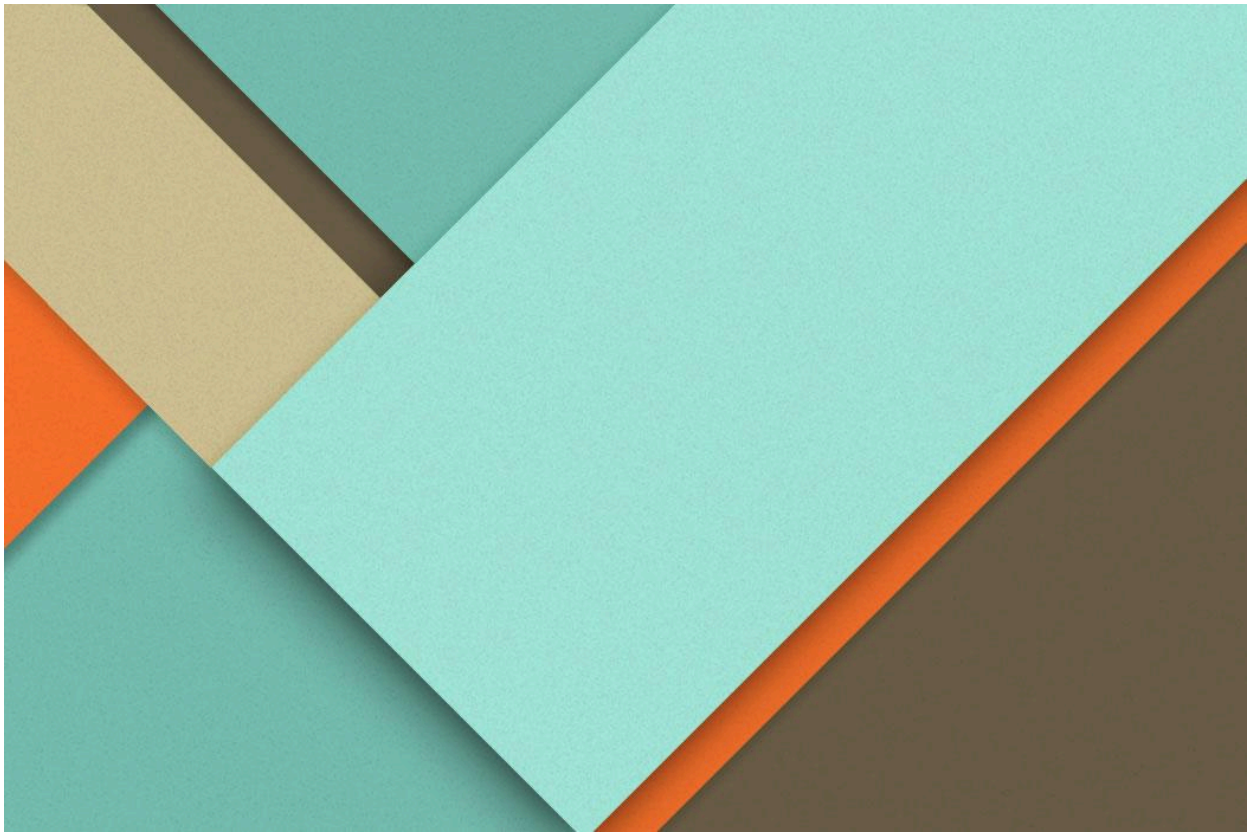


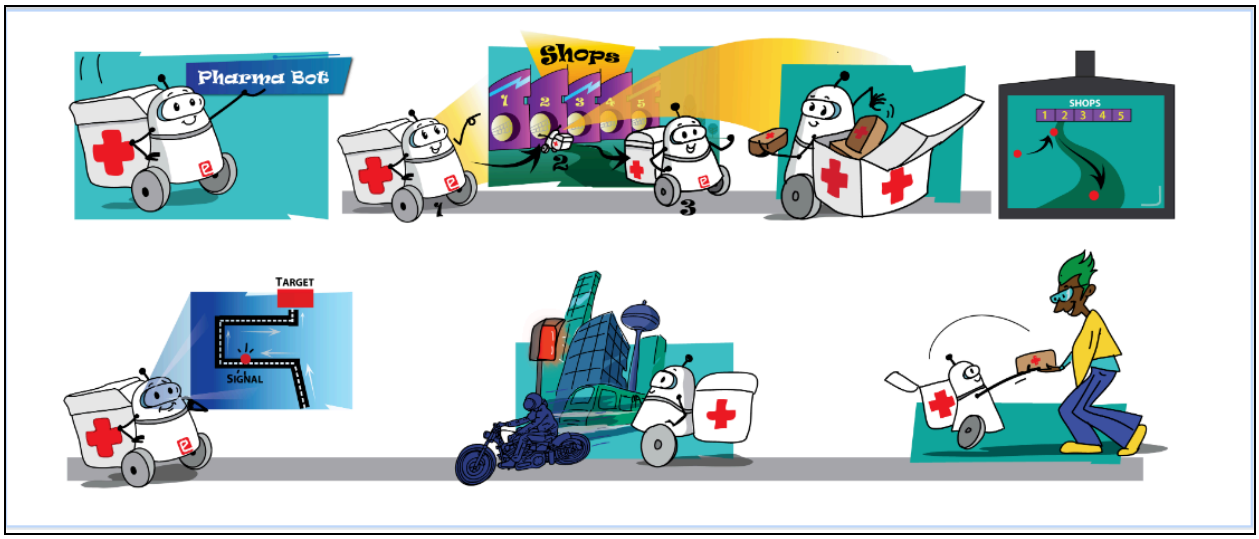
E-yantra Robotic competition IIT-Bombay

Project Timeline :August - January 2022

M JASWANTH KUMAR
2nd year UG
Electronic and Communication Engineering
Indian Institute of Information Technology Kottayam.

Theme: Pharma Bot

A pharma delivery bot which will deliver medicines to the particular location (household where medicine is ordered).



In the "Pharma Bot" theme, we attempt to address this issue by building autonomous delivery robots that "pick up" medicine packets from pharmacies and distribute them across our "Smart city" arena.

Learnings: Image Processing, Line following using Image Processing, Algorithm Building, Robotic Navigation and Localization, Robotic Simulation, Python and Lua programming.

Implementation: Simulator + Hardware based.

Team Members :

1. Leader : Rohit Tanga - ECE
2. M . Jaswanth Kumar - ECE
3. Krishna Babu - CSE
4. Chaithanya - CSE

Goals

1. Take a package from the Location on arena which is detected from the Top camera kept on ceiling .
2. Emulate the following same in Vrep Robotic Simulator
3. Scan the QR code kept at the Location and know the delivery points.
4. Delivery the package to the Correct Location.

Robotic Components :

1. Raspberry Pi 3
2. Sd card/Card reader
3. Alpha bot PCB
4. Stepper motors
5. Pi-cam
6. Hd Vision cam for rear view of Arena
7. DC gear Motors 12v
8. Rechargeable Battery
9. IR photosensor

Implementation:

The different parts of Alpha bot were given and we assembled parts together on our own.
We localized the Robot location and Delivery points and pharma Medicine packets pick up points using Aruco Markers in Arena.
The Arena setup.

