

# SMART GESTURE CONTROLLED ROBOT

## ➤ INTRODUCTION:

Imagine a robot you can control just by moving your hands – no buttons or controllers needed. That's what a Smart Gesture Controlled Robot does. It's like teaching robots to understand our hand signals, making it easier for us to communicate with them. This cool technology has lots of uses in different areas like hospitals, factories, schools, and even in fun activities. When robots understand our gestures, it makes working with them smoother and more fun for everyone involved.

## ➤ OVERVIEW:

Our main goal is to create a robot (like car model) that responds to our hand movements. Instead of using remote controls, you will be able to drive and navigate the car just by moving your hands in specific ways. This feature adds a new level of interaction and convenience, making the car more fun and easier to use. Imagine feeling like a magician as you control the car's movements with simple gestures!

## ➤ HARDWARE COMPONENTS:

The Smart Gesture Controlled Robot consists of following components:

- 1) Breadboard - x1,
- 2) Arduino UNO - x2,
- 3) MPU6050 Accelerometer - x1,
- 4) HC-05 Bluetooth Module - x4,
- 5) Jumper wires - x30,
- 6) Dc Gear Motor - x4,
- 7) L298N Motor Driver - x1,
- 8) 18650 Lithium - ion rechargeable batteries - x4,
- 9) 18650 Battery Holder – 3 cell - x1; Battery Holder – 1cell - x1,
- 10) Nuts and Bolts,
- 11) On/Off Switch - x1,
- 12) 1K and 2K resistor - x1.

## ➤ HARDWARE DEVELOPMENT:

Our robot's body has a chassis (the frame) with wheels connected to gear motors helping it to move. These motors are connected to L298N motor driver which guides their movements.

Inside the robot, there's a part called NRF24L01 that listens for signals from a special glove we wear. It has an accelerometer (MPU6050) that senses our hand movements. When we move our hand, the accelerometer tells an Arduino in the glove. This Arduino then talks to the NRF24L01 part, sending messages to the robot without wires.

The brain of our robot is Arduino UNO. It listens to messages from NRF24L01 and controls the motor driver, making the wheels spin and the robot move where we want, all with hand gestures.

We also use things like a breadboard (for neat connections), HC - 05 Bluetooth parts (for glove-robot communication), jumper wires. They work together smoothly, powered by 18650 lithium-ion rechargeable batteries in both glove and the robot, letting us control the robot easily with hand movements!

#### ➤ **SOFTWARE DEVELOPMENT:**

Our algorithm captures how your hand moves using accelerometer on the glove. It recognizes gestures like moving up, down, left, or right. Once the gestures are recognized, we mapped them to corresponding actions for the car's motion. This mapping was done using motor control algorithms that translate gesture inputs into signals for the motor driver, which controls the motors attached to the car's wheels. We added a Bluetooth module for wireless control. The glove talks to the car through Bluetooth, sending gestures as commands. Simply put, our software reads your hand signals and tells the car what to do, without wires!

#### ➤ **CONCLUSION:**

In summary, we made a robot that follows hand gestures. This can be used for remote control cars, smart machines in factories, and helping people who can't move easily. We want to make it even better at understanding gestures. Our project shows how cool gesture control can be and opens doors for future innovations in this field.

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