AIR MOUSE
MOTION SENSOR

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Introduction:

Nowadays wireless devices have become very popular. The advancement in the field of wireless technology made it possible for more innovation in many applications. Gesture recognition technology is used to identify the human hand movements. Gesture recognition technology identifies the human movements through mathematical representation. Gesture recognition technology has various applications.

Air mouse uses both wireless technology and gesture recognition system. Air mouse is increasingly being used for navigation purposes in smart TVs. Most Smart TVs come with air mouse remotes. In this project we have designed a simple air mouse using Arduino nano board.

Objective:

The aim of our project is to design an air mouse which does not require a mousepad , but tracts the hand movements. Here we are using Accelerometer to get the value of the coordinates and using the x and y coordinates we have make the mouse pointer move.

Hardware and software requirements

- Arduino Nano
- Accelerometer ADXL335 Module
- Bluetooth HC-05 Module
- Push buttons
- Arduino IDE

Features of accelerometer ADXL335 Module:

- 3-axis sensing
- Small, low-profile package
- 4 mm × 4 mm × 1.45 mm LFCSP
- Low power - 350 μA (typical)
- Single-supply operation
- 1.8 V to 3.6 V
- 10,000 g shock survival
- Excellent temperature stability
- BW adjustment with a single capacitor per axis
- RoHS/WEEE lead-free compliant

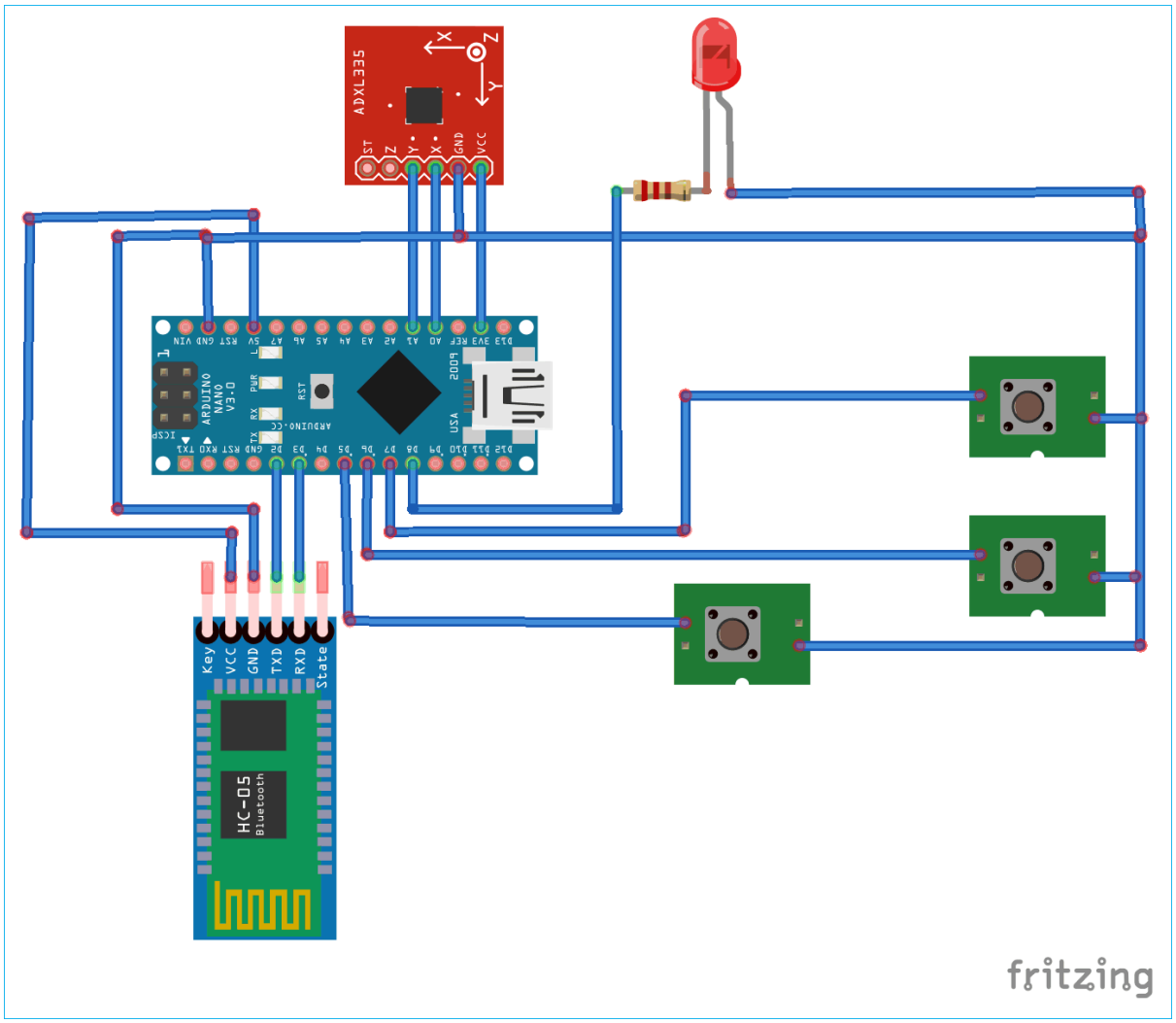
Working principle of accelerometer ADXL335 Module:

