vishwajeet balasaheb bhagyawant | **180110095**
Metallurgical Engineering & Material Science | **UG Third Year (B.Tech.)**
Indian Institute of Technology Bombay | **Male**
Specialization: MEMS | **DOB: 26/11/2000**

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Experience

Undergraduate Research Assistant | **IIT BOMBAY** May 2020 – Present
Guides - Prof. Leena Vachhani & Prof. Arpita Sinha

- Developed a decision-making algorithm for a vehicle based on the surrounding using **Reinforcement learning**
- Incorporated Unity simulator and MIT Deep traffic platform for testing and training the **DL model** of vehicle
- Studied and tested various algorithms for multi-agent **patrolling** on the SUMO platform using research papers
- Responsible for developing patrolling algorithms using **IoT** by simulating packet loss in node communication

Electronics Engineer | **Augle A.I. Private limited** May 2020 – Aug 2020
Augle A.I. is the Company that offers Face Recognition based solutions.

- Researched about **ARM processors**, GPUs, and **compute modules** for the design of **custom Linux tablet**
- **Negotiated** with various **International vendors** for the quotation of LCD modules and development boards in bulk, then finalized best and cost-effective components for designing the prototype of the device
- Worked on a **temperature monitoring device** that will be measuring the temperature of a person from long

Key Projects

Terrace Farming Bot | **Mechatronics Subsystem** Nov. 2019 – Dec. 2019
A Competition organized by DIC Agro, IIT Roorkee during 8th Inter IIT Ttech Meet

- **Represented** University in the Terrace farming challenge given by an organization during the Inter IIT Tech
- Modeled various mechanisms for climbing up & down the terraces of certain height and perform farming tasks
- **Designed and manufactured** model for the mechanisms including climbing, seeding, plowing, and harvesting

Autonomous Indoor Drone | **Mechanical Subsystem** Jun. 2020 – Present
Robotics challenge conducted by Flipkart India

- Built a cad model for a **2-kg payload drone** and analyzed its strength using **FEA** and **vibration analysis**
- Delivered a **presentation video on structural analysis** of drone with and without payload for **semi-finals**
- Achieved the position in **national finale among top 3** teams and currently working on simulation challenge

Quad-copter | **Hobby Project** Feb. 2019 – Apr. 2019
First big project of fresher year

- Successfully built a quadcopter from scratch using a **Micro-controller** and stabilized with **PID algorithms**
- Programmed **Complementary Filter** to reduce noise up to 99% in sensor generated by propeller's vibrations
- Constructed a **2D model** approximation of a drone to test out several parameters of filters and PID algorithm
- Successfully built the drone to safely take-off and land and **achieved stabilization** while hovering in the air.

ABU Robocon | **Controls Subsystem** Nov. 2018 – Jan. 2019
Competition organised by ABU requiring walking bot and another with throwing capability

- Coded an **Inverse kinematics algorithm** on micro-controller to execute the motion of **quadruped robot**
- Designed a Controller to integrate the functionality components like grippers, pneumatic cylinders, motors, etc
- Created low pass filters using **op-amp and RC combinations** to reduce noise in signal for controlling motors

Technical Skills

Languages	C++, Python, MATLAB, JavaScrip, HTML/CSS, R
Softwares	SolidWorks, Ansys, Autocad (2D), Eagle, Arduino IDE, STM32Cube, MPLAB IDE
Frameworks	ROS, OpenCV, Pytorch, TensorFlow, Django, Jekyll, Node.JS
Electrical	Raspberry-Pi, Arduino, Node MCU, PIC, Intel 8051, STM32, MSP430
Miscellaneous	Git, Google Cloud Platform, pandas, NumPy, Matplotlib

Achievements & Awards

- Secured rank among the **top 3% students** in **JEE Advanced** and 99.35% percentile in **JEE Mains** *2017-18*
- **Winnner** of the PlutoX drone hackathon conducted by a drone startup for building **flame sensing drone** *2020*
- Completed **workshops** on **RF system design**, **system engineering**,IoT, **ROS**, and **Path planning** *2019*
- Grabbed **silver medal** in **autonomous pathfinder robot** competition conducted by robotics club *2019*
- **Special** mention in the HowThingsWork contest for demonstrating the **functionality of a set-top box** *2020*

