Abhimanyu Bambhaniya

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Sophomore Undergraduate | Department of Electronics and Communication Engineering
Indian Institute of Technology Roorkee

Interests

Robotics and Control , Image and Video Processing, Microprocessor Designing ,
Circuit Design, Machine Learning , Artificial Intelligence .
Football, Travelling

Education

2015-Present	**Indian Institute of Technology (IIT), Roorkee** Currently pursuing 3rd Semester of Electronics & Communication Engineering Current CGPA: 8.071 Credits Completed: 70/70
May 2015	All India Senior School Examination, STD XII, CBSE Shree Swaminarayan H.V. Vidhyalaya, **Surat** Percentage: 94.2
May 2013	All India Secondary School Examination, STD X, CBSE Shree Swaminarayan H.V. Vidhyalaya, **Surat** CGPA: 10/10

Academic Research and Experience

January 2016 February 2016

Navigation of the bot on the given path and making a long exposure photo using Matlab

- The objective was to make a bot which moves in a particular a pattern in a room with a single LED on it.
- I used a webcam to capture the real time video of the bot and then used background subtraction and image thresholding in Matlab processed this video to give a final image that had the whole path of the bot.
- I used to give input to bot via bluetooth module and then made the bot go on a definite path with leds of various colour lit at various times
- For Reference:-Light painting Using Image Processing

February 2016 March 2016

Interactive interface for a Photo-booth using Microsoft KINECT and image processing on Processing

- The aim of the project was to make a interactive photo-booth that makes different types of virtual background according to your body shape and position .
- Microsoft Xbox Kinect was used to track the body position and movements and then processed using Processing
- Then finally background was projected using a projector.
- For Reference:-Mockingjay: Kinect Projector

April 2016 – May 2016

General Curve Navigation of Differential Drive bot using **Bi-Directional Encoders** and **Magnetometer**.

- The objective was to achieve navigation of a Differential Drive bot based on the polar-coordinate system
- Bi-directional Encoders coupled to both the wheels were used to compute the angular velocities for independent wheels and Magnetometer sensor readings were computed for the current orientation of the bot
- Both the wheel velocities and the orientation data we used for trajectory computation of the bot using Instantaneous Centre of Curvature (ICC) Method

July 2016 – August 2016

Design of **Dual-layer PCB** for sensor data acquisition to micro controller

- Developed schematics and layouts for two-layer PCBs for integration of sensors with Arduino-MEGA and Raspberry Pi
- Designed symbol and footprint libraries for ICs LTC2309-ADC and MP2307-Buck converter for PCB integration with Raspberry Pi
- Experience with low power analog circuit design with strong knowledge of PCB transmission line signal integrity and design analysis

Oct 2016 – Nov 2016

Wall following of Mecanum Drive using two **Sharp** sensors and one **Bi-Directional Encoder** and PS2 remote

- The objective was to achieve navigation of a Mecanum Drive bot based on wall following.
- The sharp sensors are used to obtain the orientation and distance from the wall and based on this error, correction are computed using PID.

Oct 2016 – Nov 2016

Wall following of Differential Drive using two **Sharp sensors** and one **Bi-Directional Encoder**

- The objective was to achieve navigation of a Differential Drive bot based on wall following.
- The sharp sensors are used to obtain the orientation and distance from the wall and based on this error, correction are computed using PID.
- The Bi-Directional encoder is used to compute the distance travelled by the bot from the reference location, and we have implemented a function to map the distance to speed.

Academic Achievements

- Secured All India Rank 1234 in JEE-Advance 2015 among 1.3 million students across the country
- Secured All India Rank 5163 in JEE-Mains 2015
- Secured 776 in Prestigeous Kishore Vaigyanik Protsahan Yojana (KVPY) 2015
- Reached national stage for National science examination - Physics, conducted by HBCSE (Homi Bhabha Center for Science Education) in 2015 .
- Recieved best execution award for my Project, Lumire Fonce in Shrishti,the annual hobbies club exhibition of IITR in 2016.

Technical Skills

Languages:	C, **C++**, Java, Python, MIPS Assembly Language, LATEX
Software Tools:	Matlab, LT Spice, Eagle, Multisim 13.0, Xilinx Design Suite
Programming Tools:	Arduino, Opencv , Processing, AVR Studio,QTSPIM, Android Studio, Visual Studios

Courses Taken

Curriculum

Object Oriented Programming (C++ and Java) , Introduction to Electronics and Communication Engineering, Mathematics-I , Electrodynamics and Optics , ,Digital Logic Design , DATA STRUCTURES , Semiconductor Devices,Electrical Science, Mathematical Methods ,Quantum Mechanics and Statistical Mechanics ,Electronic Network Theory , Analog Circuits , Signals and System , Computer Architecture and Microprocessors

Additional

- Machine Learning by Andrew NG.*
- Image and Video Processing: From Mars to Hollywood with a Stop at the Hospital by Guillermo Sapiro(Duke University)*

* -Online Courses.

Extra-Curricular Activities

- Member at Team Robocon:- I am in Electronics and control team of Team Robocon,IITR , making the bot for competing in ABU- ROBOCON-INDIA.We make a functioning bot for ABUROBOCON .
- Organizer Thomso'15:-Worked for Promotions, Hospitality and Travel team for Annual Cultural Fest of IITR in 2015.
- Social Work:-Attended and volunteered in various Blood Donation Camps.