This accelerometer is a device that is used for measuring acceleration of any object. It measures the acceleration in the form of analog inputs, in three-dimension direction such as X, Y and Z. It is low noise and less power consume device. When it is used for acceleration measure purposes then it is interfaced with any type of controller such as microcontroller or Arduino etc. It is mostly used in construction working machines such as drilling, driving piles and demolition etc., human activities machines such running, walking, dancing and skipping etc.

Applications:

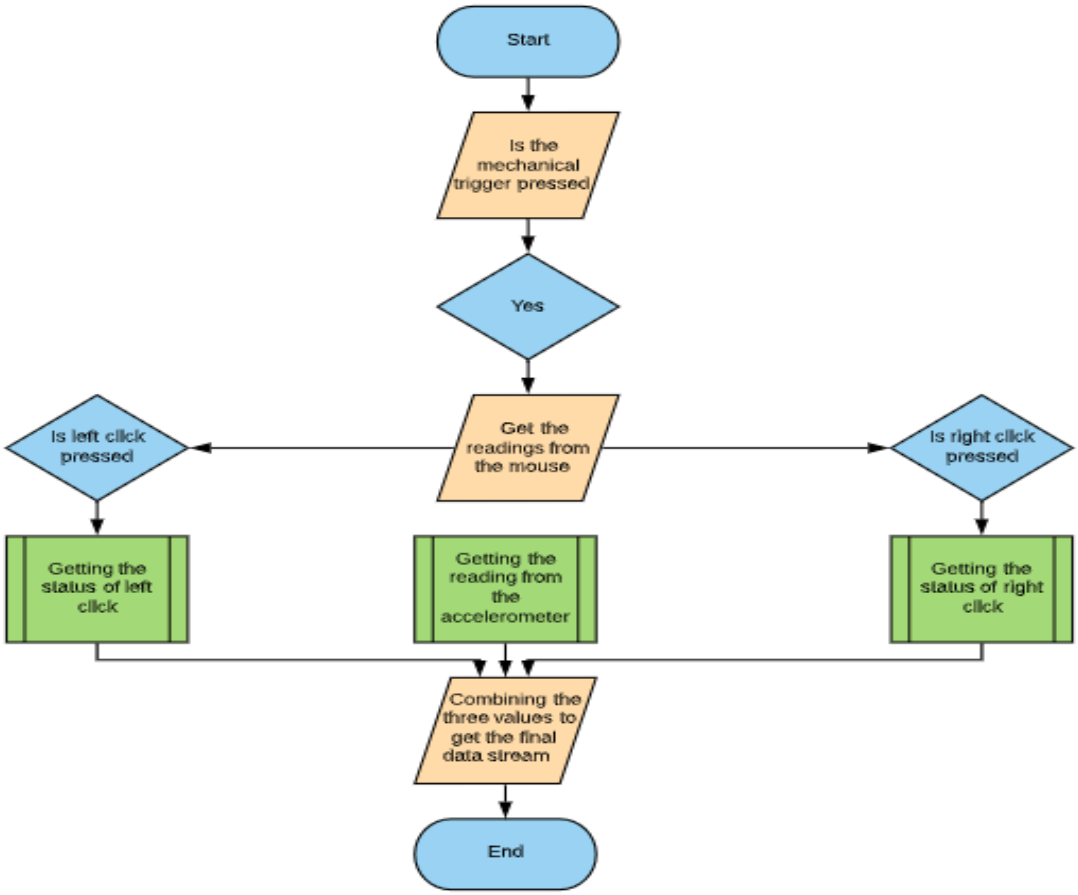
- Cost-sensitive
- low power
- motion- and tilt-sensing

