**Motion Control Mouse for Assistive Technology**

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***Abstract: In modern era, human’s interaction with computer increase drastically as computers are being use for daily work. Physically disable people find it difficult to operate computer with disabilities. The “Motion Control Mouse” system has been developed to provide computer access for the people with serve disabilities. The proposed system is developed with the integration of gyroscope (MPU-6050) sensor with the Arduino. It tracks the movement of user and maps the orientation into the cursor coordinates. The system can be attached to user’s head or suitable place where the motion can be generated. Its device uses the gyroscopic orientation values to map the coordinates of mouse cursor on desktop. Arduino communicates with the computer serially with the baud rate of 9600 to fetch the coordinates generated by the user’s motion.***

***Keywords: Arduino, MPU-6050, gyroscope, baud rate***

I.INTRODUCTION

In the world of doing everything fast humans shifts to advance technologies for their day-to-day work. Computer is one of the technologies. Large population around the world is using computer for their intensive task as computers serves to perform various tasks with more speed. Then controlling of computer is an important part in human-computer interaction. The credit of controlling part of computer goes to mouse. Mouse helps in performing different action on computer screen and helps humans to handle computers smoothly. This is not same with the person with disabilities as in many types of disabilities people loose the ability to move certain parts of their body including hands. In such situation those special people find it difficult to interact with computer and so can’t perform their work using computers. To solve this problem this paper discuss the system which will help the people with disabilities or people who were not able to interact with computers because of their disability. Without getting restricted to hand motion to control the mouse, motion of any part of the body or any external motion can be used to control the mouse movement. This system will erase the use of traditionally use table mouse to control mouse’s cursor movement. This system enable the user to control the mouse from 3D space which was not possible using traditional table mouse. This give an edge to disable people for not getting restricted to hand movement to operate table mouse in 2D space of table. This system used gyroscopic sensor interface with Arduino uno which will map the motion (orientation) and helps to move mouse cursor. This will solve the potential problem of computer operability for the disabled people. This system can not only be used by disabled people but also by the other use and gamers who were getting tired with using traditional table mouse.

II.LITERATURE REVIEW

There are different advance system which uses different techniques available to operate mouse without using hand motion. The open cv can be use to detect the movement of the user to decide the movement of mouse cursor. The mouse can also be controlled using voice by using speech characteristics. The eye movement can also be use to decide the movement of mouse cursor on computer screen.

More advance form to control the mouse cursor can be gesture controlled mouse cursor [1]. This paper propose a gesture-controlled computer mouse using IR distance sensors and an Mbed microcontroller. The project is divided into two major parts, the hardware part that captures object movements using IR distance sensors and sends the captured data serially to the PC with the help of an Mbed microcontroller, and the software part that controls the computer pointer on the screen using C# programming with the acquired serial data from the Mbed microcontroller.

The mouse cursor can also be controlled by using speech and non-speech characteristic of Human Voice. The paper [2], presents a new system called Vocal Mouse (VM) which allows users to control the computer mouse pointer continuously using vocal parameters like vowel quality, loudness, and pitch. The traditional methods of using only standard spoken words were found to be inefficient for performing continuous tasks and were often poorly recognized by automatic speech recognizers. The proposed system extracts low-level acoustic features in real-time using LPC and performs pattern recognition using a new technique called minimum feature distance technique. The results show that the system can be used by novice users without extensive training and provides a viable alternative to existing speech-based cursor control methods. Overall, the paper presents an innovative approach to mouse control that can benefit physically disabled individuals and improve human-computer interaction.

The paper [3], aimed at developing an eye-gesture control system that can be operated by people with neuro-locomotor disabilities or those paralyzed by injury. The proposed system is designed to track eye movements and enable users to perform actions mapped to specific eye gestures. The system is based on detecting the pupil from the user's face and then tracking its movements using a computer webcam. The authors highlight the importance of eye movements as an excellent candidate for ubiquitous computing and propose an open-source generic eye-gesture control system that is accurate in real-time and easy to use.

The paper [4], propose a system which is a computer access tool designed for people with severe disabilities. It uses a video camera to track the movements of the user's body features such as the tip of the nose or finger and translates them into the movements of the mouse pointer on the screen. The visual tracking algorithm used is based on online templates and correlation tests between frames. The system has been tested on a group of 20 people without disabilities and 12 people with severe cerebral palsy or traumatic brain injury. The results show that most of the users were able to use it to spell out messages and explore the Internet. The system has a high potential to provide computer access to people with severe disabilities, and it is easy to learn and use.

III. METHODOLOGY

To develop a gyroscope-based mouse control system, the first task is to evaluate various gyroscope sensor modules and select the most suitable one for the project. Based on the evaluation, the MPU-6050 module was chosen for the system. After selecting the module, the next task is to configure and connect it with the Arduino using the I2C protocol. Once the module is connected, the Arduino board is programmed to read data from the MPU-6050 module. The module generates orientation data, which is made available at the computer serially. In order to read the data, a python script is written, which continuously reads the data being made available on the computer port by the Arduino. To provide user control, the system is interfaced with three buttons: left, right, and mouse. These buttons enable left-click, right-click, and mouse movement, respectively. Finally, after feeding the code into the Arduino and running the python script on the computer, the user is able to control the mouse. This gyroscope-based mouse control system can be an effective solution for users with mobility issues or disabilities, allowing them to control the computer using only their hand movements.

IV. RESULTS AND DISCUSSION

Tthe performance of the MPU 6050 module in controlling the mouse cursor using both acceleration and gyroscopic values is very good. The results showed that using acceleration as the parameter for mapping the coordinates of the mouse resulted in a very fluctuating and unstable performance. This is because the acceleration values change constantly, making it difficult to accurately map the movements of the module to the mouse cursor movements.

However, when the gyroscopic values of the module were used to control the mouse cursor, the results were much better. The output mouse cursor was found to be very stable and smooth, resulting in a more realistic and effective performance. As a result, gyroscopic angle values were chosen as the final parameter for controlling the mouse cursor. The left, right, and mouse buttons were found to be working effectively, providing a realistic mouse-like experience. However, it was noted that the program required the module to be stable for 3 seconds for configuration purposes before it could be used to control the mouse cursor. Once the program was initialized, the module could be moved to control the mouse cursor.

Finally, it was found that the sensitivity of the module was very high, meaning that even a slight change in gyroscope angle could significantly change the position of the mouse cursor. This suggests that users need to be careful when using the module and must make small and precise movements to control the cursor effectively.

V. CONCLUSION

This study provides valuable insights into the performance of the MPU 6050 module in controlling the mouse cursor. The outcomes implies that using gyroscopic angle values provides a more stable and effective performance compared to using acceleration. However, users must be aware of the high sensitivity of the module and make small and precise movements when controlling the cursor. Overall, this study can be useful for researchers and developers interested in using the MPU 6050 module for mouse cursor control.

REFERENCES