SMART HAND GLOVES FOR DISABLE PEOPLE

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Abstract – *Smart Hand Gloves help disable people to live with normal people. As dumb person cannot speak then this smart gloves helps him to convert his hand gesture into text and pre-recorded voice. This also help normal person to understand what he is trying say and reply accordingly. This Smart Gloves has facility of Home Appliance control from which a physically impaired person become independent to live. The main objective of the implemented project is to develop a reliable, easy to use, light weight smart hand gloves system which can minimizes the obstacles for disable people where they can stand with the race.*

Key Words: Gesture to text, Gesture to voice, wireless home Automation.

1. INTRODUCTION

In our life we meet many disable people, some of them are partially and some are completely disables. The partially impaired people like dumb, deaf, paralysis in one leg or hand manages their life with difficulties and feel separate from others. Here communication plays major role to feel someone better and indulging them in an activity where they may say themselves as independent person. By this thought the project Smart Hand Gloves for Disable People is developed so that disable person can live his life as he wants.

In this project, Flex Sensor plays the major role. The glove is fitted with flex sensors along the length of each finger and the thumb. The flex sensors give output in the form of voltage variation that varies with degree of bend. This flex sensor output is given to the ADC channels of microcontroller. It processes the signals and perform analog to digital signal conversion. Further the processed data is sent in a wireless manner to the receiver section. In this section the gesture is recognized and the corresponding output is displayed on LCD and simultaneously a speech output is play backed through speaker. The portability of this project is a major advantage. Thus with the help of this project, the barrier faced by these people in communicating with the society can be reduced to a great extent **[1]**.

1.1 Literature Review

Many smart gloves are proposed in recent years where preferred technology was wireless mode with many distinct features, but those were not reliable, light weight, cheap, Easy to use, plug and play type prototypes. It is because of components used for fabrication which are normally available in market such as flex sensors, microcontroller, and wireless transmitter, and these were powered by battery which was little heavy as compare to other components. Therefore, these kinds of assemblies are bulky, and difficult to use.

In an attempt to open up the lines of communication and to spark a conversation between people who are hearing-impaired or have speaking disabilities, a student and designer at Goldsmiths University in London has developed a futuristic smart-glove named "Sign Language Glove" that is capable of translating sign language from hand gestures into a visual on-screen text as well as audible dialogue.
Advantages and disadvantage are as follow:-

- It is wireless with displays and voice device.
- It is portable, and having inbuilt battery.
- It is bulky in wearing.
- Difficult to handle.
- It is delicate and components are expensive.

1.2 Problem Definition

Problems faced by the disable person regarding employment can be overcome by our method. So in the implemented work an intelligent microcontroller based system using Flex sensors is developed which is able to-

- Convert gesture into voice and text.
- Help a person to control his home appliances if he could not walk to switchboard.

In today's technology wireless gloves are not yet reliable because to be used as wireless, the gloves should have inbuilt battery and some electronics controller board which makes gloves heavier and may cause irritation. Thus wired equipment's are preferred for patients and partial disable people.

2. PRACTICAL IMPLEMENTION

2.1. Block Diagram

Above block diagram represents the complete architecture of Smart Gloves for Disable People where it include components such as Flex Sensors, Arduino Mega, 16*2 LCD Screen, APR33A3 Voice Playback module, Transmitter, Receiver with Electronic Switches. The Arduino Mega Microcontroller Board is the heart of smart gloves

device, it has interfaced with flex sensor, voice module, transmitter, and LCD screen. This whole assembly works on voltage of 5 volts and 9 volts supplied by power supply block.

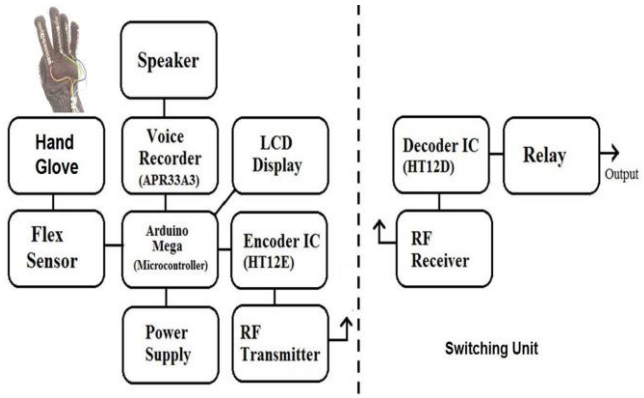

Fig-1: Block Diagram

3. WORKING

The work of this project start from movement of hand gloves where the flex sensors are attached, and the value of sensor changes when its experiences the bending. The flex sensor is another type of potentiometer are attach to the fingers when we bend the figure the value of the sensor get changes. The changing value of the sensor is depend upon the resistance and applied angle of the bending when we bend the sensor at some particular angle we can see the value of the resistance is increase and accordingly the output get reduced. On the other way we can say that it's like a inversely proportional when the resistance of the sensor is increase at that instant the value of output decrease and accordingly we can make project by getting the advantage of this process.

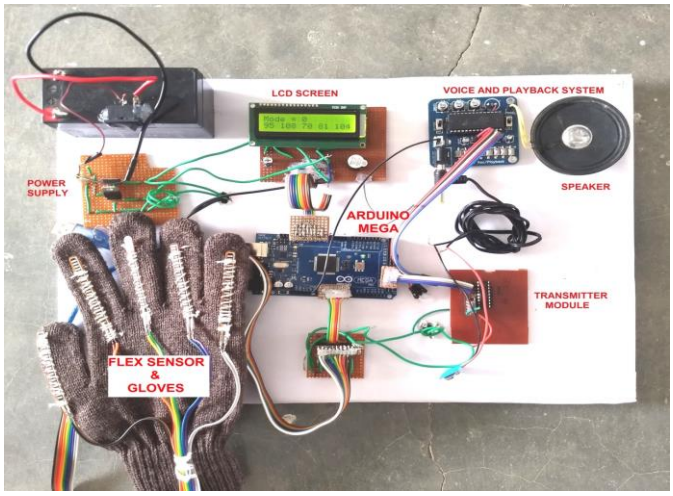

Fig-2: Implemented Prototype.

