# AMBEDKAR INSTITUTE OF TECHNOLOGY

## MAJOR PROJECT

### A PRESENTATION ON HANDS-FREE MOUSE


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# ABOUT THE PROJECT

The project, **Hands-Free Mouse**, is a microcontroller board with sensors on the top of a hat/cap. It uses Arduino Uno R3 board. It works as a standard Bluetooth mouse.

# MOTIVATION

- The basic motivation behind this project is to make technology accessible to differently-abled individuals.
- Recent years have seen a massive boom in the information and communication technology as it becomes increasingly affordable and accessible to the general public. To make available the benefits to each and every individual regardless of their capabilities for the collective upliftment of the society.
- The ‘Hands- Free Cursor Control’ is an instrument and an effort by us to make computer operation more accessible to the persons of disability.

# METHODOLOGY

It works by reading accelerometer, gyroscope and magnetometer data, puts it through a sensor fusion algorithm to get orientation and then uses the yaw and pitch values to position the mouse cursor on the screen. It uses absolute cursor positioning instead of the most common relative mode, hence the custom HID report descriptor.

# COMPONENTS

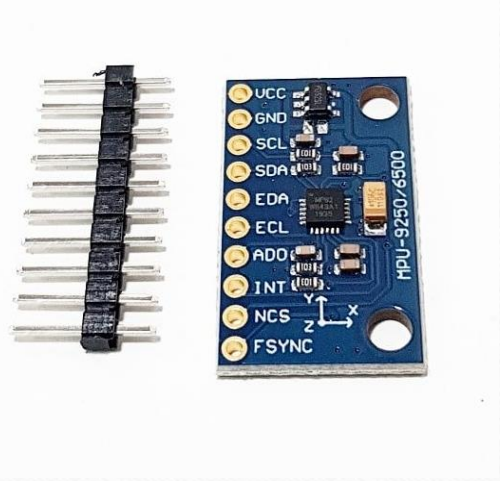
- Arduino UNO R3
- IMU sensor (MPU 9250)
- HC05 Bluetooth Module
- Breadboard
- Resistors (22k ohm & 10k ohm)
- Micro Switches

# ARDUINO UNO R3

The Arduino Uno is an open- source microcontroller circuit board based on the Microchip ATmega328P. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE, via a type B USB cable It can be powered by the USB cable or by an external 9-volt battery.

# IMU SENSORS

The IMU sensor is an electronic device used to calculate and reports an exact force of body, angular rate as well as the direction of the body, which can be achieved by using a blend of 3 sensors like Gyroscope, Magnetometer, and Accelerometer.

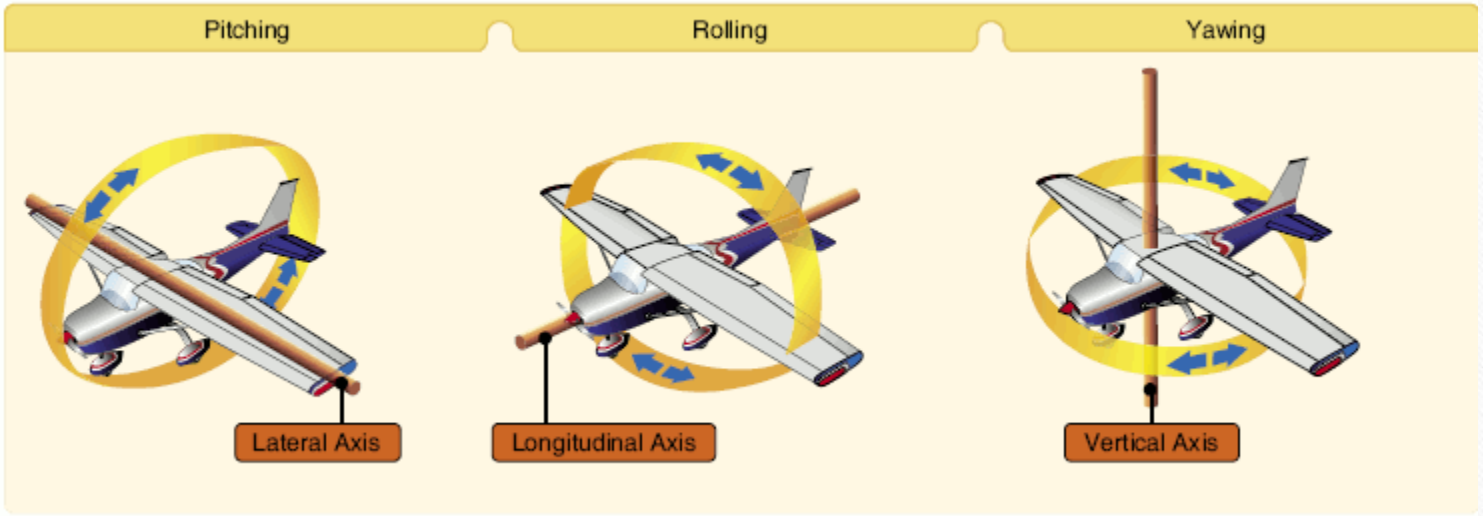


# THE MPU 9250

MPU9250 has an accelerometer ,gyroscope and a magnetometer. This MPU has 16bit registers for each sensor that is accelerometer ,gyroscope, magnetometer. They store the data from the sensors and the data is transmitted over I2C serially.

