MY MOVE

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***Abstract*—The project MY-MOVE(Move Your Mouse Without Engaging) helps us to move our old mouse with our hand gestures. As the name suggests it helps to control the cursor using the movement of our arm. The project uses gyro sensors and RF trasmission for data transfer. MY-MOVE could be a great help toward the society which could decrease common problems of Carpal tissues and could enable the physically disabled section to get familiar to the modern technology**

I. Components Used

A. MPU6050

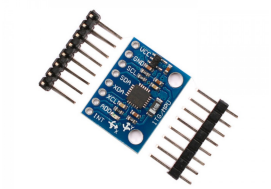

Fig.1 MPU6050 Gyro

MPU-6050 sensor contains MEMS accelerometer and gyroscope in same chip. It captures acceleration and angular velocity components simultaneously in the three dimensional axes. It is very accurate, since it contains 16- bits analog to digital conversion hardware for each channel. This sensor interfaces with Arduino using 12-C bus. In our project this sensor is used to measure the angle of our hand movement. The sensor calculates the angle of tilt whose snipet is given below.

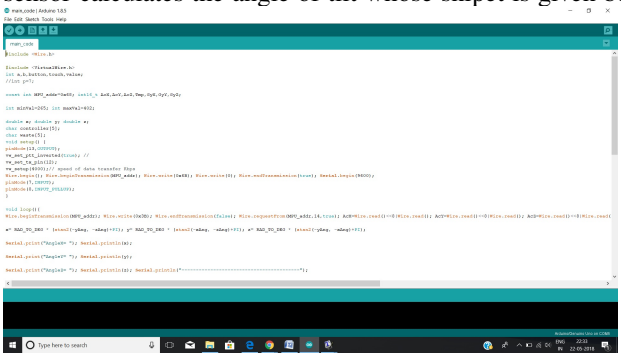

Fig.2 Code Snipet

B. RF Transmitter

Fig.3 RF

It works on based radio frequency transmission technology (wireless form of communication). It contains a transmitter and a receiver. The transmitter sends series of data it receives to the receiver through its antenna. The transmitter/receiver pair operates 434 MHZ frequency.

1) R: F Receiver Specifications-

- Operating Voltage(DC)- 5V.
- Current(Static)- 4 mA
- Receivers frequency- 434 MHz

2) R: F Transmitter Specifications

- Operating voltage(DC)- 5-12V .
- Operation frequency- 434 MHz.
- Current (Standby)- 10 mA.
- Operation current- 20-28 mA.
- Output Power- 16 dBm.
- Mode of modulation- ASK (Amplitude shift keying)
- Operation Temperature- -10 +70.

C. Arduino

Fig.4 Arduino Uno

Arduino UNO is an open source microcontroller board which is developed by Arduino CC. It works with the help of ATmega328P microcontroller. It contains various sets of digital and analog input/output (I/O) pins which can be used in connecting various expansion boards and other circuits. The

board contains 6 analog and 14 digital pins.In our project we have used two arduino, one for transmitting other for receiving,

D. Touch Sensor

Fig.5 Touch Sensor

Touch Sensor is a sensor which works based on human touch. The main principle behind its working is that when we touch it the sensor plate and our body forms a capacitor and gets charged. The Arduino measures how much is the capacitance based on the charge.

E. Motor Driver

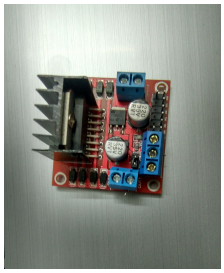

Fig.6 Motor Driver

The motor driver is used to control the speed and direction of the motors. We can control two motors simultaneously using the above motor driver.

F. Breadboard

Bread Board is a device used to provide a base to the electronic circuit. These can be used while making/testing a circuit. Bread Board is solderless, hence it is reusable.

G. Servo Motor

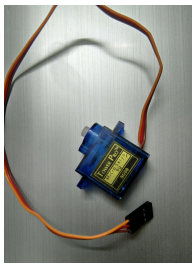

Fig.7 Servo Motor

A servo motor works on position feedback with a rotary or linear actuator. A sensor is connected to the motor to control the precise angle to be rotated or the velocity and acceleration of the device to be moved. In this project a rotary actuator rotates with its angle set when touch sensor is touched. The digital input rotates the shaft as output.

