



Wired Hand Gesture Mouse Recognition

Ms. S.Pooja Nair^[1], Dr. G. Abel Thangaraja^[2].

^[1] UG scholar, Department Of Computer Technology, Sri Krishna Adithya College Of Arts And Science

^[2] Assistant professor, Department Of Computer Technology, Sri Krishna Adithya College Of Arts And Science

^[1] 20bsct126poojanairs@skacas.ac.in, ^[2] abelthangaraja@skacas.ac.in

ABSTRACT

A wired hand glove mouse is a computer mouse that is worn on the hand like a glove. It is designed to provide a more intuitive and natural way of interacting with a computer, particularly for tasks that require fine motor control or spatial manipulation, such as graphic design or 3D modelling. Many persons suffer from Carpal Tunnel Syndrome and repetitive strain injuries due to continuous use of mouse. To avoid such problems wearable wired device is proposed. It uses Motion sensor to sense navigation and gestures.

The glove typically has sensors on the fingertips and palm that track the movement of the user's hand and translate it into cursor movement on the computer screen. Some glove mice also have buttons or touchpads on the glove itself, allowing for additional input options beyond just movement. Wired hand glove mice are connected to the computer via a USB cable and require drivers to be installed in order to function properly. The user moves the cursor of the computer screen by moving their hand in the desired direction. The user can control the speed and precision of the cursor by the motion of the hand. It is an innovative device that allows users to control their computers using a glove-like device that fits over their hand. The user moves the cursor by moving their hand, and the device can also detect finger movements to perform clicks and other functions. They are relatively uncommon compared to traditional mouse devices but may be useful for users with certain disabilities or for those seeking a unique and ergonomic input method.

1. INTRODUCTION

The wired hand glove mouse is an innovative computer input device that can be worn like a glove on the user's hand to control the cursor and various computer functions. This device comprises of a circuit board, a sensor grid, and multiple buttons located on fingertips and the thumb. The device's sensor grid tracks the movement of the user's hand and the fingers' movement, allowing for precise and fluid movement on the computer screen. The glove itself is designed to be comfortable and secure, fitting snugly to the user's hand without feeling tight or restrictive. The user can use their hand movements to control the cursor's speed and direction, making precise movements without any discomfort or strain.

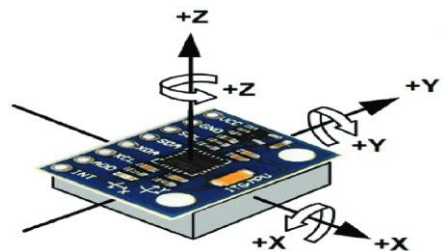
One of the primary advantages of using the wired hand glove mouse is that it allows individuals with mobility issues or disabilities to interact with their computer more efficiently. The device provides an alternative to traditional input devices such as mice and keyboards, which can be challenging to use for people with limited mobility.

Furthermore, the wired hand glove mouse is ideal for professionals who require precise control over their computer, such as graphic designers or video editors. The device's finger buttons can be programmed and customized to perform specific functions, allowing for a fully customized and personalized user experience. This device is a combination of a glove and a computer mouse, where the user can move their hand to control the cursor and perform different functions by pressing buttons located on the fingertips and thumb or making specific hand gestures.

1.1 HARDWARE CONFIGURATION

ARDUINO NANO

The Arduino Nano is a compact and versatile microcontroller board that is based on the ATmega328P microcontroller. It is designed to be used for small and medium-sized projects that require low power consumption and a small form factor. The Nano is similar to other Arduino boards in that it can be programmed using the Arduino Integrated Development Environment (IDE) and can interact with a variety of sensors, actuators, and other devices. It has a wide range of inputs and outputs, including digital and analog pins, PWM pins, and serial communication ports. One of the main advantages of the Nano is its small size, which



makes it ideal for projects where space is limited. It is also relatively inexpensive and easy to use, making it a popular choice for beginners and experienced makers alike.

MPU -6050 MOTION SENSOR

The MPU-6050 is a popular motion sensor module that combines a 3-axis gyroscope and a 3-axis accelerometer in a single package. It is commonly used in various electronic applications, such as drones, robots, and gaming devices, for measuring motion and orientation. The MPU-6050 sensor uses an I2C interface to communicate with a microcontroller or other digital devices. It provides digital output data that can be easily processed by software.

The sensor can measure angular velocity and acceleration in all three axes, and can also provide temperature readings. The MPU-6050 sensor is relatively easy to use and can be interfaced with many microcontroller platforms, including Arduino and Raspberry Pi. There are also many libraries and code examples available online that can help you get started with using the sensor in your project.



SOFTWARE SPECIFICATION

PYCHARM (PYTHON DEVELOPMENT)

Python is a high-level, interpreted programming language that is widely used in software development, scientific research, data analysis, and web development. Here are some key concepts and tools that can help you get started with Python development: Python has a simple, easy-to-learn syntax, with built-in data types and control structures that allow for rapid application development. You can start by learning the basics of Python, such as variables, data types, functions, loops, and conditionals. Integrated Development Environment (IDE): An IDE is a software application that provides a comprehensive environment for developing, testing, and debugging code. Some popular Python IDEs include PyCharm, Spyder, and Visual Studio Code.