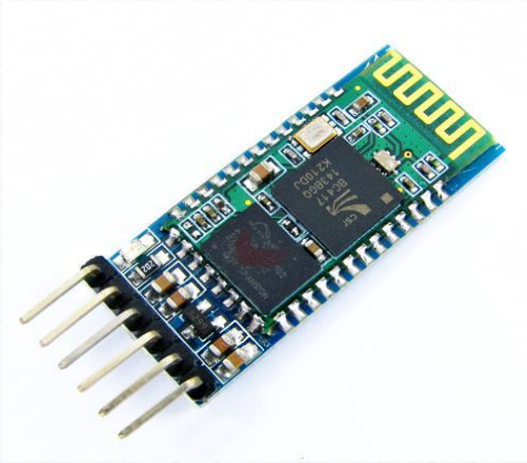
The things that we can get from a processed MPU9250's raw readings are:

1. Yaw Angle
2. Pitch Angle
3. Roll Angle



# THE HC-05 BLUETOOTH MODULE

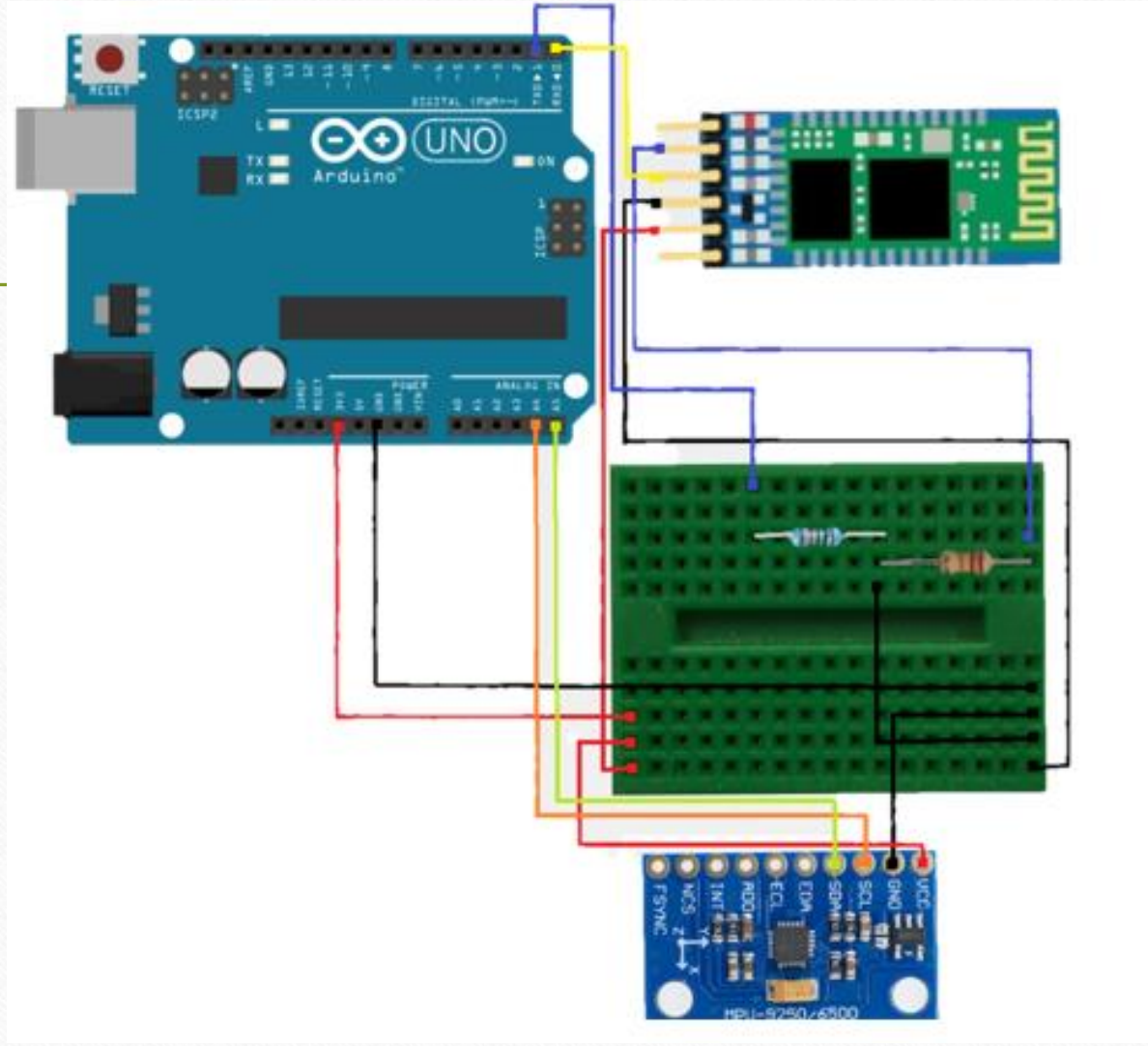
HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration. It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART).