Circuit Diagram:



Implementation:

Work flow:



1. The system continuously checks for the mechanical trigger to be pressed until it is not pressed, we can work out normally with the computers mouse.

2. When the system detects button press, the control for the mouse transferred to the air mouse.

3. As the trigger button is pressed the system starts to transfer the readings of the mouse to the computer. The system reading consists of the accelerometer readings, and the readings for the left and right click.

4. The system readings consist of the data stream of 1 byte or 8 bits, in which the first three bits consist of the X-coordinates, second three bits consist of the Y-coordinates, the second last bit is the status bit for getting the status of the left click of the mouse and the last bit is the status bit for getting the status of the right click.

5. X-coordinates and Y-coordinates can range according to system. The values for the right click and left click are the binary values either 0 or 1 in which 1 indicates the click is made and 0 that click is not made by the user.

6. To not let the bouncing of the button affect the position of the cursor a known delay of 4 seconds is kept after every click of the trigger button of the mouse.
7. For the right and left click in the air mouse, we have to first press either left or right pushbutton, and after that, we have to press the trigger button to move to the position of the air mouse where we want.

Applications of Air mouse:

- Easy to control
- Better for gaming
- This can be used in virtual reality and augmented reality
- It can aid differently abled people
- It eases the navigation in smart TV's

Code:

```
#include <SoftwareSerial.h>
#include <Mouse.h>
const int rxpin = 2, txpin = 3;
SoftwareSerial bluetooth(rxpin, txpin);
const int x=A0;
const int y=A1;
int xh, yh;
int xcord, ycord;
const int trigger = 5;
int lstate = 0;
int rstate = 0;
const int lclick = 6;
const int rclick = 7;
const int led = 8;
void setup()
{
  pinMode(x,INPUT);
  pinMode(y,INPUT);
  pinMode(trigger,INPUT_PULLUP);
  pinMode(lclick,INPUT);
  pinMode(rclick,INPUT);
  pinMode(led, OUTPUT);
  digitalWrite(lclick,HIGH);
  digitalWrite(rclick,HIGH);
  Mouse.begin();
  Serial.begin(9600);
  bluetooth.begin(9600);
}
   void loop(){
```

```
  digitalWrite(led,LOW);
  while(digitalRead(trigger)==LOW)
  {
   digitalWrite(led, HIGH);
   lstate = digitalRead(lclick);
   rstate = digitalRead(rclick);
   xh=analogRead(x);
   yh=analogRead(y); xcord=map(xh,286,429,100,999);
   ycord=map(yh,282,427,100,800);
   Serial.print(xcord);
   Serial.print(ycord);
if ((lstate == LOW)||(rstate == LOW))
     Mouse.move(xcord, ycord, 0);

   if (lstate == LOW)
     Serial.print(1);
     bluetooth.print(1);
   else
     Serial.print(0);
     bluetooth.print(0);
     Mouse.click(MOUSE_LEFT);
     if (rstate == LOW)
     Serial.print(1);
     bluetooth.print(1);
    else
     Serial.print(0);
     bluetooth.print(0);  Mouse.click(MOUSE_RIGHT);
     bluetooth.print(xcord);
   bluetooth.print(ycord);
   delay(4000);
  }
}
```

Output:

In this project output is shown in our screen as the mouse movement. The pointer moves according to the change in x and y coordinates of our sensor. It also does left click when left push button is pressed and does right click when right push button is pressed. It also gives the state of the device whether it is on or off.