

## PROJECTS

---

### 1] AUVSI's International Robosub Competition, San Diego, California

*Designing and developing an unmanned autonomous underwater vehicle (AUV) that localizes and performs realistic missions based on feedback from visual, inertial, acoustic and depth sensors using thrusters and pneumatic actuators.*

**Guide: Prof. Dr. Hemendra Arya and Prof. Leena Vachhani** (December 2011 – Ongoing)

**Founder Member** of a team of 20 members constructing state of the art AUV with a total budget of **2.2 million INR**.

Working under the following subdivisions:

- **Electronic Hardware:** The SBC communicates with the power controller which performs innovative operations like **power kill** on **accidental water seepage** in the hull besides ensuring smooth **power distribution** .  
In its **Debut participation**, the AUV qualified for the **semi-finals** of Robosub 2012 and was **ranked 10<sup>th</sup>** (out of 31 international teams).  
(September 2012- Ongoing)
- Successfully completed the Automation of Pneumatic Actuator System and Analog Signal filtering for the Pressure sensor. The Automation included synchronising the solenoid driven actuators with the Mission Planner and their controlled operation. This System communicated with the SBC over CAN bus. An PCB of 1.2'\*1.5' was developed to implement this work.

### 2] SLAM: Simultaneous Localisation and Mapping

*Building a Smart Home Assistant(SHA) implementing SLAM which would be able to undertake most of the domestic chores.*

**Guide: Prof. Leena Vachhani** (April 2013- Ongoing)

- Major focus lies on solving the SLAM problem by implementing the current approaches and trying to formulate better mathematical formulations to do so.
- Currently working on the theories and studying the available researched material.

### 3] Two Wheeled Self Balancing Robot: Institute Technical Summer Project,

**IIT Bombay** (April 2012-June 2012)

- Designed an **Autonomous** two wheeled single axis self balancing robot.
- Integrated a feedback structure for the motors using **PID control** with feedback from **inertial sensors**, on **AVR** platform.

- Successfully completed the project with **future perspective** of developing a Two-Wheeled self balancing human carrier, under the Technovation Club, IIT Bombay.

#### 4] Techfest: National Robotics Competition, IIT Bombay

##### *Self Motivated*

(December 2011)

- Designed an Autonomous Robot which was meant to solve a Problem Statement which demanded wall following going through various obstacles.
- The Robot successfully cleared the obstacles with help of data received from an array of **Proximity** and **Photo** sensors.
- Ranked **13<sup>th</sup>** in the competition in which over **75 teams** participated all over India.

#### 5] Patient-Doctor-Hospital Management Interactive Interface: Course Project

##### *Guide: Prof. Dr. D.B Phatak*

(September 2011-November 2011)

- Created an Integrated C++ program which generates an UID for the patient for a particular hospital.
- It served for the database management of patients medical history, updated it. It also kept record of the hospital's inventory. Graphical part was implemented using EZ Windows.

#### **SKILLS**

---

- **Electrical:** Analog, Digital and Power Systems design/interfacing/integration, Microcontroller interfacing(Atmel AVR, Arduino), PCB design, Embedded protocol (CAN,I2C,SPI,UART).
- **Computers:** Advanced C/C++, Solidworks, Eagle CAD, Adobe photoshop
- **Operating Systems:** MS Windows, Linux

#### **POSITIONS OF RESPONSIBILITY**

---

##### 1] Coordinator at Electronics Club, IIT Bombay

(June 2012-Up to Date)

- **Organising** and conducting various **workshops** on embedded systems in the institute.
- **Created** first of it's kind state of the art **Piano Stairs** in the institute
- **Planning and Organising Inter Hostel General Championship events** based on robotics, electronics etc.

##### 2] Technical Mentor

(July 2012-Ongoing)

Currently mentoring **60 1<sup>st</sup> year undergraduates** in Robotic events held **all over India**.

##### 3] Organiser at Techfest-2012, IIT Bombay (Asia's largest Science and technology Festival):

Organised an exhibition presented by **CRPF** on disaster management

#### **AWARDS and ACHIEVEMENTS**

---

- Awarded the prestigious "**Tech Special Mention(2011-12)**" (**6 out of 900 1<sup>st</sup> year students**) by **Dean of Academic Affairs** for Outstanding Performance in Technical Activities.
- Bagged **AIR 88** in All India Open General Knowledge Quiz Organised by **Talent Search Institute**, India.
- Got **AIR 349** in Science Olympiad organised by Science Olympiad Foundation(SOF), 2010.

## **RELEVANT COURSES**

---

- **Electrical:** Electricity and magnetism, Introduction to Electronics and Electrical and Engineering
- **Computer Science:** Computer Programming and Utilisation
- **Mathematics:** Calculus, Differential Equations, Complex Analysis, Numerical Analysis

## **EXTRA CURRICULAR ACTIVITIES**

---

- **Lead Actor** in all the plays and Dramatics Competitions in Freshhizza-Fresher Cultural Competition, Bagged the 2<sup>nd</sup> place for the hostel and Best actor in the same.
- **National Service Scheme: Educational Outreach, Lectured** over 60 students in KV, IIT Powai on Mechanics for entire Semester.
- **Heavy Weight Champion**, Boxing, Bishops Education Society, 2009