Air Mouse

TINKERING PROJECT

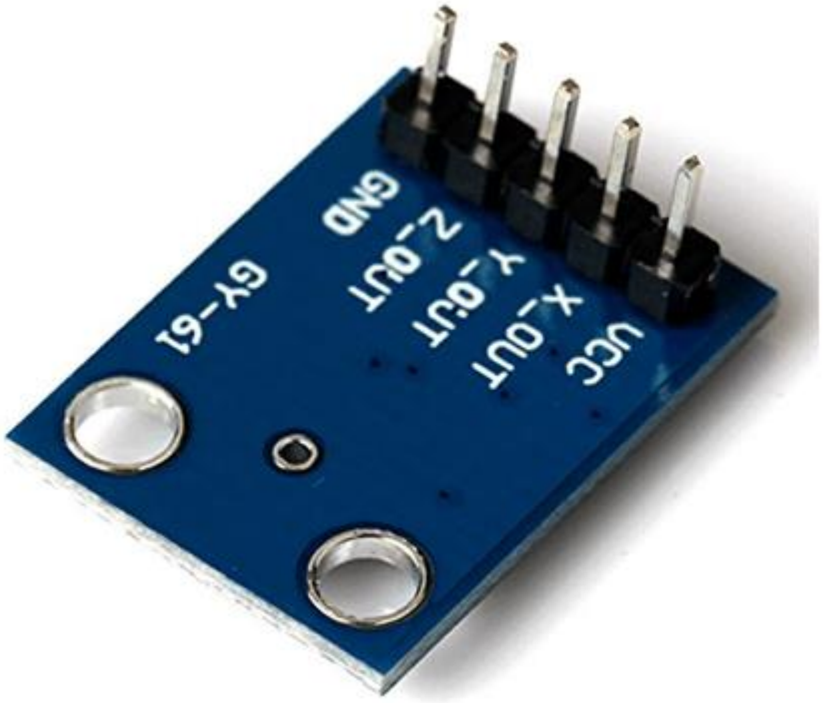
-PG-20

About our project

- The Air Mouse is a wireless pointing device that allows users to control their computer or other compatible devices with hand gestures.
- It is designed to provide a more intuitive and natural way of interacting with technology, making it easier to navigate and control your devices.

Components used

Accelometer



Arduino UNO

Components used

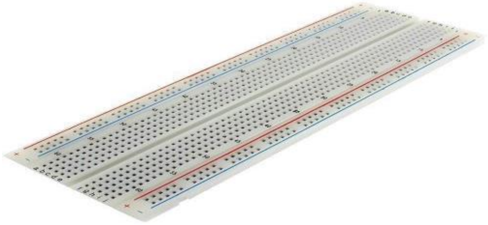
Push Buttons

LED

Resistor

Jumper Wires

Bread board



About some Components

Accelometer

- ❑ An accelerometer is a device that measures the vibration, or acceleration of a motion of a structure.

Push Buttons

- ❑ Pushbuttons are used here for lift and right click, trigger and mode.

Arduino UNO

- ❑ Arduino UNO is a microcontroller board based on the ATmega328P.

LED

- ❑ LEDs were used to check if the push buttons are working as required.

Working Principle

- Unlike a normal mouse which scans a surface (Usually your desk) and detects motion that way, an Air Mouse detects motion through, you guessed it, the air!

- Using a accelerometer system that measures changes in angle, rotation and position an Air Mouse can transfer simple gestures into mouse movements.

Hardware Implementation

- Arduino uno reads out the accelerometer readings through analog pins.

