

# Kritika Iyer

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## EDUCATION

### Master of Science, Robotics Engineering

Worcester Polytechnic Institute, (WPI), Worcester, MA

May '18

GPA: 3.76/4.00

### Bachelor of Technology, Mechatronics

Shanmugha Arts, Science, Technology and Research Academy (SASTRA), India

May '16

## SKILLS

**Machine learning packages:** Theano, Keras, Tensorflow, Scikit-learn

**Programming Languages:** C, C++, Python, MATLAB, Embedded C, Visual Basic, MS SQL

**Software and Tools:** OpenCV, Git, ROS, Gazebo, Simulink, OpenRave, OMPL

**Design Software:** ProE, AutoCAD, LabVIEW, CODESYS, Solidworks, Ansys, COMSOL

**Boards:** Arduino, PIC, Raspberry Pi, AVR

## EXPERIENCE

### Internship: Persimmon Technologies

July '17 —Aug '17

- Designed a test bed in Solidworks with 25 individual components and 221 assembled components for Encoders
- Performed trade off analysis to make most efficient and cost effective design.
- Toleranced parts and made sure all standard and custom parts mesh well.

### Internship: Maruti Suzuki India Ltd, Gurugram, India

May '15 —Jun '15

- Studied trajectory controllers for 6 DOF Fanuc, ABB industrial robots used in car manufacturing.
- Designed ladder logic for bottle filling station involving complex pick,place and fill operations.
- Implemented logic on Siemens Programmable Logic Controllers (PLC).

## PROJECTS

### Deep Reinforcement learning for PABI

Jan '18—Present

- Extracting features from images of faces and training neural network on those features using dlib library in python
- Designing reinforcement learning algorithm to customize sessions with the children based on emotion and attention

### Deep learning for robot perception

Aug '17 —Dec '17

- Designed a Convolutional Neural Network with different layers of flattening, max-pooling and dropouts.
- Trained on Kaggle dataset and achieved an accuracy of 68.5% (highest recorded for this dataset is 71%)
- Implemented Harr-face detect and the model obtained from training to detect emotions in real-time.

### Manta Ray fin analysis

Feb '17 —June' 17

- Modeled a manta ray in Solidworks and simulating the fin movement in COMSOL
- Analyzed the effect of friction and fluid velocity on thrusts produced by the fin
- Designed a fin model to overcome the effects

### Safe Driving using MPC for Autonomous Vehicles

Jan '17 —May '17

- Controlled a car using Kinematic Bicycle model and model predictive control(MPC).
- Worked in MATLAB to simulate results using Fmincon and Yalmip libraries.
- Implemented MPC to achieve safe driving diversion from reference trajectory for obstacle avoidance.

### Modular teleoperation Framework

Feb '17 —May '17

- Developed an algorithm for complex master-slave coordination between manipulators and haptic devices.
- Implemented it in Gazebo using ROS on davinci and ABB robots.

### Mapping and Motion Planning for RC Car

Jan '17 —May '17

- Implemented A\*,RRT\*, and ARA\* algorithms using c++
- compared optimality, completeness, space and time complexity in 3 different Gazebo worlds using ROS.

### Motion compensation during surgery

Oct '16 —Dec '16

- Implemented motion compensation techniques using EKF and Fourier series in Gazebo using ROS
- visualized using daVinci along with teleoperation

### MANTA Ray fin actuation

Sept '16 —Dec '16

- Fabricated tiny Manta rays from 3D printed molds with silicone dragon skin 10.
- Actuated the Manta rays using Nitinol Shape memory alloy wires and pneumatic actuators.

### Kiosk for Autistic Children

Oct '15 —June '16

- Designed and fabricated a gaming kiosk with various motor skill enhancement tasks integrated into it
- Controlled the system to track the speed of performance, gripping methods and overall improvement
- PIC16F877A and got input from various sensors.

### Estimation of Velocity of a bubble using image processing

Oct '15 —June '16

- Used a bubble column reactor to push bubbles into and obtain images
- Processed images in Matlab using adaptive histogram and edge detection to calculate volume and velocity of bubble
- Published paper in IEEE: <http://ieeexplore.ieee.org/abstract/document/6724169/>