After looking at the changing value of the output, the value of the get recorded by the arduino and show from the display attached to it. Here the process gets started the arduino gets different value from the sensor. The output value we can continuously see from the LCD which attached to it.

3.1 Mode 0

When system get ON, it stays initially in Mode 0 where glove give status about user; his finger sensor value and position of palm and all these get displays on LCD Screen Attached to it. The user can generate different gesture and user can change Mode by particular patterns as coded. According the programming we have made there are three modes and modes are change when all the sensor give low output. Here we are trying to create the project such that it can work in the two different applications.

3.2 Mode 1

In this Mode, user can use feature of Voice and Playback by generating desired gestures then recorded voice can be played. When the mode gets activated, the sensor gives some value to the Arduino and according to the programming the signal passes from the Arduino to the voice and playback recorder (APR33A3). The recorder check which port or section is active at that time and sound which already recorded in the recorder it play. The sound we hear from the speaker which attached to the recorder.

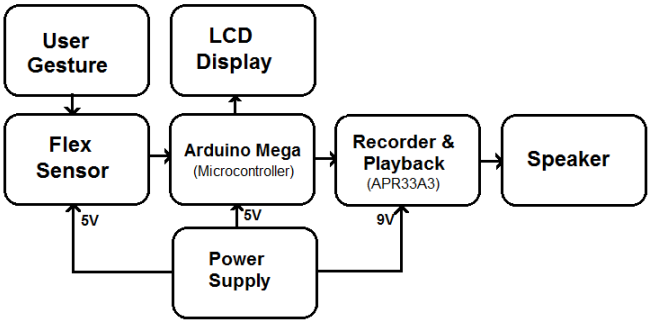

Fig-3: Block diagram of Audio and Playback.

3.3 Mode 2

In this mode a user can control the home appliances where we deal with the major part of the project. Here the output of the sensor is recorded to the Arduino and this value is matched with the programming by the Arduino. The Arduino check the value and matched us the programming and the output we can see from the LCD attached to the Arduino. The output value is send to the transmitter for transmit the data. The transmitter is attached with IC HT12E which encodes the data and finally sends from the antenna. At Receiver end the data get decode with the IC HT12D and send to the relay for switching purpose. The relay we use only for switching purpose which use to ON or OFF the switch.

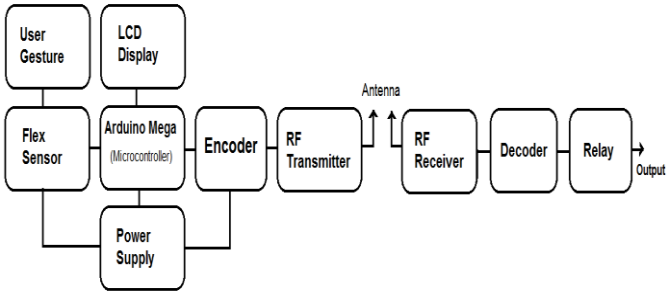

Fig-4: Block diagram of controlling home appliances.

4. RESULTS

As a solution to problem definition, our results are more realistic and affordable than other research paper had claimed. Our Smart Gloves Prototype not only displays the gesture into text, but it also able to convert in voices. The results of our prototype are mentioned below.

4.1 Mode 0

- The status of user's palm and fingers, and Gesture for changing Modes is obtain as follows:

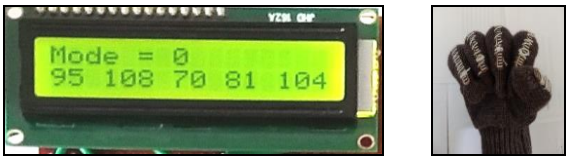

Fig-5: Result of Mode 0 and Gesture for changing Modes.

4.2 Mode 1

As per the code written for different gesture pattern the voice and playback system responded with recorded voices and on LCD display as follows:

- **First gesture command:**

Fig-6: First gesture command for first voice.

- **Second gesture command:**

Fig-7: Second gesture command for second voice.

- **Third gesture command:-**

Fig-8: Third gesture command for third voice.

- **Fourth gesture command:-**

Fig-9: Forth gesture command for forth voice.

4.3 Mode 2

Results of operating appliances as per the different gesture set are obtained below:

- **First gesture command for first Appliance:**

(a) For Switching ON:

Fig-10: Switching ON first Appliance.

(b) For switching OFF:

Fig-11: Switching OFF first Appliance.

- **Second gesture for second Appliance:**

(a) For switching ON

Fig-12: Switching ON second Appliance.

(b) For switching OFF

Fig-13: Switching OFF second Appliance.

5. CONCLUSIONS

This paper introduced the Smart Hand Gloves for Disable People. It will provide the more reliable, efficient, easy to use and light weight solution to user as compare to other proposed papers. This will responsible to create meaning to lives of Disable People.

During this project we face various types of challenges. We have tried to minimize the problem. One problem is there to make it Wireless. So, we observed and analyzed different research papers and products available in market which are bulky, difficult of handle, and delicate in structure. Since this was a prototype our focus was to build a model, which can solve or minimize the communication problem for the disable people.

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