- Dimensions of grid should be **182cm x 182cm**

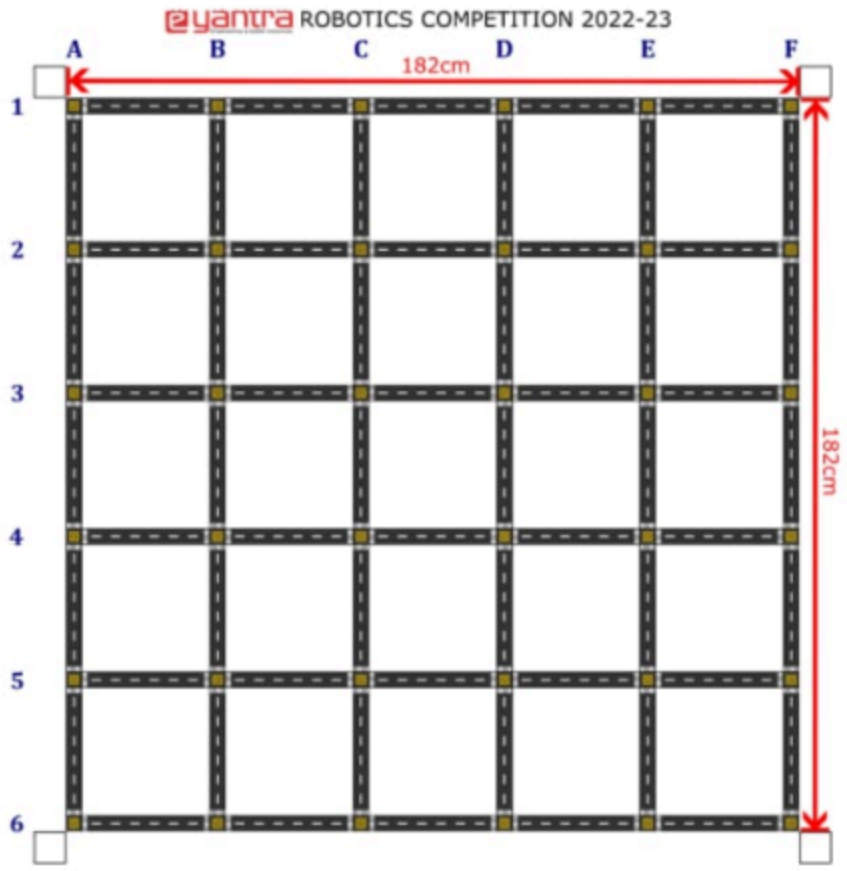
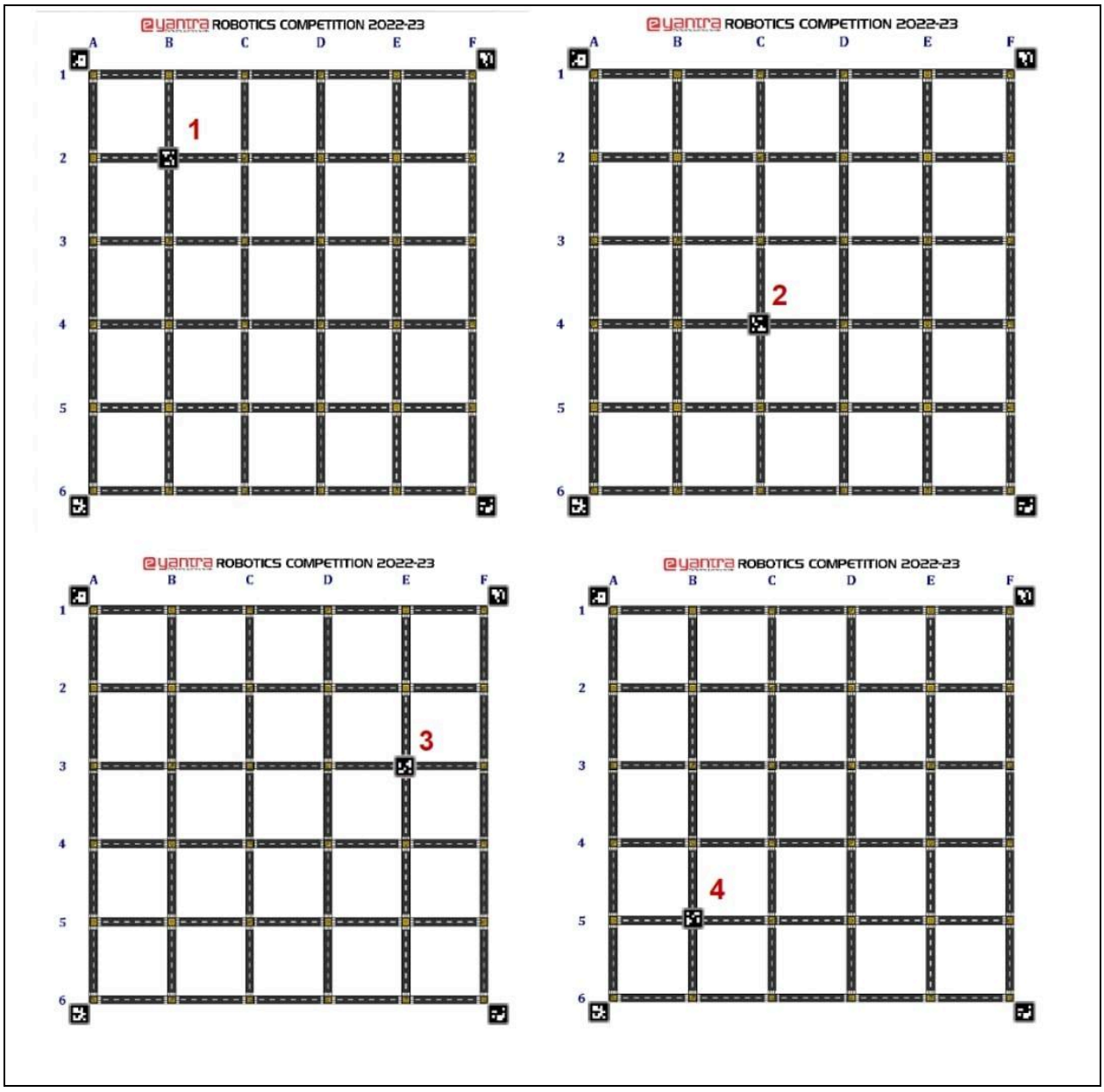


