International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 12 Issue 04, April-2023

IoT based Smart Assistance Gloves for Disabled People

Ms. B. Vijaya Kumari[1], Mr. K. Durgesh[2], Mr. M. Ratnakanth[3], Mr. M. Ajay Kumar[4],Mr. N. Naga Teja[5],
[1]Assistant Professor, Department of Electronics & Communication Engineering,
[2,3,4,5]Students, Department of Electronics & Communication Engineering, KKR & KSR Institute of Technology and Sciences, Guntur, Andhra Pradesh, India.

***Abstract*:- These days it is a challenging effort to communicate with those who have hearing difficulties and regular people. There is a communication barrier because the sign language used by these people is not understood by the general public. Paralyzed people also frequently need assistance. We have suggested the use of IOT-based smart support gloves for disabled persons as a solution for these people. Comparing our design to the current system, the gloves we created are incredibly straight forward yet effective. The finger motion is recognized by Flex sensors, and the appropriate audio output is played through speakers. Arduino Nano is used to implement the suggested system. In an emergency, a warning message will be transmitted via the GSM Module.**

Keywords: Gloves, Flex sensors, Arduino Nano, GSM Module, Speaker, voice module.

1. INTRODUCTION

According to an Indian survey, many babies are born with impairments. Speaking and hearing issues are being experienced by a large number of people.

In order to communicate with one another, persons with disabilities frequently utilize sign language, which is difficult for non-disabled people to comprehend. Learning these sign languages is challenging for everyone, including those without disabilities. They find it challenging to interact with others and will be unable to express their thoughts.

The elderly members find it extremely difficult to carry out their daily tasks, such as sipping a glass of water, turning on a fan, or using a remote control for a TV, etc. After examining each issue, we recommend a solution called the "smart glove" that combines a number of characteristics to assist the impaired community members and enable them to interact freely with the outside world.

Kumar, R. S., et a1., [1] proposed a method for communicating with disabled person. Here raspberry pi and Arduino nano is used for communication. Here output is observed on android app and message and heard through speaker. Here the cost is very high and not effective.

Kshirsagar, S.,et a1., [2] proposed a method for communication between disable person and home appliances. Here home appliances are controlled using gloves. But the basic needs are not fulfilled by using this.

Domingo,et a1., [3] proposed a method for communication between house and disabled person. Here house needs are controlled using RFID tags. But RFID tags are used more for particular thing. So cost is high.

Anisha, M. R., eta1., [4] proposed a method for communication for specially privileged people. Here Ultra Sonic sensor is used, if there is any obstacle then sound is heard through buzzer. But there are only 3 modes and ultrasonic sensor is not useful.

Akhund, T. M. N. U., et a1., [5] proposed a method for communication between human and robotic car. Here when we bent our finger the car will go front and when we release car will go back. And it is very high cost.

Shubankar, B., et a1., [6] proposed a method for communication between disable person and lcd display. When the gesture is detected then the output is displayed on LCD display. If the person is outside the needs are not fulfilled.

Punsara, K. K. T.,et a1., [7] proposed a method for communication between disable person and mobile. Here battery is used and gyroscope is used and it is not effective if the person is outside if the disable person wants any needs then he can'tcommunicate.

Bhat, K., et a1., [8] proposed a method for communication between disabled person and mobile app. Node mcu and analog extender is used for communication . It is used for only wifi and Bluetooth. Cost is high. And the components are more.

The majority of remote controls require button pressing in order to operate a device. As a result, while these controls are helpful for someone with typical abilities, they are less helpful for those who are physically challenged, especially the elderly, who lack the dexterity to exert sufficient pressure to press the buttons. So we made use of flex sensors here. The old person may simply bend their finger using flex sensors, and the matching output is displayed as a speech message through a GSM module and a voice through ARP33A3 Voice Module.

In Section-I we have discussed about Introduction, and in Section-II about Components, and in Section-III about Methodology, Results and Discussions are mentioned in Section-III, Conclusion and Future Scope in Section-IV.

2. COMPONENTS

2.1 Flex Sensors

Figure 1 illustrates a flex sensor, a type of sensor that measures how much deflection or, alternatively, bending has taken place. To create this sensor, materials like plastic and carbon can be employed. The resistance of the sensor will alter when the plastic strip holding up the carbon surface is shifted. As a result, it is often referred to as a bend sensor. Because the amount of turn directly correlates with the variance in resistance, it may also be used as a goniometer.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 12 Issue 04, April-2023

Fig-1: Flex Sensor

Below shows pins description of flex sensor:

- Pin P1: This pin is generally connected to the +ve terminal of the power source.
- Pin P2: This pin is generally connected to Ground (GND) pin of the power source.

