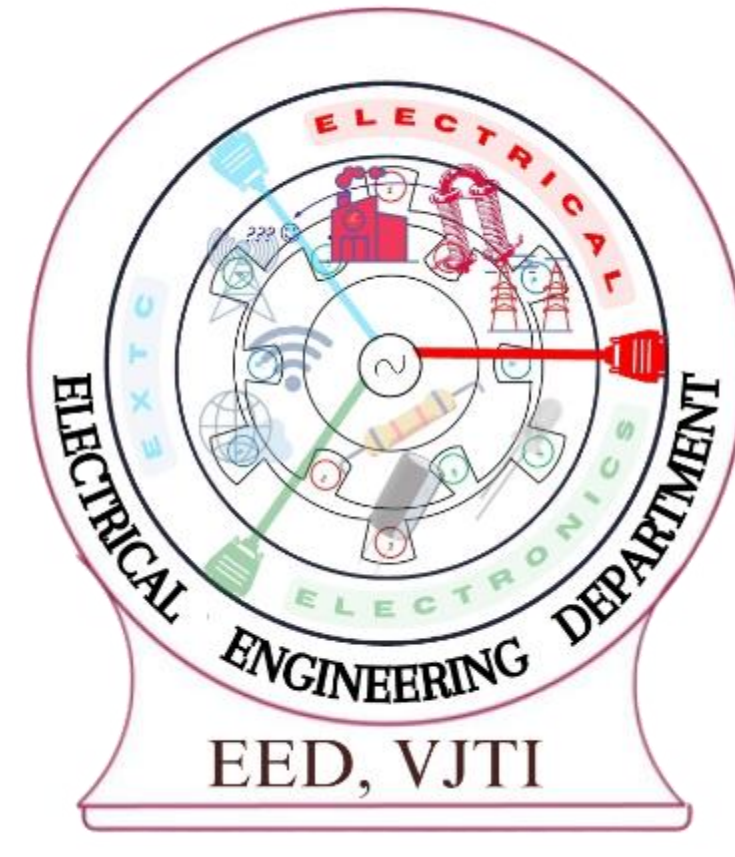# Gesture-Controlled Car Navigation

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Abstract:

- Our project introduces an innovative method for controlling RC cars through **hand gestures**.
- Utilizing **gyroscopic sensors** and microcontrollers like Arduino or ESP32, this system offers seamless navigation.
- It **eliminates the need for traditional remotes**, enhancing user interaction and ease of use.
- Beyond recreational use, it finds **applications in education and assistive technology.**
- Provides hands-on learning experiences and aids individuals with disabilities.
- It has a **user friendly** interface which increases its usability than generic RC Car.
- Highlights the possibilities of **gesture recognition technology** in enhancing accessibility and usability.

Components used:

- ESP 32 - Microprocessor
- L298N Motor Driver
- MPU6050 – Gyro Sensor
- Breadboard
- MM,MF,FF Jumper Wires
- 4 DC Motors (200rpm)
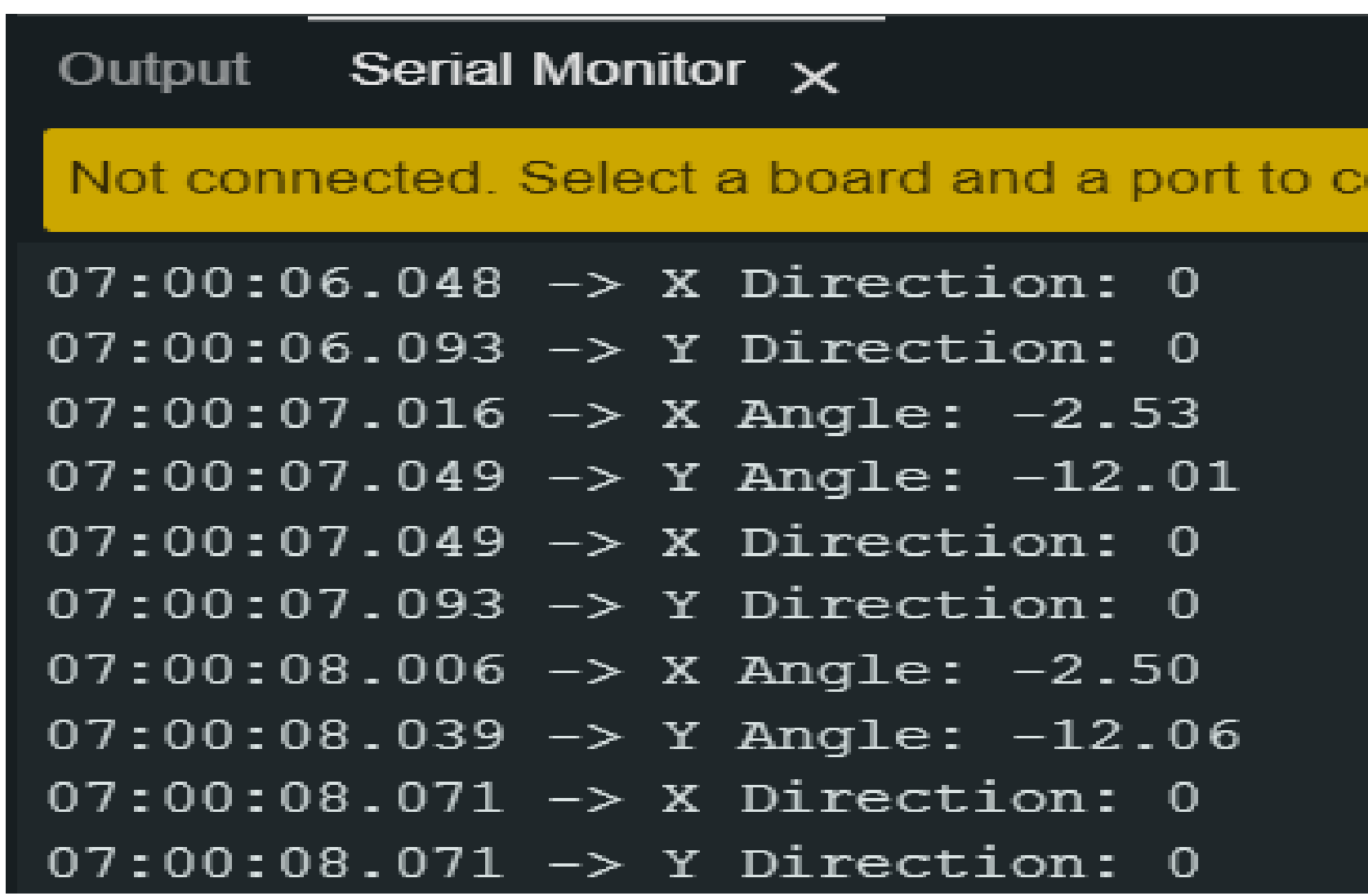- Chassis
- 12V Battery
- Switch

