Abhishek Balasubramaniam
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Education

Hindustan University ***(Chennai, TamilNadu, India)***
Bachelor of Technology Mechatronics Engineering (CGPA: 7.3/10) *2013-2017*
course include: 2D/3D modelling, C++, Python, ROS and Arduino

Chinmaya Vidyalaya Higher Secondary School ***(Chennai, TamilNadu, India)***
School and Junior College

Experience

Cambionix Innovations ***(Chennai, India)***
Co-founder and Machine learning Architect. October 2017 - Present

- *Co-founded Cambionix Innovations with the vision to enhance user experience and automate small and medium scale industries in India that cannot afford automation solution at market price.*
- *My role is to design, integrate and innovate futuristic solution that can enhance the performance of existing mechanical devices.*
- *I also work on research project for various companies.*

Metaplore solution Pvt. Ltd ***(Chennai, India)***
C++ Developer *April 2017* – October *2017*

- *I was working on Image Processing based security solution where we do facial recognition, pattern matching etc.*

Flytta Innovation Pvt. Ltd ***(Chennai, India)***
Technical Manager *April 2016 – April 2017*

- *I was working as the technical team manager where I manage interns and other members of the technical team*
- *I also worked on webpage development.*

Team Falcod ***(Chennai, India)***
Founder and Team Lead *May 2016 – Present*

- *Built an Autonomous unmanned Aerial Vehicle*
- *Participated at Drones for Good Awards by Government of UAE.*

Team Destination Space ***(Chennai, India)***
Co-founder and Team Lead *May 2015 – June 2016*

- *Built a space balloon for near space research.*

Team Hindustan Mars Rover ***(Chennai, India)***
Team Manager *May 2015 – Present*

- *Built two version of Semi-Autonomous Mars rovers*
- *Participated at University Rover challenge by Mars Society USA*

Professional Skills

Programming and System Integration:

Languages: C++, Java, Python, HTML, CSS, Node js, Angular js, PHP, JavaScript and Native Android.
Platforms: AWS, Azure
Database: SQL, MongoDB, Oracle.

Artificial Intelligence:

Packages: TensorFlow & lite, PyTorch, FastAI.
Tools/platform: Jupiter, Paperspace, AWS.

Robotics:

Software: Robot Operating System, Arduino, Qt, Processing, Lab-view, Fluid SIM, PLC programming, Sensor design, circuit designing and integration, CircuitMaker, PCB (software).
Hardware: Arduino, Raspberry Pi, Nvidia JTK1 and JTK2, Intel Microprocessors, PLC, PIC.

Designing and simulation:
Auto-cad, Fusion 360, Blender, Solid Works, Photoshop, Illustrator, Qt Designer.

Academical Projects

Wireless ultrasound and body monitoring device ***Duration: 12 weeks***

The project was about designing and fabricating a compact ultrasound device which has a wireless data transmission via Wi-Fi. The main focus of this project was to eliminate wired model of ultrasound device and monitoring body parameters and sending warning signals in case of emergency to the doctor.

Cartesian drawing robot ***Duration: 16 weeks***

This project was done as a replacement to conventional classroom boards. It works via Wi-Fi and controlled using a Micro-controller and Microprocessor.

Unmanned aerial vehicle with position and altitude lock with GPS based navigation system ***Duration: 20 weeks***

An open-source software and hardware based Autopilot system was designed with altitude and position lock. Artificial neural network and Fuzzy logic where used for decision making. Autopilot system was built using Arduino and Robot operating System.

ROS Based Stereo Vision System For Autonomous Navigation ***Duration: 20 weeks***

As the Team lead and software developer of the team i worked on a Stereo vision based autonomous navigation system that uses Artificial Neural Network and Image processing for autonomous Navigation. Communication was established via Wi-Fi with Robot Operating System(ROS) which sends and receive signal from user. A custom made Android App that works on ROS helps in GPS data acquisition for continuous feedback.

Android Based Position Tracking Robot ***Duration: 16 weeks***

In this project I developed a Vision based object tracking semi-autonomous robot which uses an android app to capture and process images and then the data is transferred to Arduino. This data is processed to find the exact location of the object and then the controller send data to the motors to track the object. I used OpenCv with Android studio and Arduino to control the Robot. The Android phone camera capture real time data and calculate the position and distance of the object with the data using various image processing techniques and calculate the velocity and direction of movement of the object and track the object accordingly.