Other Projects

Team Aerov | Mechatronics & Controls Engineer Aug. 2020 – Present

A team of 17 people working on aerial vehicles and their competitions

- Working in the mechanical subdivision for International Aerial Robotics Competition(**IARC**) **mission 9**
- Ideated on the various mechanisms possible on quadcopter for removing 2kg block supported by magnetic force
- Presently working on the design of the **coaxially** configured **quadcopter** capable of carrying **15 kg payload**

Project Ethan hunt | Team Leader Jul. 2020 – Aug. 2020

A month long simulation project based on a problem statement

- Spearheaded a team of five people to complete the project of autonomous security hacking robot simulation
- Modeled a bot capable of lifting itself to a certain height and navigate **autonomously** to find safe and unlock
- shaped the bot for gazebo simulation to simulate the task of autonomous navigation and **digit recognition**

Vehicle tracker | Hobby project Dec. 2019 – Jan. 2020

A real time tracker for vehicles to track their position on roads

- Accomplished a **working prototype** of a GPS tracker by fabricating GPS module & NodeMCU linked circuit
- Established a google map-based website using dynamic **Maps API** to track the location of vehicles in realtime
- **Enhanced the accuracy** of the location of vehicles on roads by using Google's snap to road algorithm

Cozmo Clench | Techfest 2018 Dec. 2018

A Competition organized during Asia's largest technical fest, TechFest 2018

- Competed with students from various engineering colleges in Techfest Robotics competition COZMO CLENCH
- Bult, a wireless **joystick controller** which could control the motion of bot and functionality of a **robotic gripper** to perform different tasks given which includes picking a box and dropping it at particular checkpoints

Thor Hammer | Hobby project July. 2019 – Aug. 2019

One month long summer project

- Constructed an electrical hammer inspired from the one which is present in **MARVEL'S COMICS THOR**
- Used electromagnetics of a solenoid to generate a strong magnetic force between a hammer and metallic surface
- Embedded an **NFC** microchip in a ring so that only a worthy person wearing it will be able to lift the hammer

Autonomous Path Finder | Line following competition Jan. 2019

Robotics comepetition for freshers

- Built an **autonomous robot** that follows a white line track and **designed an IR sensor** to detect white lines
- Coded PID algorithm in the bot, cleared all three stages of the competition, and emerged as 2nd best performer
- Built an advanced version of line following bot and **represented IIT** Bombay in robotics event Robotex India

Home Automation | Arduino Hackathon Oct. 2018

Day-night hackathon organized by electronics and robotics club, IIT Bombay

- Assembled a home automation system to control home appliances like a bulb, fan over the Internet using IoT
- Combined the NodeMCU (WiFi module), relay switch, and android app to bring the project into action
- Took the inspiration from the project to design an user-friendly android app to control lights during festivals

Position of Responsibility

Convener | Electronics and Robotics Club | Institute Technical Council Jul. 2020 – Jul. 2020

- Part of a **17 member** team responsible for **inculcating Tech culture** among the fresh minds of the institute
- Conducted **sessions on Arduino**, **Rpi**, Get Mechanised and Get Electrified for **500+ tech enthusiasts**
- Organized XLR8 competition, club's main flagship event, which saw a rise in the number of participants by **35%** and, a huge success rate of **92%**, and **mentored 150+ teams** in debugging the circuits of their bot
- Organized **hands-on sessions** like Electrified & HowThingsWork to give insight into everyday equipment

Extra-Curricular Activities

- Volunteered in the Smart India hackathon finale hardware edition to cater the hardware requirements of teams
- Visited GMRT (Giant Metrewave Radio Telescope) in Pune,learned how to set up a telescope to observe planets
- Volunteered for 80 hours under the national social service team by planting and maintaining trees of the campus
- Participated in the **XLR8 competition** and made a Bluetooth controlled bot to **tackle the obstacles** and simultaneously worked on a system to show robots status whenever it's going up or down the inclined plane
- Made an **AR glass** using ArudinoMini & OLED display to project data on glass using the **principles of optics**

Key Courses taken

Robotics	Robot kinematics, Robot motion, ROS Localization, Navigation and SLAM
Computer Science	Data structures and algorithms, Computer programming and Utilisation
Miscellaneous	Theory of Machines and Machine Design, Intelligent Feedback and Control