Methodology:

1. Gyro Sensor Integration:
- Connect gyro sensor to microprocessor to give angle and inclination output

2. Microcontroller Processing:
- Use microprocessor to process data from gyro sensor
- Make and algorithm to determine direction of navigation based on gyro sensor output

3. Gesture Recognition:
- Translate recognized algorithm to motor driver

4. Wireless Communication:
- This project can also use ESP32's Bluetooth connectivity , this will be implemented in this project in further iterations.

5. Motor Driver application
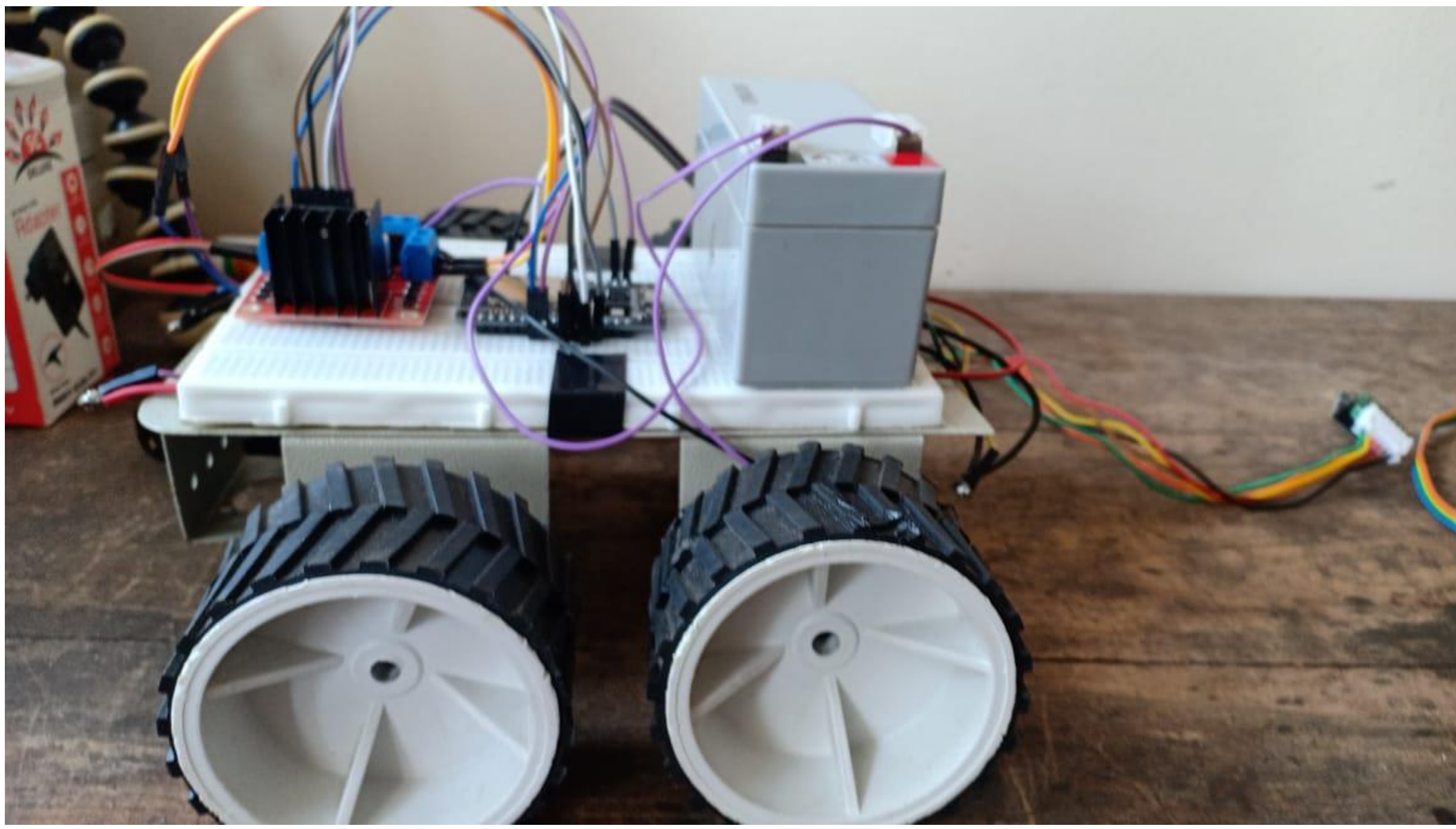- Making use of L298N Motor driver which will ensure seamless navigation

