

## EDUCATION

### WORCESTER POLYTECHNIC INSTITUTE

#### MS IN ROBOTICS ENGINEERING

May 2019 | Worcester, MA

GPA: 3.93/4.0

### MNIT JAIPUR

#### B TECH. IN ELECTRICAL ENGINEERING

May 2017 | Jaipur, India

GPA: 8.25/10

## RELEVANT COURSES

### GRADUATE

Robot Dynamics | Robot Control

Artificial Intelligence

Deep Learning for Advance Robot

Perception

Deep Reinforcement Learning

### UNDERGRADUATE

Control System Engineering

Modern Control Theory

Computer Architecture and Organisation

## INTERESTS

Control Systems | Manipulation

Reinforcement Learning

Motion Planning

Mobile Robotics

## SKILLS

### LANGUAGES

C++ | Python

MATLAB | LATEX | Java

### SOFTWARES

ROS | V-REP

Gazebo | SolidWorks

Processing

### LIBRARIES & PACKAGES

KDL | FCL | Conda

TensorFlow | MoveIt

NumPy | Keras

OpenAI-gym | roserial

Klampt | OMPL

### HARDWARE

TurtleBot | Jetson Nano

Intel Galileo | Arduino

Raspberry Pi | Atmega 328/2560

## EXPERIENCE

Robotics Software Developer- Modbot Inc. | July 2019-Present | San Francisco, US

- Developing kinesthetic teaching, collaborative safety and motion planning algorithms for modular robots using C++ & Python

Robotics Software Intern - Modbot Inc. | June 2018-April 2019 | San Francisco, US

- Developed dynamical models and control, planning, collision detection and performance enhancement algorithms for modular robots using C++ & Python

Robotics Intern - Swaayatt Robots Pvt. Ltd. | May-July 2016 | Bhopal, India

- Developed an AGV with a 6-DOF serial manipulator arm for indoor applications

## SELECTED PROJECT WORK

### MANIPULATION OF 15 DOF SDA10F DUAL-ARM ROBOT [URL](#)

Aug 2017 - April 2018 | CIBR LAB - WPI | Mentor: Prof. Jane Li, Prof. Jie Fu

- Motion planning for each 7-DOF arm by generating multiple point trajectory (Used OMPL library and implemented simulation in ROS using MoveIt)

### FLC FOR INDOOR ROBOT NAVIGATION [URL](#)

Feb - May 2018 | WPI | Mentor: Prof. Jie Fu

- Implementation of Fuzzy Logic Controller for goal tracking and obstacle avoidance on TurtleBot2 using Kinect generated Point Cloud data

### COLLABORATIVE TASK PLANNING USING REINFORCEMENT LEARNING [URL](#)

Aug 2017 - Dec 2017 | WPI | Mentor: Prof. Carlos Morato

- Simulating mid-air robot-robot object transfer on V-REP using Deep Q-Learning with Keras & Tensorflow

### IMITATION LEARNING ON 5-DOF MANIPULATOR ARM [URL](#)

Feb - May 2018 | WPI

- Implementation of supervised & reinforcement learning based LfD techniques on 5-DOF Kuka YouBot manipulator arm in V-REP simulation environment

### LOWER BODY WALKING BIPED ROBOT [URL](#)

Aug 2016 - Apr 2017 | ZINE LAB - MNIT JAIPUR | Mentor: Dr. Rajesh Kumar

- Trajectory planning for an in-house developed 12-DOF servo actuated biped
- IMU sensor based joint angle prediction and estimation of the biped's orientation (Sensor Data Fusion using Kalman Filter)

### SMART ANIMATRONIC HUMAN FACE [URL](#)

Jan - May 2017 | MNIT JAIPUR | Mentor: Dr. Rajesh Kumar

- Designed movement mechanisms and implemented interactive control (using computer vision and speech inputs) on an in-house developed animatronic head

### ROBOT FOR POWER TRANSMISSION LINE MAINTENANCE [URL](#)

Mar - Apr 2015 | ZINE LAB - MNIT JAIPUR | Mentor: Dr. Rajesh Kumar

- HILS model implementation on Simulink-based live animation setup of a remotely functioning robot deployed on power transmission lines

## PUBLICATIONS

- Kumar, Akshay, et al. "Hardware in the loop based simulation of a robotic system with real time control and animation of working model" 2017 International Conference on Inventive Systems and Control (ICISC)". IEEE, 2017. [URL](#)
- Kumar, Akshay, et al. "Joint Angle measurement for biped robot orientation estimation using MEMs based inertial sensors" Presented at 2nd IEEE International Conference on Electronics, Communication and Aerospace Technology (ICECA 2018) [URL](#)