Vivek AGRAWAL
Software Engineer   Roboticist

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Born on 12 January 1999 in Jaipur, India

I am a 3rd year undergraduate student pursuing my major in Department of **Electrical Engineering** at IIT Kanpur. I am a **robot enthusiastic** guy and had done many projects in the field of robotics. I was part of team Robocon and was also secretary at Robotics Club of IIT Kanpur. My major work areas are Deep Learning, Reinforcement Learning, Computer Vision, Motion Planning, SLAM, Controls, Simulation, CAD and Circuit Designing.

SKILL-SETS

Programming Language	C, C++, Python, R, HTML, CSS
Python Libraries & Frameworks	Opencv, Robot Operating System (ROS), Numpy, Matplotlib, Scipy, Pytorch, Tensorflow, Keras
Tools and Softwares	Matlab, Gazebo, AutoCad, Arduino, Autodesk Inventor, GNU-Octave, Git, LaTeX, Linux(Ubuntu)
Online Courses	Deep Learning Specialization by Andrew Ng, Artificial Intelligence for Robotics

ACADEMIC PROJECTS

May 2019 — Present

Shared Autonomy via Deep Reinforcement Learning and Formal Methods, IIT KANPUR
SURGE Project, *Advisor* : PROF. INDRANIL SAHA
> Worked with Astra Depth camera on Turtlebot2 to sense the environment.
> Used Gazebo for simulating Turtlebot in a real environment like situation.
> Applied **Dueling Deep Q-Learning** algorithm to train the robot for navigating in an environment without the need of any human intervention using Tensorflow library.
> Applied **Soft Actor-Critic** algorithm to train robot the with RGB image, and depth image as input, to predict a safe action for the robot using pytorch library.

Deep Reinforcement Learning | Formal Methods | Gazebo | Autonomous System

May 2019 — June 2019

Swarm Robotics, IIT KANPUR
Summer Project, *Advisor* : DR. SOUMYA RANJAN SAHOO
> Created a group of autonomous robots that navigate in an environment, avoid obstacles and communicate with each other.
> Designed a controller for **Omnidirectional** robots that navigates using mecanum wheels
> Used **ROS** for communicating between different nodes of sensors and actuators of the robots.

Omnidirectional Controller | Robot Operating System (ROS) | Swarm Communication

May 2018 — April 2019

ABU Robocon 2018 & 2019, IIT KANPUR
Memeber, *Advisor* : DR. ASHISH DUTTA
> Worked upon the **autonomous navigation** of robots using computer vision algorithms. Write an algorithm for **lane detection**, and **ball detection** and its **distance estimation** from robot.
> Designed circuit and wireless controller of robots and wrote **control algorithm** of a **4 legged** spider robot actuated with 12 servo motors.
> Modified the **Theo Jansen mechanism** for **4 legged robot**, designed the CAD model, **Simulated** on **Matlab** to find optimal link lengths and made a working prototype of it.

Computer Vision | Controls | Simulation | 4 legged Robot | CAD Design | Circuit Design

RELEVANT COURSE WORK

Data Structure and Algorithms	Image Processing**	Partial Differential Equation*
Introduction to Electronics	Control System Analysis	Machine Learning for Signal Processing**

*Exceptional Performance **Ongoing*

AWARDS AND ACHIEVEMENTS

> All Indian Rank(AIR) 456 among 0.5 million students in JEE Advance 2017.
> All Indian Rank(AIR) 1118 Among 1.5 million students in JEE Mains 2017.
> International Rank 1041, City Rank - 1st in 17th Science Olympiad.