Microcontroller based wireless GPS system for tracking objects ***Duration: 4 weeks***

The device is a microcontroller based GPS navigation device used to find the current location of the device and also to timestamp data from the device to a web server using http push request. The microcontroller used is a wemos d1 microcontroller which is Wi-Fi enabled which makes it easier to connect to know wifi and transmit data and also makes the device compact. This device has a very high accuracy of +/- 10 m.

Automatic dial gauge calibrator ***Duration: 16 weeks***

This project is about automating dial gauge calibration device. I am developing a prototype of an automated dial gauge calibration device with universal dial gauge probe adapters. I am working on a microprocessor based DAC which can be used as an alternative for DRO machine which can potentially reduce the cost of operation and reduce the time and parallax errors made by human eye. As the first part of the project I am working on the software side of the project creating the GUI for the DAC which can automatically collect data from the device and display it in a table format and also draw a graph using the values.

Kibana customization ***Duration: 2 days***

Kibana is a visualisation web application. I customised it with various new features that includes changes in the chart display, changes in time interval, changes in frequency of refresh interval and also added new customization displays such as pie chart, health metric, etc. I worked with HTML , Node js and Angular js

Projects for Competition

Hindustan mars Rover ***Duration: 24weeks***

As a Technical Team Manager I took up the responsibility of designing the technical aspects of the prototype of an Martian rover for the competition "University Rover Challenge 2014" which was held by Mars Research Society USA, UTAH. We where selected for the finale in Hanskville, Utah, USA where 36 teams around the globe where shortlisted from more than 250 participants. We secured 10th place out of the 36 finalist and we secured 2nd place out of 8 finalist from India

Destination Space (project on space balloon) ***Duration: 18weeks***

In this project I worked as the Software team lead where we made a weather monitoring aerial balloon with thermal cameras and live data transmission system which is capable to reaching near space atmosphere and collect data. The data is collected and transmitted to the base station via RF control in order to analyze it. The balloon also transmits its GPS coordinates in order to retrieve the payload for further study on the conditions.

Team Falcod ***Duration: 18weeks***

As the Team lead and software developer of the project i developed an open-source software and hardware based Autopilot system For the competition DRONES FOR GOOD conducted by government of UAE. Artificial neural network and Fuzzy logic where used for decision making. Autopilot system was built using Arduino and Robot operating System

Publication

Dinoponera 6 Wheeled Exploration Vehicle with Swarm Bots ***August 2018***
21st International Mars Society Convention, Mars Society, USA
Co-Authors: Varun Rufus Raj Samuel

ROS Based Stereo Vision System for Autonomous Vehicle ***September 2017***
ICPCSI, IEEE XPLORE
Co-Authors: Gautham sivathan and Varun Rufus Raj Samuel

Low Cost ROS Based Semi-Autonomous Drone with Position and Altitude Lock ***September 2017***
ICPCSI, IEEE XPLORE
Co-Authors: Gautham sivathan and Varun Rufus Raj Samuel

Arachnid 6 wheeled all-terrain explorer with 7 DOF robotic arm ***September 2017***
20st International Mars Society Convention, Mars Society, USA
Co-Authors: Allen Fredrick and Shyam R Nair.

Internship and Implant Training

Programming intern at ucal-jap system ***Duration: 30 days***

- *Worked on designing and programming an autopilot system for an uav*
- *Design and fabrication of UAV*

Achievements

- *Co-founder of Cambionix Innovations selected as Top 10 best engineering services start-up in India 2018.*
- *Invited as track speaker to present a model on Mars rover in 21th International Mars Society*
- *convention*
- *Invited as track speaker to present a model on Mars rover in 20th International Mars Society*
- *convention*
- *Finalist in Robotryst 2013 conducted by Robosapiens at IIT DELHI*
- *17th place in University Rover Challenge 2015 conducted by Mars Research Society, Utah, USA*
- *Participated in SAUV 2015 conducted in NUS High School, Singapore*
- *Participated in UAE Drones For Good Awards 2016 conducted UAE Government.*
- *Winner in state level drawing competition*
- *Avid runner and participated in half marathon and athletics competitions*
- *Won tennis matches in inter-club level competitions*

Membership in Organization

- *Institute of Electrical and Electronics Engineers*
- *Condition monitoring society*
- *ROS Community*
- *Pycon India*
- *Mars society India*
- *Build to learn society*

Languages Known:

- *Tamil (Native speaker)*
- *English (Proficient) IELTS: 7 BAND*