GYRO
MPU6050 → ESP 32 → L298N
Motor Driver → 4 DC Motors
Attached to chassis

12V Battery
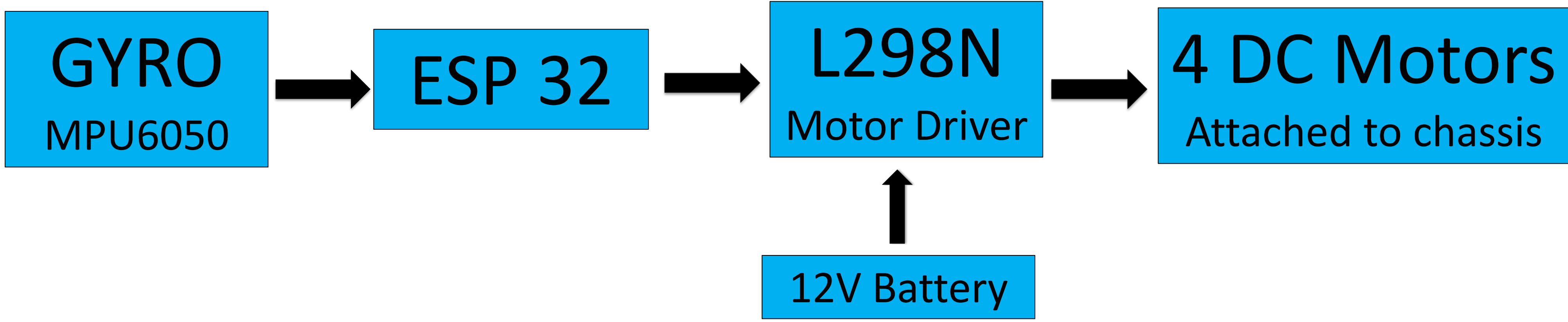
Coding :-
-Read data from MPU6050 in angles
-If angle satisfies the condition for any statement then execute that in loop
-Make outputs for every possible condition

Results:

- Successful implementation of gesture control for RC car.
- Driving experience achieved through navigation with hand gestures.
- Testing ensured responsive and accurate control


```
Output    Serial Monitor  ✕
Not connected. Select a board and a port to c
07:00:06.048 –> X Direction: 0
07:00:06.093 –> Y Direction: 0
07:00:07.016 –> X Angle: –2.53
07:00:07.049 –> Y Angle: –12.01
07:00:07.049 –> X Direction: 0
07:00:07.093 –> Y Direction: 0
07:00:08.006 –> X Angle: –2.50
07:00:08.039 –> Y Angle: –12.06
07:00:08.071 –> X Direction: 0
07:00:08.071 –> Y Direction: 0
```

Output

Final Prototype

Conclusions:

- Demonstrate feasibility and effectiveness of gesture controlled RC car.
- Integrating **Bluetooth** for controlling it remotely
- Opens up new possibilities for simply control system in various applications beyond RC cars.
- Such gyro technology can also be implemented in **drones** and **medical fields** such as **robotic surgery**
- Integration of camera and mapping technology can help in **defense sectors and spying.**

References:

Some concepts were referred online from DroneBotWorkshop for L298N working and websites like MathWorks for MPU6050 code syntax .

Acknowledgement