2.2 Voice module

- The gadget may be powered by a 5V or 12V source, respectively. Power switch selection is made by sliding it.
- For audio recording, we have access to 8 channels (M1 to M8), each of which may record for 1.3 minutes. When recording, the onboard MIC will be used automatically.
- Turn on the power to the board, and LED (LD1) will turn on.
- You may choose the playback or recording mode using the sliding button labeled "REC/PLAY."
- While recording, choose a channel (M1-M8) to record the message on. Assuming we wish to record messages on channel M0, join M1 to GND. The M1 button can also bepressed and held directly.
- The MIC will now record anything we say, and the status LED (LD2) will turn on in the record mode to show that the chip is presently recording.

Fig-2: ARP33A3 Voice Recording andPlayback Module

2.3 GSM Module

SIM900A Modem is built with Dual Band GSM based SIM900A modem from SIMCOM. It works on frequencies 900MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. SIM900A is an ultra-compact and wireless module. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls.

Fig-3: GSM Module

2.4 Arduino Nano

This Arduino Nano is the genuine article. It is an ATmega328P-based breadboard-compatible board created in Italy by representatives of Arduino. It only lacks a DC power jack and utilizes a Mini-B USB cable as opposed to a conventional one. Surface mount breadboard embedded version with USB is the original Arduino Nano. The only one that is comprehensive, compact, and breadboard-friendly. It is lacking a power jack physically. There is no need for the power select jumper because the Nano automatically detects and switches to the higher potential source of power.

Fig-4: Arduino Nano

Microcontroller	ATmega328P (SMD)
Operating Voltage	5V
Input Voltage	6V - 20V (7V - 12V recommended)
Digital I/O Pins	14 (6 PWM)
Analog I/O Pins	8
Current Per I/O	40mA
Flash Memory	32KB (2KB Used by Bootloader)
SRAM	2KB
EPROM	1KB
CLOCK	16MHz
Dimensions	45mm x 18.5mmm
Weight	7g

Fig-5: Specifications

Arduino boards have the ability to take analogue or digital input data from various sensors and convert them into an output, such as turning on or off a motor, an LED, connecting to the cloud, or doing a number of other tasks.

- 32 KB of Flash Memory
- 2 KB of SRAM

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 12 Issue 04, April-2023

- 1 KB of EEPROM
- 2 KB of the Flash Memory is usedby the boot loader code.

3. METHODOLOGY

Below Fig-1 represents the block diagram ofIOT based Smart Gloves for Disabled People.

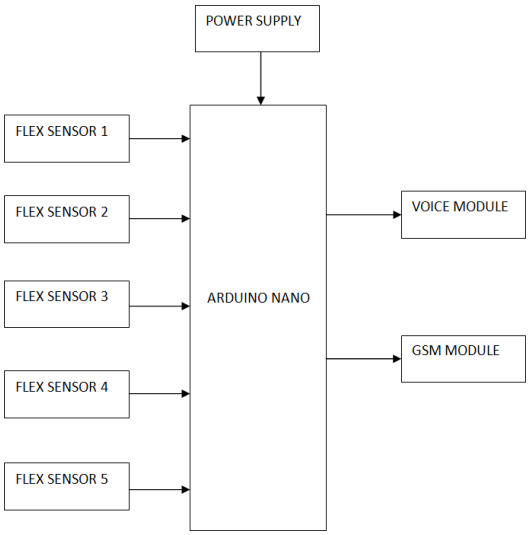

Fig-6: Block diagram of smart gloves fordisabled people

At first we have implemented this project for disabled people. For this project arduino nano is used. All sensors are connected to arduino nano by using connecting wires. There are 5 fingers for a person. By using hand Gloves the flex sensors are fixed to it .By bending the finger the resistance increases and the respective bending finger command is sent through Arduino nano. For example for Index finger we have fixed a flex sensor. For that we have given a command like “FOOD”. If the disabled person wants food then he bendsthe index finger.

For the output we have used APR3A33 Voice recording and playback module .This module gives audio output that we have stored like Food. And if the audio is not hearable then we have used GSM module. By using this GSM module message is sent to caretaker phone. If the caretaker is outside then also he gets a message. If there is an emergency purpose then he bends a Small finger. Then the caretaker knows that he is in danger. Like that for 5 fingers 5 flex sensors are used for each finger there is a command and the respective finger command output is observed as message andlistened as voice.

