

Shivam Sehgal

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EDUCATION

University of Maryland College Park

Master of Engineering in Robotics; GPA: 4.0/4.0

MD, USA

May 2024

Punjab Engineering College

Bachelor of Engineering in Mechanical Engineering; GPA: 3.5/4.0

Chandigarh, India

May 2019

SKILLS

Programming Languages: C++, Python, MATLAB, C, Bash, HTML, UML

Software and Tools: Linux, Git, Docker, CMake, Valgrind, Doxygen, ROS, Gazebo, Fusion 360

Libraries: OpenCV, TensorFlow, NumPy, SciPy, sklearn, pandas, Matplotlib, GTest, pytest

Domain Skills: Robotics, Deep Learning, Machine Learning, Computer Vision, State Estimation, Data Structure, Algorithms

EXPERIENCE

Lamba Function

San Fransico, California

Mechatronics Intern(Python, ML)

June 2023-August 2023

- Developed an adaptive controller to control speed to follow a given spindle load, feed is optimised to follow chip load according to tool specification
- Implementing machine learning models for tool life and chip load prediction.

Hero Motocorp, Neemrana

Rajasthan, India

Assistant Manager

July 2019 – August 2021

- Led a team of 60 field associates to achieve daily targets, implementing automation solutions for manual tasks such as automating bolt tightening at One-Way clutch sub-assembly, saving 2-manpower/shift .
- Implemented automation in oiling stations, saving 1 manpower/shift, while also digitizing tasks like log book, process audit, tool audit, and attendance, savings of 8 hours per week per team manager.

ACADEMIC PROJECTS

Real-time obstacle avoidance on a Drone(ROS, Python, OpenCV, numpy)[[Github](#)]

- Connected real sense 435D depth camera with modal AI voxel flight to get the depth map. Implement a computer vision pipeline to generate a U-depth map to segment obstacles by distance. Coded a simple C++ controller for obstacle avoidance and successfully conducted the trials.

Enhanced Image Classification using CNN and Transfer Learning (Python, Pytorch)[[Github](#)]

- Implemented Transfer Learning strategy leveraging *ResNet34* resulting in a substantial leap in classification accuracy. The accuracy is significantly increased from 45% to 95% on the training data set having 10 classes with merely 140 training images per class.

Handwritten Digit Recognition with Convolution Neural Networks (Python, Pytorch)[[Github](#)]

- Developed a specialized CNN for recognizing handwritten digits, achieving an impressive 95% accuracy on the MNIST dataset. Explored various factors like learning rate, loss function, layers, momentum, batch size, epochs, and optimization techniques, showcasing the network's robust performance.

Path planning of Turtlebot3 in obstacle space using A* algorithm(Python, ROS)[[Github](#)]

- Implemented A* algorithm for path planning of turtlebot3 to move it from start position to goal position while avoiding obstacles and taking into account nonholonomic constraints.

Detailed 3D Scene Reconstruction with Simultaneous Pose Estimation (Structure from Motion) (Python)[[Github](#)]

- Applied Structure from Motion (SfM) to reconstruct scenes and estimate camera poses. Conducted essential steps, including feature extraction, matching, outlier rejection, Fundamental and Essential Matrix estimation, and Bundle Adjustment. Achieved a detailed 3D reconstruction with accurate pose estimation.

Accurate Pose and Depth Estimation using Stereo Vision (Python)[[Github](#)]

- Implemented stereo vision for precise depth map estimation from two images of the same scene captured from different camera positions. Conducted camera calibration, estimated poses, rectified images, and computed depth maps using the sliding window method. Attained meticulous depth estimation through a finely tuned stereo vision setup.

CERTIFICATIONS

Machine Learning Specialization: Specialization - 3 course series

Courses - 1) Supervised Machine Learning: Regression and Classification 2) Advanced Learning Algorithms 3) Unsupervised Learning, Recommenders, Reinforcement Learning