KALP GARG

B.Tech. Electrical Engineering

Indian Institute of Technology Roorkee

Email: kalpgarg.12@gmail.com

Registration No: B.Tech./EE/15115065/2019

Area of Interest

Embedded System, Circuit Design, Robotics

Education

Year	Degree/Examination	Institution/Board	CGPA/Percentage
2019	B.Tech.	Indian Institute of Technology Roorkee	9.292
2015	Twelfth	JVP International School, Jaipur(CBSE)	*90.6 %*
2013	Tenth	Jaipuria Vidyalaya, Jaipur(CBSE)	*9.8*

Internships

Summer Internship | Sonant Technologies Pvt Ltd — 10 May 2017 - 8 July 2017

- Worked as an Embedded System intern and develop an assistive device in the area of Augmentative and Alternative Communication.
- This device eases the interaction of a deaf and mute person with other people and changes the perspective of the waythey communicate.
- A driver library in RTOS structure is being written in the TI CC2650 wireless MCU to communicate it with RFID reader MFRC522 using SPI protocol. Obtained data is being sent to smartwatch through BLE. Finally, a PCB schematic and layout has been made to put all modules/controllers into a single board.

Research Internship | Nanyang Technological University — 8 May 2018 - 13 July 2018

- Worked on Unmanned Surface Vehicle (USV) which was developed by NTU and Rolls Royce Lab for the Maritime RobotX Challenge.
- Was assigned the task of developing vision modules in ROS according to the need of competition.
- I implemented the KNN classifier algorithm as a separate ROS node to distinguish various colours. An interactive GUI is also being made to easily analyze the functionality of the algorithm.

Projects

Frequency Independent Sinusoidal phase shifter using FPGA | Indian Institute of Technology, Roorkee — October 2017 - November 2017

- The whole project is based on Xilinx Spartan 3E FPGA.
- Onboard ADC LTC1407A-1 (to convert analog input from a function generator into the digital signal) and DAC LTC2624 (to convert the processed digital signal back into analog) is being used and both of them communicate using SPI communication.
- Then in between a CORDIC algorithm is used to generate a necessary phase shift. All the work is being done using VHDL.

Humanoid Bot | Indian Institute of Technology, Roorkee — January 2017 - March 2017

- Worked as an electrical team member in developing the humanoid bot which follows the dynamic walking algorithm (after trying various algorithms before) with DC motor as the main actuator and IMU and potentiometer as sensors and Arduino Mega as the microcontroller.
- This project won "best project entry" award during Shrishti 2017 (Annual Techno-Hobby Exhibition cum Festival organised by the Hobbies Club, IIT Roorkee).

Microcontroller based automatic, portable and customized Liquid Level in a Tank Control System | Indian Institute of Technology, Roorkee — December 2017 - February 2018

- A PID controller based liquid level system is being developed and its performance is being analysed for different PID tuning methods.
- To control the speed of the pump (induction motor), a gate firing circuit is being made using triac whose gate signal is controlled by ESP-8266 MCU. Feedback of water level is provided by the ultrasonic sensor and fed directly into MCU which in turn control the speed of the pump.
- Based on the performance of the system, finally, the best PID values for that system is automatically chosen.

Technologies for Soldier Support | Indian Institute of Technology Roorkee — December 2017

- The project was developed keeping in mind of the challenge conducted by DRDO by the same name in the Inter IIT Tech meet 2018.
- Developed an ad-hoc network which helps localize the soldiers in a map that is dynamically generated based on their location.
- ESP8266 modules are being used to calculate the distance between soldiers using the RSSI technique. Finally, a local map of all soldiers is being displayed on their screens.

Cognitive system for automatic waste segregation and disposal | Indian Institute of Technology Roorkee — August 2018 - March 2019

- The project aims to develop infrastructure which consists of a smart dustbin capable of automatic segregation and classify the given waste into paper, plastic and metallic waste.
- A solid compacted 3D mechanical model of dustbin has been developed using ROS URDF and is simulated using RViz.

3D Mapping Robot | Indian Institute of Technology, Roorkee — January 2018 - March 2018

- Implemented a robot based on differential wheel configuration which performs SLAM autonomously in any surrounding.
- Whole work is being done in ROS with Kinect as the main hardware component for vision. Arduino Mega as the main controller for interfacing with sensors and actuators and with Laptop which acts as the main processing unit.

Stock Price Prediction and analysis using Artificial Neural Network | Indian Institute of Technology Roorkee April 2018

- Data used in the model consist of the daily adjusted closing price of Reliance Industries from January 1st 1996 to March 23rd 2018.
- Lagging between inputs is selected using PACF. Training algorithm used was Gradient descent using the LM method.
- Finally, for different sets of training, testing and validation, MSE is being calculated to get the best response.

Awards / Scholarships / Academic Achievements

- Secured AIR 1409 in IIT-JEE Advanced 2015.
- Secured 3rd position in Arduino Hackathon during Cognizance 2017(Annual Technical Festival of IIT Roorkee).
- Secured 3rd position in Spectrum event of ECE Department during Cognizance 2017(Annual Technical Festival of IITR).

Skills

Computer languages	C,C++
Software Packages	ROS, Gazebo, RViz, RTOS, Code Composer Studio, MATLAB, Simulink, Latex, Arduino, Android Studio, Eagle, Xilinx, Adobe Photoshop.
Additional Courses Taken	Embedded System, Economics, Fuzzy set and Fuzzy Logic Systems, Artificial Neural Networks, Financial Statement Analysis and Reporting, Introduction to Robotics
Languages Known	English (SRW) , Hindi (SRW)

Positions of Responsibility & Extra Curriculars

N.S.S(National Service Scheme) 2015

- Worked in Prerna cell which provides daily free education to poor children up to 12th class.

Microsoft Code.fun.do 2015

- Developed an app which displays famous tourist spot of different cities of India.

Valeo Innovation Challenge 2017

- Successfully completed a proposal for their challenge. We proposed a GPS alert system for cars to let an ambulance pass through which can prove crucial for a patient's life.

References

Sohom Chakrabarty
Assistant Professor, Deptt. of Electrical Engineering
Indian Institute Of Technology Roorkee sohomfee@iitr.ac.in