4. RESULTS AND DISCUSSION

When the flex sensor is bent then the voice is listened and the message is displayed in the care taker phone.

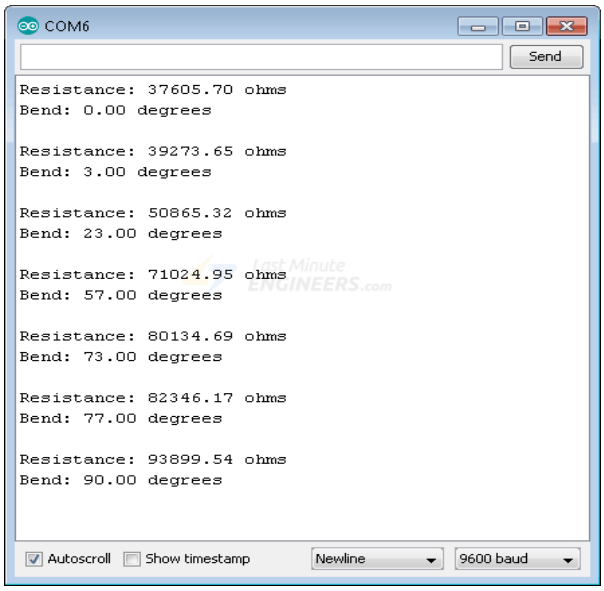

Fig-7: Output on the Serial monitor whenthe flex sensor is detected.

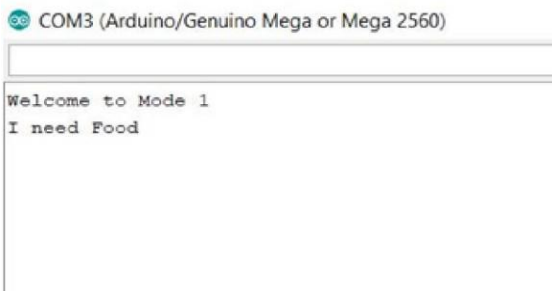

Fig-8: Flex Sensor 1 is activated

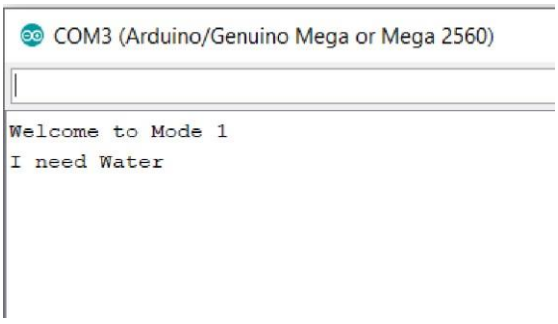

Fig-9: Flex Sensor 2 is activated

In fig-6 when the bent is done the resistance increases and the respective command is sent to arduino nano and the command is stored and out as audio using voice module.

Here in Fig-7 disable person wants food so he bent index finger and the resultant output is displayed on serial monitor for practical working purpose that he needs food. So the caretaker gives food tothat person.

Here the resistance value will be 2^10 means 0-1023. It is difficult to check that value so we have decreased to 0-100 and the value is normal at 70. If it is greater than 70 then the resistance increases and the respective command is sent to voice module &GSM.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 12 Issue 04, April-2023

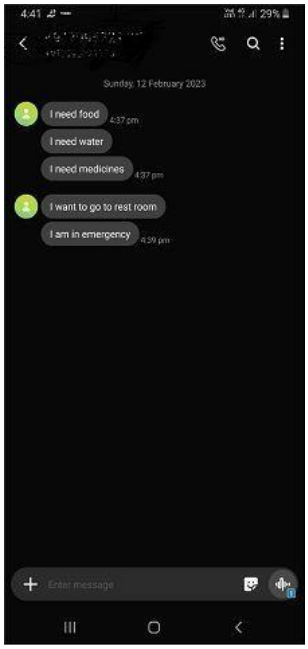

Fig-10: Message on Phone when disableperson bends the respective finger.

4.1 Booting the GSM Module

- Lock the GSM module afterinserting the SIM card.
- Attach the adapter to the GSMmodule and turn the device on!
- Now, wait for a while, say one minute, and check the status LED'sblinking frequency.

The status/network LED will begin blinking consistently every three seconds after the connection has been made successfully. You might try calling the SIM card's mobile number that is located within the GSM module. The GSM module has successfully established a network connection if you heara ring back.