PyCharm is an integrated development environment (IDE) for the Python programming language. It is developed by JetBrains and is available in two editions - Community and Professional. PyCharm offers a range of features that make Python development easier and more efficient. Some of its features include code analysis, code completion, debugging tools, support for version control systems, and a wide range of plugins.

The Community edition of PyCharm is free and open source, while the Professional edition is a paid version that offers additional features such as support for web development, scientific computing, and database management. PyCharm is available for Windows, Mac, and Linux operating systems and has a user-friendly interface that allows developers to easily navigate and manage their projects. It is a popular choice among Python developers due to its advanced features and ease of use.

ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a software application used to write and upload code to Arduino boards. It provides a user-friendly interface for writing, compiling, and uploading code to the board. The IDE supports multiple programming languages, including C, C++, and a simplified version of C++ known as Arduino Sketch.

The Arduino IDE includes a code editor, a compiler, a bootloader, and a serial monitor. The code editor provides features such as syntax highlighting, code completion, and error highlighting. The compiler converts the code written in the IDE into machine language that can be understood by the microcontroller on the Arduino board. The bootloader is a small program that runs on the microcontroller and allows the board to be programmed over the USB port. The serial monitor allows the user to communicate with the Arduino board and receive data from the sensors or other peripherals connected to it.

The Arduino IDE is available for Windows, Mac, and Linux operating systems and can be downloaded for free from the official Arduino website. In addition to the Arduino IDE, there are also other third-party development environments available that can be used to program Arduino boards, such as Visual Studio Code and Eclipse.

EXISTING SYSTEM

The primary input devices for computers were the traditional mouse and keyboard. The computer mouse was first invented in the 1960s and became popularized with the release of the Apple Macintosh in 1984. In recent years, there have been other input devices introduced to the market, such as touchpads and touchscreens, which allow for more natural and intuitive interaction with computers. However, these devices still require physical contact with the computer or device.

DRAWBACKS

- While a mouse provides a reasonable level of precision for most tasks, it may not be accurate enough for tasks that require extreme precision, such as graphic design or CAD modelling.
- A mouse has a limited range of motion and may not be suitable for use in small spaces or for tasks that require large movements.
- Using a mouse for extended periods can cause ergonomic issues such as wrist strain, carpal tunnel syndrome, or other repetitive strain injuries.
- A mouse requires a flat surface to operate correctly, which may not always be available, especially when using a laptop on the go.
- A mouse has a limited number of buttons and functions, which may not be sufficient for complex tasks or specialized software.
- Some people with disabilities may find it difficult to use a mouse, especially those with fine motor disabilities or who are unable to grip or move a mouse.

PROPOSED SYSTEM

The hand glove mouse itself would consist of sensors, electronics, and a wired connection to the computer. The sensors would detect hand movements and translate them into cursor movements on the computer screen.

To enable the hand glove mouse to communicate with the computer, a software interface would be necessary. This software would read the sensor data from the hand glove mouse and translate it into cursor movements, clicks, and other actions on the computer.

A driver software would be required to install the necessary drivers for the hand glove mouse on the computer. This would enable the computer to recognize the hand glove mouse as an input device and allow the user to configure its settings.

To customize the hand glove mouse settings and assign specific actions to different hand gestures, a configuration tool would be needed. This tool would allow users to adjust settings such as sensitivity, cursor speed, and button assignments.

Documentation and support materials would be required to help users set up and use the hand glove mouse effectively. This could include user manuals, tutorials, and online support forums

FUTURE ENHANCEMENT

- One significant enhancement for wired hand glove mouse is the addition of wireless capabilities, allowing it to communicate with the computer over Bluetooth, Wi-Fi, or other wireless protocols. It can make the device more mobile, giving users more freedom to move and operate their computer from a distance.
- The addition of haptic feedback to the wired hand glove mouse could provide tactile feedback to users, making it more immersive and engaging when interacting with the computer.
- Advanced gesture recognition software could enable the wired hand glove mouse to recognize an even wider range of hand and finger movements, allowing the user to perform more complex tasks and functions.
- Improved durability could be an enhancement that can add to the wired hand glove mouse. The parts can be made more robust and durable to withstand heavy usage.
- The hand glove mouse could be integrated with virtual and mixed reality applications, allowing users to interact with virtual objects, applications, and environments more intuitively and naturally. This application can be useful in gaming, education, simulation training, medicine, and other fields.
- Another enhancement could be to have the hand glove mouse control multiple devices at once, such as multiple screens, laptops, or even home automation systems

CONCLUSION

In conclusion, a wired hand glove mouse is a device that provides users with a unique way to control their computer using hand gestures and movements. It is connected to the computer via a wired connection, which provides a stable and reliable connection for the device. Developing a wired hand glove mouse involves designing and building the hardware components, including the sensor module, microcontroller module, actuator module, power module, communication module, and user interface module. Firmware is also required to control the sensors and actuators and to communicate with the computer. Software is needed to interpret the user's input and translate it into appropriate commands for the computer.

Testing is an essential part of the development process to ensure that the device functions correctly and meets the user's needs. This may involve testing the various components of the device, as well as user testing to ensure that the device is comfortable and functional for users. While a wired hand glove mouse may not offer the same level of freedom of movement as a wireless device, it provides a reliable and stable connection that is important for many users.

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