

# SHIVANG AGRAWAL

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## EDUCATION

**Indian Institute of Technology Kharagpur**  
B.Tech. Chemical Engineering 2019

## SKILLS

**PROGRAMMING:** C, C++, Python, Java, MATLAB, Bash

**LIBRARIES:** OpenCV, ROS, TensorFlow, PyTorch, CUDA

**TOOLS:** Linux, Git, Gazebo

## PROJECTS

**DeepFlow** Oct 2017 - Current

- Developing deep recurrent CNN model for relative position estimation
- End-to-end training from downward facing image feed to raw position estimate using data recorded from Microsoft's Airsim.

**DQN on Atari** Oct 2017 - Dec 2017

- Implemented Deepmind's paper on deep reinforcement learning to create a deep Q network of convolutional layers using tensorflow.
- Trained the model to play pong using Amazon AWS cloud GPUs.

**TheCrawler** May 2017 - Jun 2017

- Implemented Q-Learning algorithm on Arduino for a robot with a 2-DOF arm and an encoder to learn to crawl on its own

**Disparity-Generator** Mar 2017 - Apr 2017

- Built a C++ application to compute the disparity map with one moving camera.
- Used epipolar geometric relations to calculate relative pose between the images.

**Smart-Steer** Feb 2016 - Mar 2016

- Built the software framework on Robot Operating System for smooth communication between sensors' input and actuator controllers.

## ACTIVITIES

**Inter-IIT Tech Meet, Warehouse inventory check team**  
Oct 2017 - Jan 2018

- Technologies: ROS, OpenCV, Tensorflow, C++.
- Won gold in the event warehouse inventory check.
- Built a drone capable of navigating in a warehouse to perform inventory checks.
- Wrote the software architecture, state estimation and control algorithms using a two monocular camera and drone sensors on ROS framework.

**Aerial Robotics Kharagpur, Controls and Perception Team**  
Aug 2016 - Current

- Technologies: ROS, Gazebo, OpenCV, C++.
- Working on map generation from stereo and lidar data for obstacle avoidance in long-range outdoor navigation.
- Integrated PX4 SITL gazebo simulator with IARC problem statement 7 arena.
- Implemented High-Level Controller using MAVROS to compete in IARC 2017.

**Swarm Robotics IIT KGP, Software Team**  
Mar 2016 - Current

- Technologies: ROS, OpenCV, C++ .Bash
- Built a decentralized message passing framework using ignition-transport for communication between the swarm robots.
- Developing a distributed SLAM system using ORB descriptors to rapidly map an unknown environment.

**Technology Robotix Society, Autonomous Head**  
Feb 2017 - Current

- Organized an autonomous event in 'Robotix' fest under Kshitij, Asia's largest techno-management fest of its kind. Robotix attracts 2000+ participants from over 100 colleges in the Indian subcontinent
- Mentored IEEE workshop on Autonomous Robotics for 30+ first and second-year students.

## RELEVANT

## COURSEWORK

### UNDERGRADUATE

Programming and Data Structures, Probability and Statistics, Transform Calculus, Basic Electronics

### MOOC

Machine Learning, Neural Networks and Deep Learning, Convolutional Neural Networks, Robotics: Perception, Robotics: Computational Motion Planning, Probabilistic Graphical Models(Ongoing)