5. CONCLUSION AND FUTURE SCOPE

Because most people cannot understand the sign language that these individuals employ, there is a communication barrier. People who are paralyzed usually require help. As a remedy, we've recommended the usage of IOT-based smart assistance gloves for people with disabilities. When compared to the existing method, the gloves we developed are remarkably simple but efficient. Flex sensors detect the finger motion, and the corresponding audio output is presented through speakers. The proposed system is implemented with Arduino nano. A warning message will be sent over the GSM Module in an emergency.

The Future Scope of Implementation of iot based smart assistance gloves for disabled people is to understand the needs of a disabled person and fulfill his/her needs whenever he/she wants. Disable persons cannot say through mouth and cannot express their feelings. In an emergency situation some people are dying because they can't say through their mouth. So, in this project in an emergency situation the disable person bend their little finger so that the caretaker knows that he/she in danger and admit in hospital and the death rate decreases.

REFERENCES

[1] Kumar, R. S., Leninpugalhanthi, P., Rathika, S., Rithika, G., & Sandhya, S. (2021, March). Implementation of IoT based smart assistance gloves for disabled people. In 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS) (Vol. 1, pp. 1160-1164). IEEE.

[2] Kshirsagar, S., Sachdev, S., Singh, N., Tiwari, A., & Sahu, S. (2020, March). IoT enabled gesture- controlled home automation for disabled and elderly. In 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC) (pp. 821- 826). IEEE.

[3] Domingo, M. C. (2012). An overview of the Internet of Things for people with disabilities. journal of Network and Computer Applications, 35(2), 584-596.

[4] Anisha, M. R., Nair, A. S., Shreya, A., Tharun, C., & Neethu, K. N. (2020, December). Design and implementation of smart gloves for the specially privileged. In 2020Third International Conference on Advances in Electronics, Computers and Communications (ICAECC) (pp.1-5). IEEE.

[5] Akhund, T. M. N. U., Jyoty, W. B., Siddik, M. A. B., Newaz, N. T., Al Wahid, S. A., & Sarker, M. M. (2020, July). IoT based low-cost robotic agent design for disabled and Covid-19 virus affected people. In 2020 fourth world conference on smart trends in systems, security and sustainability (WorldS4) (pp. 23-26).IEEE.

[6] Shubankar, B., Chowdhary, M., & Priyaadharshini, M. (2019). Iot device for disabled people. Procedia Computer Science, 165, 189-195.

[7] Punsara, K. K. T., Premachandra, H. H. R. C., Chanaka, A. W. A. D., Wijayawickrama, R. V., & Nimsiri, A. (2020, December). IoT Based Sign Language Recognition System. In 2020 2nd International Conference on Advancements in Computing (ICAC) (Vol. 1, pp. 162- 167). IEEE.

[8] Bhat, K., & Chayalakshmi, C. L. (2020, November). Advanced glove for deaf and dumb with speech and text message on android cell phone. In 2020 IEEE international conference for innovation in technology (INOCON) (pp. 1-7). IEEE.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 12 Issue 04, April-2023

AUTHORS PROFILE

Ms. B. Vijaya Kumari working as an Assistant Professor in the Department of Electronics and Communication Engineering in KKR AND KSR INSTITUTE OF TECHNOLOGY AND SCIENCES,
with a specialization in Embedded systems, IoT, Analog electronics and Communication systems. She has good research exposure and published several research papers in various journals of repute.

K. Durgesh is currently pursuing a B.Tech degree in KKR AND KSR INSTITUTE OF TECHNOLOGY AND SCIENCES, Andhra Pradesh, India. His subjects of interest are C programming, embedded systems and Image Processing, and IoT.

M. Ratnakanth is currently pursuing a B.Tech degree in KKR & KSR INSTITUTE OF TECHNOLOGY AND SCIENCES, Andhra Pradesh, India. His subjects of interest are Wireless Communication and VLSI.

M. Ajay Kumar is currently pursuing a B.Tech degree in KKR & KSR INSTITUTE OF TECHNOLOGY AND SCIENCES, Andhra Pradesh, India. His subjects of interest are Wireless Communication and Python Programming.

N. Naga Teja is currently pursuing a B.Tech degree in KKR & KSR INSTITUTE OF TECHNOLOGY AND SCIENCES, Andhra Pradesh, India. His subjects of interest are Wireless Communication and Python Programming.