



Rahul Prajapat
Electrical Engineering
Indian Institute of Technology, Bombay
Specialization: Communication & Signal Processing

10D070039
UG Second Year
Male
DOB: 15/9/1992

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2011	7.14
Intermediate/+2	CBSE	St. John's Senior Secondary School	2010	87.60
Matriculation	RBSE	Shri R. G. G. Sr. Sec. Adarsh Vidya Mandir	2008	90.00

RESEARCH INTERNSHIP

Indian Institute of Science, Bangalore

(Dec 2011)

Guide : Prof. Bharadwaj Amrutur, 'ENVIROMOTE', WIRELESS POLLUTION MONITORING

- Helped to develop a platform to measure the standard pollutant gases like CO, CO₂, NO, SO₂, using low cost electro-chemical sensors, MSP430 mixed signal controller and a GSM module
- Aimed to instrument the traffic intersections in Bangalore and collect real time air quality data, hence useful for urban planning and traffic management, with a goal to reduce pollution
- Successfully modified the existing FreeRTOS source code and demo application (msp430f5438) to use it for msp430f5435 and tried to implement it on our main Enviromote code for effective multitasking

KEY ACADEMIC PROJECTS

High speed data transfer using Optical Fiber Technology

(May 2012 – Jul 2012)

Guide : Prof. Joseph John

- Studied various types of Optical fibers, principle on which they work, Comparison between Electrical wired and optical fiber networks and their various applications etc
- Studied the DSP course from NPTEL website, basically covered DFT, FFT, Filters (FIR, IIR) part
- Tried some experiments in the area of DSP like implemented filters on DSP chip (DSK6713) remotely using virtual labs setup, simulated same experiments on MATLAB

Digital Electronics Project

(Mar 2012)

Guide - Prof. M.B. Patil

- Aimed to make a travelling message display unit which can be used in buses or trains
- Designed a circuit for 10 (5*7) led matrixes (were placed in a row) and decoders to show the route number and the name of the station. Instructions were given from FPGA to led matrixes via decoders.
- Coding – VERILOG Hardware Descriptive Language

Book Keeping Robot Project

(Jan 2011 – Sep 2011)

Technovation, IIT Bombay

- Assisted in designing an autonomous robot which can find the location of a book stored inside the IITB library and store a number of books and navigate within the library to the desired location
- Designed the sensor part of the Robot involving ultrasonic sensor, sharp sensor, LDR, Photo Module
- Worked on the electronics part of the project which also involves study of stepper and servo motors

Voice Recognition System

(May 2011 – Jul 2011)

Electronics Club, IIT Bombay

- Developed a Speaker Independent Voice Recognition System using Matlab and then tried to transfer it to DSP chip using C language, can recognize any human voice (command)
- Designed Pre-amplifier Circuit for condenser microphone using LF353, as well studied all other circuits using varieties of operational amplifiers like LM358, LM741 and separate transistors
- Studied many algorithms, Finally adopted silence and noise removal method using Mahalanobis distance, Discrete Wavelet Transformation, Pre-Emphasis, De-Emphasis, K-means Algorithm
- Implemented our system on 5*7 LED matrix for showing any 1 digit number, all capital English alphabets, all small English alphabets and any moving word using specific voice commands

Market Analysis

(Aug 2011 - Nov 2011)

Guide: Prof Haripriya Gundimeda

- Detailed study of camera market in India which included analysis of the market share, market structure, level of competition and growth rate for major camera manufacturing companies

Innovative Mobile Application for Rural India

(Feb 2011 – Mar 2011)

Guide: Prof Juzer M. Vasi

- Studied problems faced by peasants regarding the information in rural areas of India
- Use of the mobile phone for providing information regarding the commodity prices to the rural India

Nexus (National Robotics Competition)

(Aug 2011 – Sep 2011)

Organised by: Techfest'2012, IIT Bombay

- Built an autonomous robot using Proportional Integral Differential control, able to follow a white painted path on a black background and also able to solve a maze using Flood Fill Algorithm
- Designed a unique mechanism which enables the robot to pick up a block with a gripper