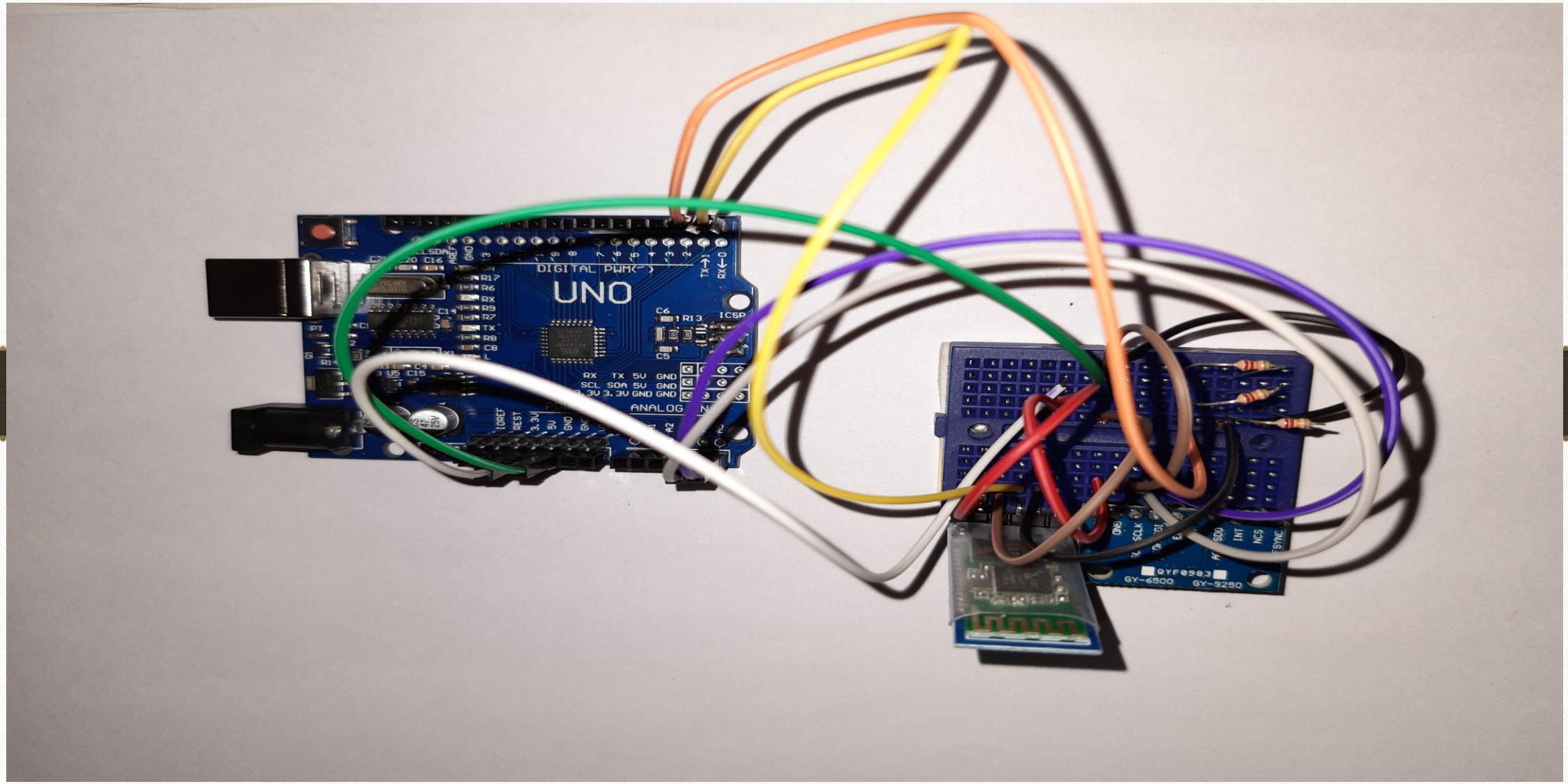


# APPLICATIONS

- Replacing mouse to make computer- operation more accessible to differently abled
- In gesture- controlled home- automation systems
- As a pointing device in virtual- reality environments, e.g., VR games
- Making computers more adapted and integrated to the natural environment

# CIRCUIT DIAGRAM




UNO
DIGITAL PWM~
ANALOG IN
GY-6500
GY-9250

# THANKYOU