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Education

- **University of California, San Diego** (Currently on F-1 student visa)   **GPA 3.94/4.0**
  M.S. in Intelligent Systems, Robotics and Control   *2019-2021*
  Department of Electrical and Computer Engineering
- **Indian Institute of Technology (IIT) Kharagpur**   **CGPA 9.36/10.0**
  B.Tech. (Hons), Department of Mechanical Engineering   *2015-2019*

Projects/Research Experience

Motion Planning Networks (MPNet) using Fastron   ***San Diego, U.S.A.***
Guide: Prof. Michael Yip   *Feb 2020–Present*
- MPNet is a computationally efficient, learning-based neural planner for solving motion planning problems
- Fastron is a sparse support vector machine (SVM) like algorithm which uses forward kinematics kernel for proxy collision detection of a multi-degree of freedom robot manipulator giving about 98% accuracy
- Used LibTorch in C++ for multi-objective optimization with joint limit, collision score and path length as objectives
- Reduced the computation time by 50% and improved the success rate from 85% to 99%

Semantic SLAM   ***San Diego, U.S.A.***
Guide: Prof. Henrik Christensen   *Jan 2020–Present*
- SLAM that create semantically meaningful maps by combining geometric and semantic information
- Using YOLOv3 for object detection and semantic labelling and PoseCNN for pose estimation of the detected object
- Using libraries like PyMC3/ParaMonte for Markov Chain Monte Carlo (MCMC) data association across keyframes

Motion planning of autonomous UAVs   ***Kharagpur, India***
Guide: Prof. Cheruvu Siva Kumar   *July 2018–April 2019*
- Obtained a multi-objective optimized path for UAV using OMPL & FCL for collision detection in cluttered environment
- Autonomous 3D occupancy (Octomap) and collision avoidance was developed and tested on Ardupilot SITL Gazebo
- Used cheap stereoscopic camera instead of lidar reducing the cost by 90%, where point cloud was created using OpenCV

RoboSoccer   ***Kharagpur, India***
Guide: Prof. Jayanta Mukhopadhyay   *Feb 2016–April 2018*
- Built a team of autonomous soccer playing robots in Python & C++ and participated in 21st RoboCup, Japan (2017)
- Performed a comparative study on the variations of RRT, worked on path simplifier and velocity profiling of the path
- Developed a multi-threaded 3-tier Skills-Tactics-Plays architecture for controlling omni-directional robots using ROS

Autonomous stair-climbing Robot   ***Kharagpur, India***
Self-initiated project   *Nov 2016–April 2017*
- Computer vision based target following for navigation was achieved using Kanade-Lucas tracking of Shi Tomasi corners
- Developed EEG signal based control, voice control using CMUSphinx along with a touch interface using Raspberry Pi
- Recipient of the Gold medal in the intra-collegiate hardware exhibition 2017 at IIT Kharagpur.

Rehabilitation Robotics   ***Kharagpur, India***
Guide: Prof. Dilip Kumar Pratihar   *May 2016–April 2018*
- Aim of the project was to improve the therapeutic outcome of the recuperation process of disabled patients
- Developed an exoskeleton for the lower extremity of the human body consisting of actuators and feedback sensors
- Fabricated a plantar system to record gait cycle data using IMUs & strain gauge and transmit in real-time over Wi-fi

Technical Skills

- **Languages:** C, C++, Python
- **Software:** ROS, Gazebo, OpenCV, MATLAB/Simulink, SolidWorks, EagleCad
- **Platforms:** Linux, Windows
- **Hardware:** AVR, ARM

Relevant Courses

- **University of California San Diego**
  - Planning & Learning in Robotics
  - Sensing & Estimation in Robotics
  - Random Processes
  - Statistical Learning
  - Bio-inspired robotics
  - Nonlinear Systems
  - Linear Algebra
  - Introduction to Robotics
  - ML: Learning Algorithms
- **Coursera/edX**
  - Control Of Mobile Robots
  - Computational Motion Planninng
  - Robotics: Perception
  - Robotics: Aerial Robotics
  - Robotics: Mobility
  - Estimation & Learning