II. Libraries Used

- Virtualwire.h
- MPU6050.h
- Servotimer2.h

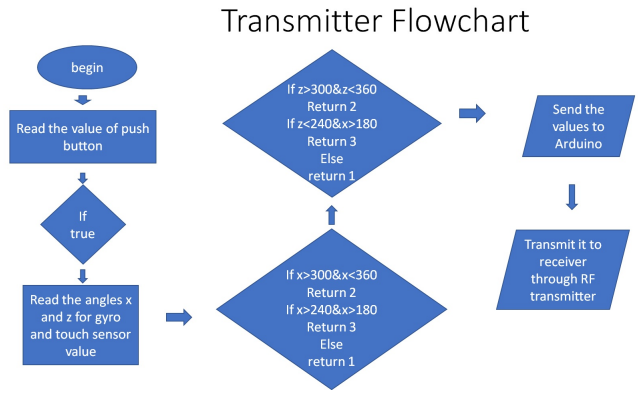

Fig.8 Transmitter Flowchart(code wise)

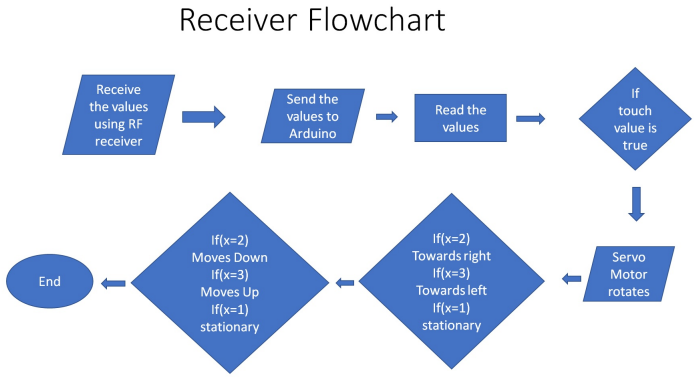

Fig.9 Receiver Flowchart(code wise)

III. Working

A wireless hand mouse is designed which controls the cursor with different hand gestures and finger pressers. The key component in the model is the accelerometer sensor which receives the input data with different hand orientations.

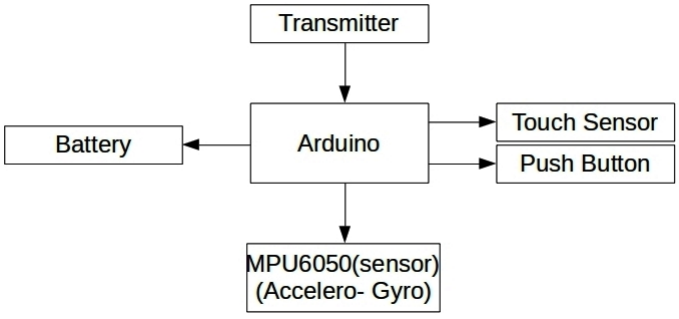

Fig.10 Transmitter Flowchart

A. Hand Glove unit

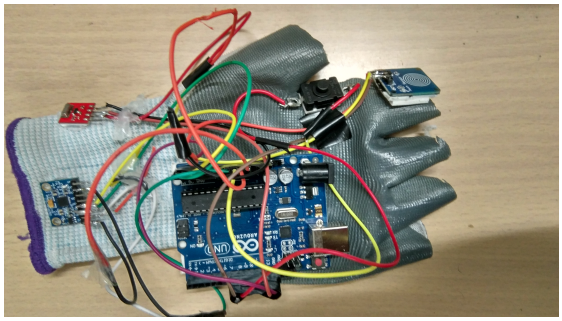

Fig.11 Glove

Push button is used to on/off the control of cursor. MPU6050 gyro+accelero sensor is fixed to the wrist. The orientation of wrist changes the motion of the cursor. This device measures the angle deviated from the x-axis, y-axis and z-axis. These angles are the input and the cursor moves according to these angles. A touch sensor is fixed on a finger to be able to be touched by the thumb. This device is responsible for the click by the cursor. All these input data is fed to the arduino and is accordingly transmitted to another arduino using RF transmitter .

B. Hand Movement

Different directions of hand movements results in the motion of the cursor in the respective directions as output. The mean position of the hand is fixed in the horizontal direction with proper orietation. On moving the hand up and down in the midair, the cursor accordingly runs up and down on the diaplay. With the movement of wrist along x -z plane in clockwise direction, the cursor moves towards right and vice versa.

