



Anshuman kumar
Aerospace Engineering
Indian Institute of Technology Bombay

120010036
B.Tech.
Male
DOB: 12/11/1994

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2016	7.80
Intermediate/+2	CBSE	Creane Memorial School	2012	91.80
Matriculation	CBSE	DAV Public School	2010	9.60

Major Interests: Autonomous Unmanned Systems, Embedded Systems, Computer Graphics, Image Processing, Parallel Computing, Artificial Intelligence, Machine Learning and Cryptography.

AWARDS AND ACHIEVEMENTS

- Honoured with prestigious **Institute Technical Person of the Year**, 2015 for outstanding performance.
- Awarded **Institute Technical Special Mention**, 2014 for contributions to technical activities.

PUBLICATIONS AND PAPERS

- Lead author and presenter: “Design and Analysis of an Autonomous Underwater Vehicle Matsya 2.0”, **2nd best poster** at International Underwater Technology Workshop at National Institute of Ocean Technology
- Authored 3 Technical Description Paper: “Research and Development of MATSYA series AUVs”, presented at AUVSI Robosub Competition organized by U.S. Office of Naval Research, San Diego, California

INTERNSHIPS

Klugtek Robotics
Software Architect

Summer 2015

- Designed a software architecture for two wheeled robot which can be easily ported to any embedded architecture.
- Implemented **Kalman Filter for Sensor Fusion** between encoder and IMU.
- Designed a **synchronous bluetooth protocol** for communication among robot and smart devices.
- Programmed **ARM processors** using CMSIS, HAL and mbed.
- Devised modified version of **pure pursuit algorithm** for path tracking of the robot.
- Implemented Industrial level **PID controller** for increasing rigor in controls.

National Institute of Oceanography, Goa

Summer 2014

Modules for Autonomous Underwater Vehicle (AUV) Maya

Guide: Pramod Kumar Maurya, Senior Scientist

- Designed the **software architecture** for navigation of Maya over beaglebone platform.
- Developed modules in Robot Operating system for operations of the autonomous vehicle.
- Implemented **Socket communication** for sending and receiving data among main computer and subsystems.
- Developed the drivers for integrating **AHRS and GPS**.

MAJOR PROJECTS

Matsya, Autonomous Underwater Vehicle

2012 - Present

International Robosub, AUVSI & US Office of Naval Research

Guide: Prof. Leena Vachanni

AUV-IITB is an all student team working on the design and development of an AUV Matsya which competes annually at the International AUVSI Robosub competition in San Diego, California.

- **Team Leader**, 2015
 - Managing operations, logistics, recruitments and knowledge transfer in a 4-tier cross functional team.
 - Spearheading Mechanical, Electronic, Software and Public Relation sub-divisions in student-run AUV Lab.
 - Administering project worth 7 million INR; planning for financial risks; propelling marketing efforts.
- **Senior Architect, Software Subdivision**, 2014
 - Supervised and led junior architects for unhindered development of software stack.
 - Developed a two way **multi-threaded** communication protocol using **pthread** and sockets library.
 - Designed a modular architecture to integrate military grade **Doppler Velocity Log** for navigation.
 - Implemented navigator for the AUV using **Finite State Machine** Model.
 - Designed and implemented the **PID controller** for controlling the five DOF of the AUV.
 - Implemented the map and mission planner for completing various task in a planned way.

- **Chief Mechanical Designer**, 2013

- Fully designed and developed underwater technologies such as Underwater Connectors and Underwater switches that are about 95% cheaper than commercial products.
- Experimented and developed various water-proofing techniques for Underwater Hulls.

- **Fabrication Engineer**, 2012

Semi-Finalist at Robosub 2013, 2014 & 2015

Voice Controlled Surveillance Bot

Summer 2013

- Designed and fabricated a Voice Controlled Surveillance Bot which is capable of capturing videos and sending to host computer using X bee.
- Developed **algorithm from scratch** for comparing saved sound and currently recorded sound using Matlab.

SELF MOTIVATED PROJECT

Moodle Sync

Autumn 2015

- Developed an application to automate downloading procedure of relevant lecture material from moodle.
- Incorporated offline organisation and recursive scanning features for multiple platforms.

Connect Four

Autumn 2014

- Devised a deterministic algorithm with different difficulty level to play against human.
- Optimised over game state to maximise winning chances.

Naga Saga

Autumn 2013

- Developed terminal implementation of classical snake game using Ncurses libraries.
- Implemented the progressive difficulty level and bonus points.

OTHER PROJECTS

- Designed the Website (www.auv-iitb.org) using Bootstrap, Java-script, HTML, PHP, CSS.
- Successfully Designed and Fabricated the Hydronoid gripper, Line follower and Remote control Torpedo shooter for Institute level competition.
- Successfully designed a remote controlled highly stable motorized ground vehicle using RF transceivers. Secured second rank out of 200 team participated.
- Solved **Travelling Salesman Problem** using **Simulated Annealing**
- **Green Gym**: Modified the ergometer cycle to charge Mobile phones.

POSITIONS OF RESPONSIBILITY

Mentor(Students Technical Activities Body- IIT Bombay)

- Mentored 2 teams for technical summer projects under Student Technical Activity Body(STAB).

EXTRACURRICULAR ACTIVITIES

- Participated and cleared 4 round in institute level chess competition.
- Participated in some Institute level painting competition.