

- Created a library of customized APIs for CATIA V5 so as to automate several designing tasks used for designing aircraft parts.
- Skills: C++, C#, CAA, WinForms, Catia V5

Hatching Automation Tool — *Client: BOEING*

- Developed a tool for editing CAD drawings to set the hatching pitch and angle for each hatching depending on shape and location of hatchings
- Custom APIs were developed using CAA/C++ for extracting the shape and location information of the hatchings and editing their properties
- Skills: C++, C#, CAA, WinForms, Catia V5

Structural Repair Manual Thickness Evaluation Tool — *Client: BOEING*

- Developed a tool which is used for evaluation of thickness of composite panels at each and every point in the aircraft fuselage. The tool performs the following tasks
- Reading SVG image files and populating the data to database.
- Measuring the thickness of CATIA 3D model at every point and populating the data to database.
- Custom made user interface for comparing the thickness data from the SVG file and the 3D part.
- Generate automated reports and summary of various data.
- Skills: Catia V5, C#, SQL, WPF, SVG, XML, MS Office Automation.

Composite Panel Automation Tool — *Client: BOEING*

- Developed an application for creating and modifying Composite Sandwich Panels with multiple cores.
- The application can be used to create a new panel in a new location with standard predefined ply layup which would be release ready.
- The application also reads the existing ply layup and assists the user to modify the ply layup by adding, reordering and deleting plies. The user can also modify the material and orientation of any.
- Skills: Catia V5, C#, WPF.

Export ERP Batch Support— *Client: ALSTOM*

- This is a support project to resolve user issues while running the application.
- The application exports MCAs from Delmia to ERP on a continuous basis.
- The main errors aroused were due to errors in the application which had to be debugged and corrected
- Skills: Delmia V6, CAA, C++.

Classified advertisement website

Link

Developed a classified ad website targeting infosys employees only.

- The website verifies employees using email..
- Implemented all the functionalities that classified websites have.
- Skills: Angular, Angular-CLI, Typescript, Materialize.css, Angularmaterial2, Angularfire2,firebase.