

# Sanjuksha Nirgude

17 Hampden St, Apt 2, Worcester, MA. 01609  
linkedin.com/in/sanjuksha-nirgude-0904a1a3/  
Education

github.com/sanjuksha  
sanjuksha.github.io/

+1 5713148588  
[snirgude@wpi.edu](mailto:snirgude@wpi.edu)

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## Worcester Polytechnic Institute (WPI)

Master of Science in Robotics Engineering, GPA – 4.0.

**Relevant Courses:** Deep Learning for Perception, Synergy of Human and Robot, Robot Control, Robot Dynamics, Swarm Intelligence, Computer Vision Nanodegree (Udacity), Motion Planning, Humanoid Robotics.

## University of Pune (UoP)

Bachelor of Mechanical Engineering, Agg–71 %.

## Skills

**Softwares:** ROS, Linux, Git, Arduino, Latex, ARGoS, Mocap, MS Office (word, power point, excel)

**Languages:** Python, C++, MATLAB, Buzz, HTML

**Libraries :** PyTorch, OpenCV, Tensorflow, Keras

Worcester, MA.

May 2019

Pune, India.

June 2016

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## Internships

### Robotics Intern Waypoint Robotics Inc.

Aug-Dec 2018

- Developed various behaviors in the mobile robot, which involved use of LIDAR data, digital IO and robot motion to provide feedback to bystanders about the robot's intention.
- Developed, tested and integrated a motion planning algorithm to extend the capabilities of the mobile robot.
- Expanded the robot's programming environment functionality by sensor fusion, including the contribution of new elements to the Graphical User Interface.
- Took part in the assembly of mobile robots.
- Integrated detection deep learning algorithm on live video input from a mobile robot camera and developed a motion algorithm for the robot depending on this input.

### Machine Learning Intern Cere Labs Pvt Ltd.

Mar-June 2016

- Demonstrated application of Reinforcement Learning(RL) method, specifically the Q-learning algorithm by making a crawling robot move towards a wall by itself.
- Manufactured and trained the CURL(Crawling using RL) robot using Raspberry Pi as the controller and implemented the algorithm in Python.

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## Projects

### Atlas's Escape, WPI

Jan-May 2019

- Completed a task of detection and localization of a door in an environment, walking towards the door and opening it using the Atlas Humanoid robot by Boston Dynamics.
- Simulated in Gazebo using ROS and C++.

### Automated Cinematography using an unmanned aerial vehicle, WPI

Aug-Dec 2018

- Implemented a Motion Planning algorithm on a quadrotor to find a path in an environment while avoiding obstacles and capturing images of the environment.
- Simulated in Gazebo and used ROS for communication.

### Facial Key-point Detection, Udacity

May-Aug 2018

- Created CNN to detect facial key points on eyes, nose and mouth using image processing and deep learning.
- Used PyTorch to develop a 3- layered convolutional neural network for feature detection.

### Fuzzy Logic Controller for Indoor Navigation of Mobile Robots, WPI

Jan- May2018

- Designed a fuzzy logic controller (FLC) to carry out the decision-making processes to reach the goal in cluttered environment. Sensor readings are inputs and wheel accelerations are outputs.
- Using the Tracking FLC and Obstacle avoidance FLC as the two major parts of the controller

### Collective transport of Concave objects using a robot swarm, WPI

Jan-May2018

- Implemented occlusion based collective transport strategy for transport of concave objects.
- Converted the concave objects to convex objects by filling the concavity by swarm of robots.
- The algorithm was written in C++ and the experiments run in ARGoS simulator.

### Detection, Recognition & Pose Estimation of Tabletop Objects, WPI

Aug-Dec2017

- Detected and identified three table-top objects: stapler, mug and mouse.
- Developed a 4-layered convolutional neural network that determined the orientation of the object-placed on a table.

## ASIA PACIFIC ROBOTICS CONTEST (ABU ROBOCON)

### Badminton Playing Robot, UoP.

2014-2015

- Designed a mechatronic for two badminton playing robots, for serving and returning.
- Robot uses non-modified shuttles and rackets, which are detected and localized using purely visual information.

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## Achievements

- Secured 5<sup>th</sup> position in India in ROBOCON 2015
- Secured 1<sup>st</sup> position in state level archery competition in 2010.

## Extra-curricular

- Taught Robotics to middle school children by organizing workshops and seminars.
- Volunteered at a local NGO Sanjeevani Foundation for 6 years.
- Participated in Entrepreneurship Awareness Camp (MITCON) 2014.