RELEVANT COURSES UNDERTAKEN

- **Core Courses** : Electrical Machines and Power Electronics, Analog Circuits, Digital Systems, Signals and Systems, Microprocessor, EM waves , Communication systems, Electronic Devices (Theory and Lab)
- **Mathematics** : Calculus, Linear algebra, Differential Eq., Complex analysis, Probability and Random process
- **Computer science and statistics** : Computer programming and utilization, Data analysis and interpretation
- **Humanities and Social Sciences** : Economics, Environmental Studies, Sociology

LEADERSHIP EXPERIENCE

MANAGER, ELECTRONICS CLUB

(Apr 2012 – Till Date)

- **"Institute Technical Summer Projects" Program :** (Apr 2012 – Jul 2012)
 - Initiated ITSP especially for freshmen of IIT Bombay, aiming to give them a insight of technology
 - Total 300+ freshmen (70+ teams) build exciting very exciting productive projects
 - Got approved of Total budget of Rs. 5.3 lacs from Institute for this program
 - Planned "Exclusive Mentorship Program" to mentor the freshmen (total 45 volunteers participated)
 - Mentored Self Balancing Two Wheeled Vehicle, Rubik's Cube Solving Robot and Robotic arm ITSP projects
- **Vision** : Students will be having such a strong enough technical background after getting trained from our club that they will be able to make innovative projects which will help in **solving Economical problems** of India
- Responsible for organising the various technical activities (Competitions, Hands on workshops, Varieties of Talk Sessions, Hobby projects, Work Visits) in whole institute, Recently organised Electrified session : **617** footfall

TECHNICAL SECRETARY, HOSTEL 5

(Aug 2011 – Apr 2012)

- Led the Hostel to 1st position (**First time ever in history** of hostel 5, IIT Bombay) in Technical general championship (Tech GC) held every year among total 14 hostels of IIT Bombay during my Tenure
- Part of 22 member council responsible for addressing hostel affairs and ensure its smooth functioning
- Responsible for administration of tech room and maintenance of electronics, mechanical tool kits

SOFTWARE SKILLS

- **Programming Languages**: C/C++, HTML, Ezwindows, verilog programming, freeRTOS, Winavr
- **Hardware Description languages**: Arduino (Electronics Prototyping Language), IAR workbench, Verilog (VHDL)
- **Microcontrollers** : Atmel AVR, Microchip PIC, Texas Instruments MSP430, Intel 8085
- **Softwares**: MATLAB, LTSpice, EAGLE, Photoshop, Illustrator, Easy Scope, Adobe Dreamweaver, Sony Vegas

SCHOLASTIC ACHIEVEMENTS

- Was among the **top 1%** students in the country in **IIT-JEE** (among 4.75 lakhs students appeared) (2010)
- Secured All India Rank of **1515** and **258** at state level in **AIEEE** (among 1 million appeared) (2010)
- Amongst **top 0.01%** students nationwide selected for **BITS Pilani** (2010)
- Amongst **top 1%** students selected from state for Indian **National Physics Olympiad** (2009)
- Institute (IIT) Scholarship: I'am a recipient of the Institute Merit Scholarship given by Government of India: includes free tuition during the study at IIT (present)
- **Award** : Awarded hostel **technical colour** for accomplishments in Technical activities (2012)

EXTRACURRICULAR ACTIVITIES

CULTURAL

- Led a 7 member team for production work of **Gyration'2011** and secured a place in top 3 for the same
- **Special mention** in consecutive years **PAF'2010** and **PAF'2011** (Performance Arts Festival) for production work
- Organised various literary and art competitions during Freshizza and hostel events including dussehra, matki phod, ganesh, painting, valedictory function, ganesh chaturthi, alumni welcome function etc

TECHNICAL

- Built an autonomous robot that can follow a white painted path on a black background in my first year, Robot used the Proportional Integral Differential for line following and differential drive mechanism
- Construction a manual robot properly in "Track Mania" competition and Secured 4th rank in hostel

SPORTS

- Part of school team for Kho-Kho tournament held at state level for 7 years, won the 2nd prize in "Institute Freshman Tournament" in Kho-Kho as a **captain** and also selected in institute team
- Interests include debating, trekking, playing Volleyball, TT, and coding