Figure 4: Dimensions of Grid



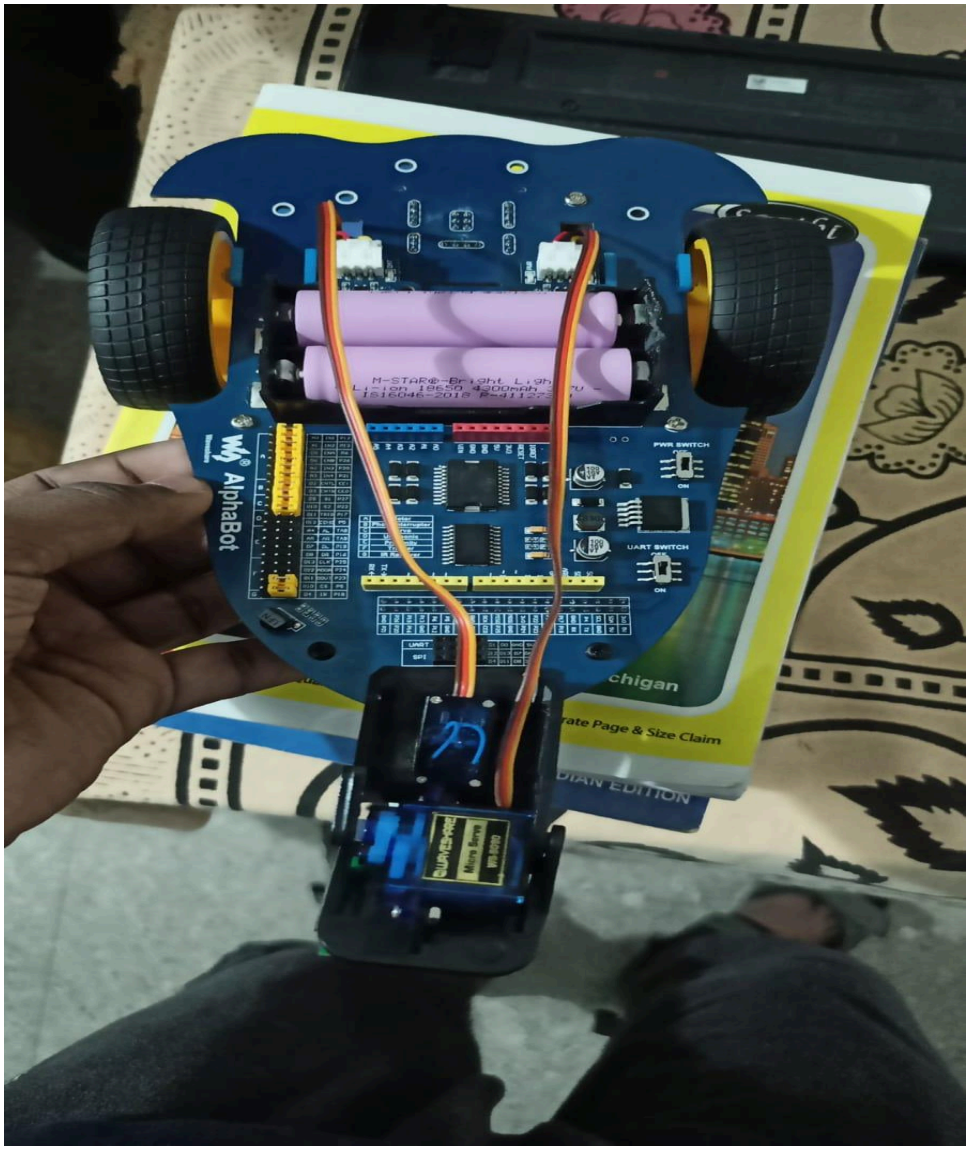
We implemented Line following using Pi-cam and implemented P.I.D controller.

