ABHISHEK **KUMAR**

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An electronics and robotics enthusiast, a deterministic person, wants to abridge the gap between nature and humans using Electronics and Machine Learning.

INTERNSHIPS

2018

PROJECT INTERN, IIT (BHU), VARANASI

Worked as 2-month intern at IIT BHU under Prof. Hari Prabhat Gupta, CSE Department. As a team of two, we have developed "Intelligent Gardening System" which is the combination of IoT and Artificial Intelligence. Tools which were used are machine learning, sensor networking, MQTT protocol for communication, and microcontrollers

2019

TRAINEE, RESEARCH DESIGN AND STANDARD ORGANIZATION (RDSO) LUCKNOW

Undergone 1-month training in Telecom and Exchange Department, RDSO. In this training, I have learnt basic networking and signaling in railways and train navigation. I have also learnt about telephone and internet distribution system in RDSO premises.

EDUCATION

JUNE 2016-2020

B.TECH., INSTITUTE OF ENGINEERING AND TECHNOLOGY, LUCKNOW (UP)

Currently a 3rd year student in Electronics and Communication engineering department. Aggregate CGPA up to now is 8.10.

MARCH 2015

(XII) SENIOR SECODARY, OXFORD MODEL SENIOR SECONDARY SCHOOL, KANPUR

Passed my 10+2 in CBSE board with 94.2% in science stream.

SKILLS

- Robotics
- Python
- C/C++
- LINUX
- Arduino
- MATLAB
- Machine Learning
- OpenCV
- Raspberry pi v3
- Embedded C

PROJECTS

1. **INTELLIGENT GARDENING SYSTEM:** A smart watering system with the help of IoT and Machine Learning. A 3-node system which covers a piece of land and monitors some physical parameters like moisture, temperature, humidity, etc. and runs a machine learning model on central node to predict whether to water a plant or not. Whole set up consist of a plant, a USB camera, raspberry pi, and sensors. Nodes comprises of Raspberry pi, camera module, various sensors. They communicate among themselves via MQTT protocol, which is a light weight communication protocol. This project was provided by IIT BHU. Under this project I have learnt various concepts of IoT, image processing and machine learning.

2. **MOCKING BOT:** A project provided by E yantra, IIT Bombay and funded by MHRD, govt. of India. We (as a team of 4) developed a robotic system which mimic the audio provided to it, recognize it and correctly plays on the respective instrument (trumpet or piano) with the help of machine learning. The project deals with music application in robotics and audio processing. The audio file is either sampled at 16 KHz or 8 KHz mode, which is to be analyzed on Sonic Visualizer software. The feature extraction and database creation are done on python platform, from which machine learning model was running. The robot is to hit the correct key of piano or trumpet at correct onset. At the national finals (held in IITB), our team has secured 5th position nationwide. In this project, I have worked on machine learning, SD card module interfacing with AVR microcontroller, and embedded programming in C. I have also worked on hardware prototyping. In electronics part, I have helped in circuit designing on CCB, which we have used for visualization of respective notes.

3. **IARC (2018):** Designed a robot for IARC (International Autonomous Robotics Competition) at IIT Kanpur. The bot was to follow a line, avoid the hurdles differentiated by colors, and follow the wall in least time. In this project, I have worked on TCS series color sensor, precision IR sensors and Ultrasonic sensors and interfaced them with Arduino mega. The programming was done on embedded C. Our bot qualified to national finals.

4. **CAT CLASSIFIER USING DEEP LEARNING:** Using deep neural network, I have designed a 5-layer learning algorithm in python that will classify between a “cat” and a “non-cat” image with 87% accuracy. In this project, I have learnt about various parameters of image like its pixel, size etc. and writing it into matrix form. I have also learnt about back propagation mechanism which was the hardest part to understand.

5. **PORTABLE POWER SUPPLY BOX:** As a part of academics, I made a power supply box, which converts 220V, 50Hz AC into 5V and 9V DC. The PCB was designed from scratch i.e., from etching to soldering is done in college.

TRAININGS

1. **Python and its Application in IoT 2017 (Softpro India Pvt. Ltd.):** 2 days Python workshop and its practical Implementation in robotics, IoT and database.

2. **Robotics and IoT Workshop 2016(E Cell IIT Kanpur):** Certified workshop on embedded C and IoT on Arduino platform. Made a simple line follower using Arduino UNO board.

EXTRA-CURRICULAR ACTIVITIES

- Assistant Coordinator at PRAVAH-2018, the cultural fest of AKTU hosted by IET Lucknow.
- Member and mentor at Robotics Club of IET Lucknow.
- Assistant Coordinator at PARAKRAM-2018, the technical fest of IET Lucknow.

ADDITIONAL DETAILS

- Worked on various sensors like Ultrasonic, color, LCD, Bluetooth etc. with microcontroller.
- Have experience in **OpenCV**, **image processing and object tracking**. Developed a simple algorithm on python which uses PC webcam to detect an object in front of it and continuously track its location using contour formation.
- Have experience on **MATLAB,** performed basic operations of control systems and signal processing. Also implemented **image processing** and learned about various **toolboxes**.
- Made a live streaming web server using raspberry pi and USB camera.