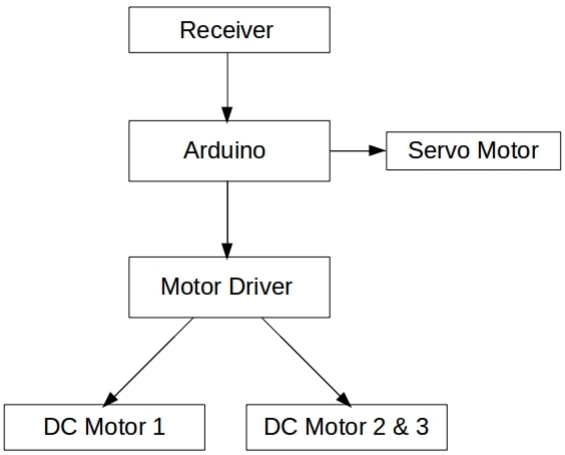

Fig.12 Receiver Flowchart

C. Mouse Movement

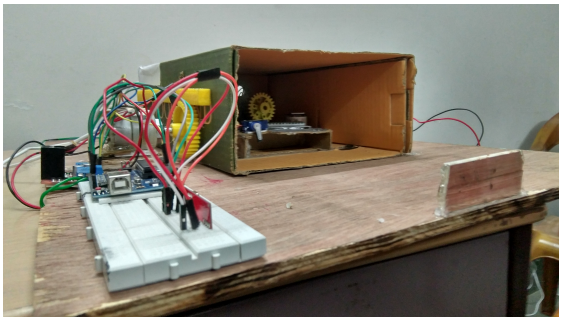

Fig.13 Prototype

RF receiver collects the data from the trasmitter and is fed to arduino. Analyzing the data, the motor moves accordingly up/down and sideways. The L298 motor driver is used to turn the low-current signal to a high-current signal which drives the motor with controllable speed. The motion of the wireless mouse placed inside this receiving unit is controlled through these motors. Servo motor clicks the mouse with its rotatory motion and is accordingly positioned on the mouse. The motors fixed, rotate pinion and results in the linear motion of the rack.

D. Cursor on the display

With the motion of the mouse and clicks due to servo motor, the cursor moves accordingly on the display and clicks whenever touched. Sensivity of the cursor movement is determined by DIP switch. With high sensitivity, the cursor speed reasonably slows down and gives a better output.

IV. MOTIVATION BEHIND THE PROJECT

The main motivation behind the project was to decrease the number of cases of **Carpal Tunnel Syndrome** which are about 10 million every year only in India. The syndrome causes pain and numbness in the palm and is prominent in today's generation of coding and computer. The second major issue that we focussed was the utility of computer moiuse for physically handicapped people with amputated hand. The model has been made for the usage of person with amputated hand as the main sensor is being placed on the forelimb.

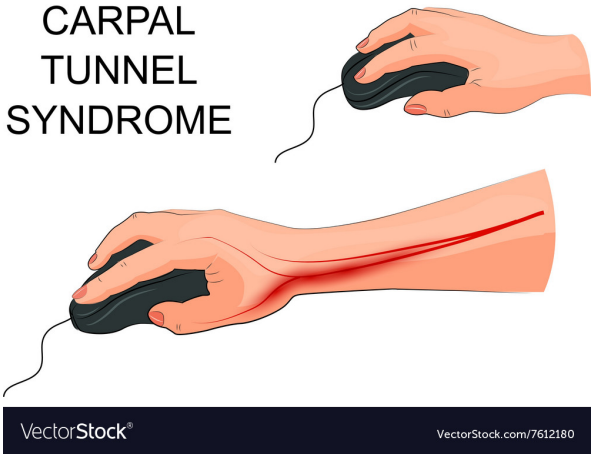

Fig.14-Carpal Tunel Syndrome

V. RESULT

The new way of controlling mouse has been implemented and following were the outcomes:-

- One could control the movement of the cursor using tilt of the forlimb.
- This model can also help to click the mouse with the help of touch sensor.
- Even people without a palm will be able to use a mouse.
- Carple Tunnel Syndrome can be controlled with our mouse.

VI. CONCLUSION

Finally, we have learnt a lot about the RF transmission and gyro sensor. The final outcome fulfills our expectation to a large extent. The gyro sensors send data through RF flawlessly and give us desired reult in movement of the mouse.

VII. ACKNOWLEDGEMENT

I really appreciate the uncountable effort of our mentor Mr. Kushagra Singhal (Tech. Sec) for his time and valuable suggestions, along with his brilliant knowledge regarding the equipments. I also want to thank Dr. Hitesh Shrimali (SNTC) and Dr.Kunal Ghosh for creating such an amazing platform for us in 1st year which helped us to improve our knowledge.

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