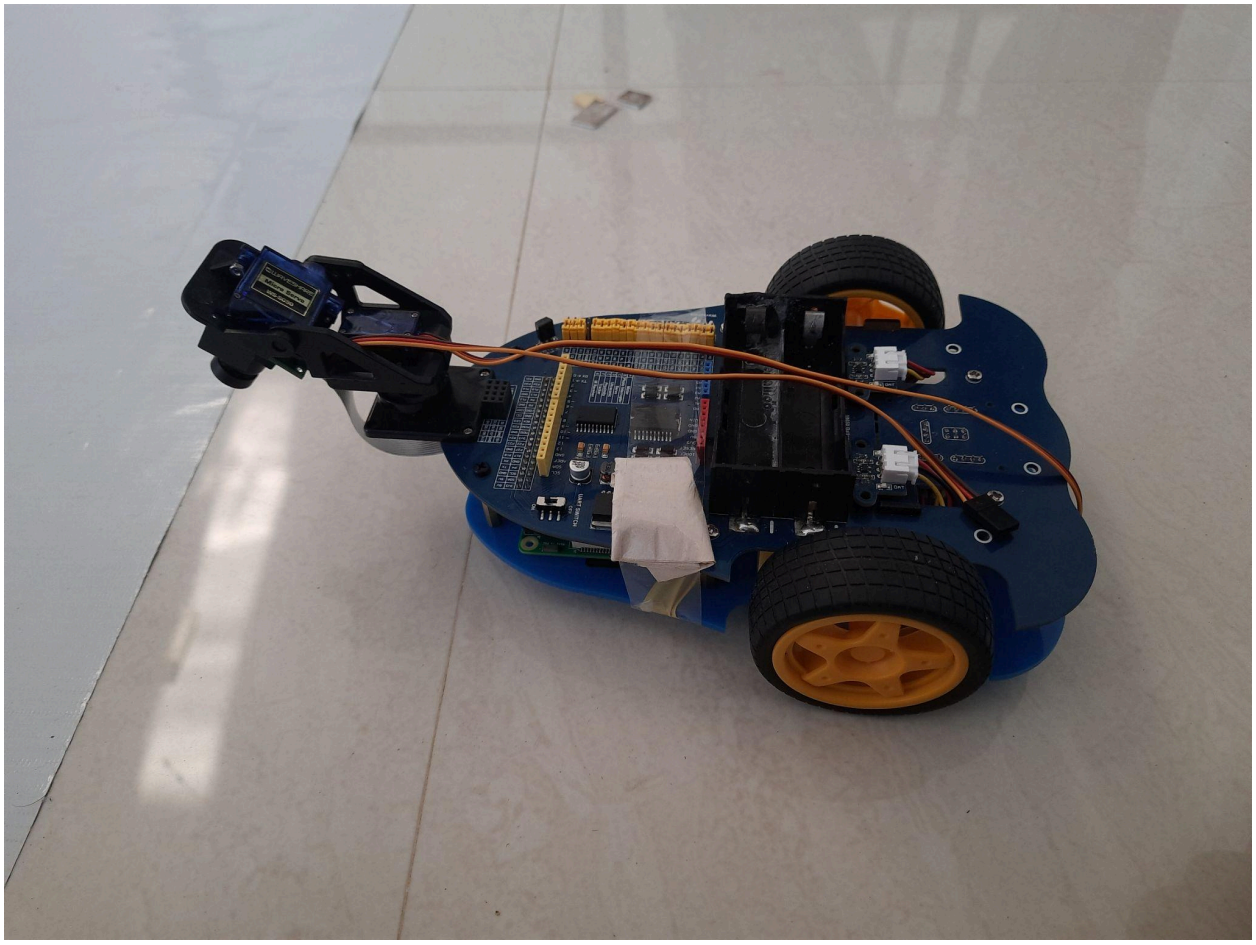
And made turns using PWM and DC motors .

Path planning is done using A* algorithm when the bot is initiated.Using Overhead Camera .

Emulated the same in Coppelia Vrep Robotic Simulator.

ROBOT IMAGES :





MY CONTRIBUTION:

1. wrote the code for Aruco marker detection and Qr detection.
2. Assembling the Alpha bot.
3. P.I.D controller for line following.motors code and encoder code.code for interrupts in raspberry pi also used

socket programming to communicate the commands from the laptop to the Bot.
4.Simulating the Bot,and emulation of the path planning.
5. Debugging the Algorithm code.

Links :

1. **Eyantra Website : e-Yantra Robotics Competition 2022-23**
2. **Github link :**
   https://github.com/jaswanth-coder/eyantra_PB1727/tree/Task3D