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IOT Based Smart Assistance Gloves for Paralyzed People

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ABSTRACT

People who are paralysed find it difficult to express their emotions and to interact with others in day-to-day life. In order to communicate with one another, people with disabilities frequently use sign language, which is hard to interpret by non-disabled individuals. This smart glove enables him to turn his hand gesture into a pre-recorded speech because persons with paralysis are unable to talk. then this smart glove helps him to convert his hand gesture into pre-recorded voice along with Mobile App and LCD based message display. Here the sending of messages is done through Internet Of Things(IOT). In this we are using our own gestures instead of sign language to reduce the difficulty. This makes it easier for anyone to comprehend what he is saying and respond appropriately. The primary goal of the project-in-progress is to create a dependable, user-friendly, lightweight smart hand glove system that can reduce the barriers for persons with paralysis so they can participate in races. The major parts of this system are voice-based hardware, RF modules, and Arduino boards.

KEYWORDS: Internet Of Things(IOT), Flex Sensors, RF Modules, Ardino boards.

1. INTRODUCTION

The Internet of Things (IoT) is a network of devices, vehicles, and household appliances that have connectivity, electronics, actuators, and software to connect, interact, and share data. In addition to common devices like desktops, laptops, smartphones, and tablets, IoT entails bringing more conventionally non-intelligent or non-internet-enabled physical objects and everyday items online. These devices have technology incorporated into them, allowing for online interaction and communication as well as remote monitoring and control. Helping the elderly and those with disabilities is one of the main uses of the Internet of Things. These intelligent systems provide special accommodations for an owner's limitations via assistive technology. Voice controlcan help users with vision and movement impairments, while cochlear implant users who are hard of hearing can directly connect alert systems totheir devices. They can also have additional safety features installed. Sensors that keep an eye out for medical

situations like falls or seizures can be one of these characteristics.

The sign language varies from nation to nation and even region to area. With the use of a gesture recognition system, it has been given a 21st-century technological makeover to help the deaf and dumb population and the general public communicate more effectively. The study of gesture recognition is quite active. The last few years have seen a lot of work. This report highlights the advancements made throughout time to boost productivity and accuracy. It serves as a language interpreter in a limited sense and offers a practical means of communication as well as a streamlined method for normal people and the deaf and dumb community to communicate. The two primary categories of gesture recognition are sensor-based and vision-based. The drawback of vision-based approaches is the need for sophisticated data processing algorithms. Variable lighting conditions, occlusion, range of vision restrictions, and background blur are additional difficulties in image and video processing. The sensor-based approach provides more mobility.

STRUCTURE OF PAPER

The paper is organized as follows: In Section 1, the introduction of the paper is provided along with the structure, important terms, objectives and overall description. In Section 2 we discuss literature survey. In Section 3 we discuss related work.Section 4, we tells us about the methodology. In Section 5, we shares information about hardware components. Section 6 specifies he result. Section 7, concludes the paper with acknowledgement and Section 8, gives references.

2. LITERATURE SURVEY

1. In their study, Anbarasi et al. [1] described a system that can successfully translate American Sign Language gestures to text and audio. Here, the interpreter uses a glove-based system that includes an accelerometer, tactile sensor, and flex sensor. The sensors that correspond to the hand sign create a signal for each hand gesture made. The controller compares the motion to inputs that are already stored. Ten novices were evaluated using a Deaf communication translator for the letters "A," "B," "C," "D," "F," "I," "L," "O," "M," "N," "T," "S," and "W." Using an end signal, word construction from letters is also accomplishe overall accuracy at recognising the letters' gestures was roughly 90%.

2. Gunasekaran, K., et al. [2] suggested a system in their study that makes use of the data glove technique. It is made up of flex sensors that are used to track finger motions and provide data to a PIC microcontroller. In order to provide a signal corresponding to the orientation of the hand motion, he additionally used gyro sensors. The PIC microcontroller analyses the user's gesture before playing the audio track that goes along with it. The APR9600 contains the voice signals. High-quality voice recordings are recorded on a single chip with non-volatile flash memory and a playback time of 40 to 60 seconds.APR offers a large number of random and sequential messages, and designers can change storage time to meet user needs. He basically used an RF module and pre-recorded voice to communicate between the transmitter and receiver sides.

3.Pallavi Verma, et al. [3] described a system that captures user movement utilising a pair of gloves with flex sensors along each finger, thumb, and arm.The voltage divider method is employed with flex sensors to determine the voltage equivalent of the degree of the fingers, thumb, and arm.

The PIC microcontroller is utilised for a variety of tasks, including converting data from flex sensors from analogue to digital. The digital data is then transmitted after being encoded in an encoder. Once the received data has been decoded by the decoder, the gesture recognition system compares it to previously provided data. The voice segment notifies the speaker whether the data matches.

3. RELATED WORK

There are several methods for detecting sign language, including the Data glove method, the vision-based method, and the virtual button method. Prior to now, not many attempts had been made to recognise the movements using different techniques. When adopting these strategies, there are drawbacks related to accuracy, practicality, and portability, such as:

- Leaf Switches based glove
- Copper plate-based glove
- Flex sensor-based glove

Leaf switches-based glove:

These switches look like standard switches, but they have been intended to close when a weight is connected since the two ends will come into contact. These leaf switches are attached to the glove's fingertips in a way that when the finger is bent, the switch's two terminals come into contact. The source voltage of 5V will often pass via the MC input with the finger straight. A value of 0V will then arrive at the MC input, indicating that the finger is closed, and bending the finger will cause the switch to close, draining the supply voltage through the ground.

Disadvantages: The switch will get closed after prolonged use, preventing the appropriate transmission of gestures while the finger is straight.

Copper plate-based glove:

Small metal strips that are attached to the glove's five fingers, as seen below, can be used to create this glove. A copper plate that acts as the ground is placed on the palm. A ground plate is used over individual metal strips because it has a greater contact surface and makes it easier to identify the finger's position. In the idle state, the copper strips display a logic 1 voltage level. However, their associated voltage is drained when they make contact with the ground plate, and they display a logic 0 voltage level. As a result, the proper gestures are produced.

Disadvantages: Because the glove is made of copper plate, it is heavy and unsuited for prolonged usage.

Flex sensor-based glove:

Flex is a bending or curving verb. Sensors convert mechanical energy into electrical energy by means of transducers. Flex sensors are used in this haptic technology to capture physical values for processing.

Advantages: Extremely high levels of consistency, dependability, and tolerance to extreme temperatures. A wide range of flexible or stationary surfaces are available for attachment.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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