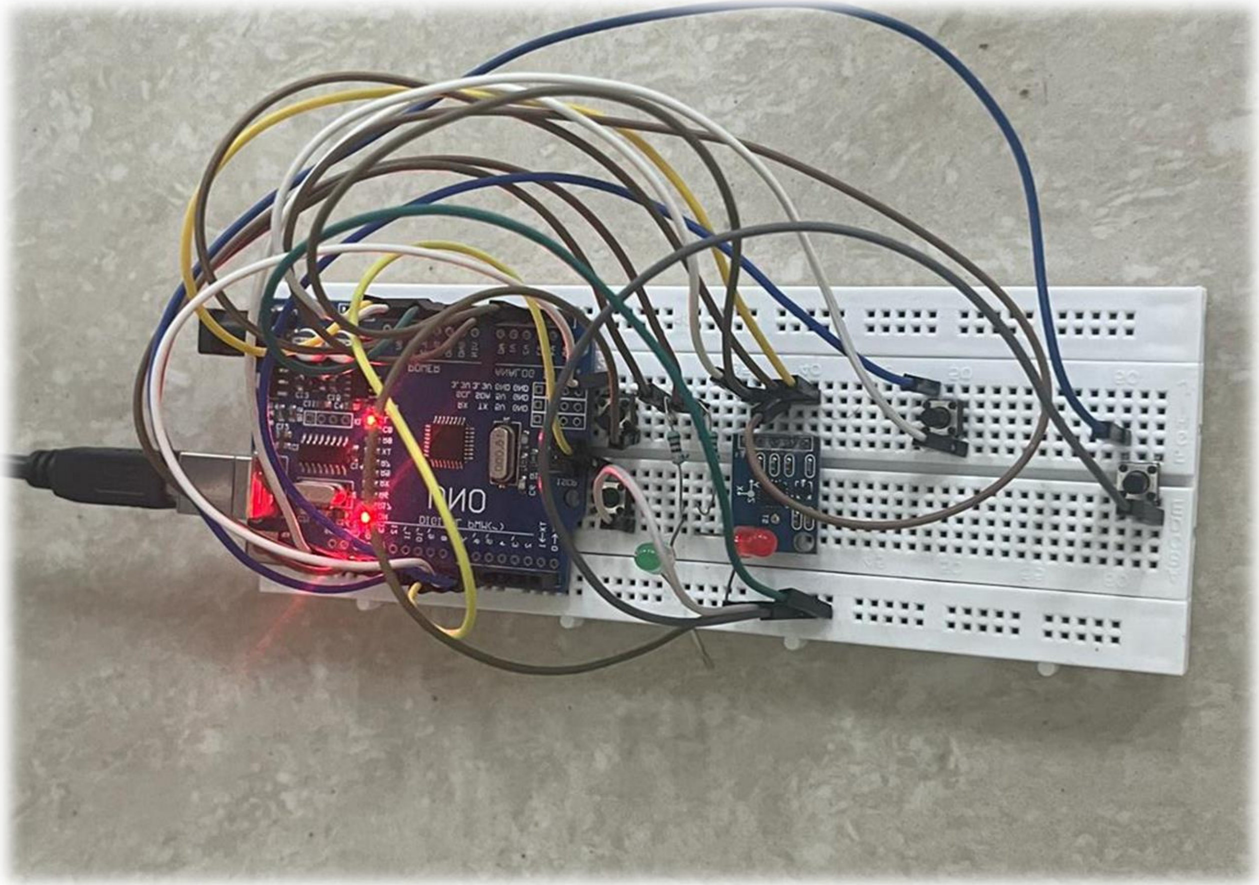
- Accelerometer readings were used for calculating roll & pitch values.

- Push buttons were used for trigger, toggle, left click & right click.

Software Implementation

- Arduino code appropriately maps the roll & pitch values to the cursor movements.
- Arduino code programs the push buttons to operate in different modes.
- Python driver script establishes the connection between Cursor & Arduino.
- Library Used:
  - Arduino – Math.h
  - Python – Serial, Pyautogui

Circuit



Challenges Faced

- The components used weren’t the ideal one.
- Control & smooth motion of cursor.
- Software implementation.

Solutions

- We use roll & pitch values for optimal utilisation of given accelerometer.

- Adjusting the time interval between any two movements & mapping of optimal values.

- Uses of python driver script.

What’s Different !

- Implementing the concept Roll & pitch.

- Toggle between different modes
  - Trigger mode
  - Drag mode

Implementation on a Large Scale

- Buttons can be improved

- Better packaging

- Reducing the production cost
  - Large scale manufacturing
  - Using PCB’s for wiring

Further Refinements

- We can use a 6-axis accelerometer and a gyroscope for smooth movements.

- Using the concept of Quaternions.

- We can install a Bluetooth module to make it wireless.