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Smart Glove for Disabled

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Abstract:

In this beautiful planet where life exists, Communication is one of the most cherishable things in human life. It is a medium by which we can share our thoughts or convey messages but for a person with disability it is difficult to communicate with a normal person. Communication for disabled people(deaf, dumb) is difficult and creates a gap between normal and disabled. So aiming this and to reduce this gap, Smart Glove is proposed. Smart glove can be used by disabled people to come forward and grow.

Keywords — **Sign Language, Arduino, Text, Gesture Recognition system, Flex Sensors.**

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I. INTRODUCTION

India is the second largest populated country in the world. It is also the home to around 2.4 million Deaf and Dumb. These people face a difficulty in communication and this results in less literacy and puts them on the backfoot. The big reason behind this is, deaf people are unable to listen and dumb are unabled to speak. According to a survey a decreasing ratio of literate and employed deaf and dumb people is seen.

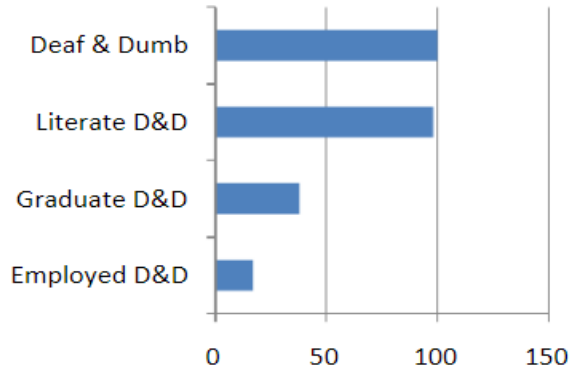

Fig. 1 Deaf and Dumb Work Survey

Also according to a survey conducted by WHO there are currently over 30 million speech impaired people in this world and they rely on sign language to communicate, but sign language is not understood by most people, which creates a communication barrier for the impaired people. As far as the visually impaired are concerned, they find it really difficult to travel along the roads due to various barriers. The old aged members find it really difficult to perform their day to day routines like drinking a glass of water, switching on a fan or controlling a TV remote etc. After analyzing all these problems we propose a system called the smart glove which will integrate multiple features to serve the disabled members and help them communicate freely with the open world. Remote control of appliances in the subarea of Internet of Things is an area well established today. Most of the remote control devices require pressing of buttons, to control a gadget. These buttons are useful to control but not very convenient for disabled.

II. LITERATURE SURVEY

D.R.Akshay proposed a low-cost smart glove for the disabled. The glove was able to control multiple home appliances by simple hand gestures. As we bend our index finger, the fan turns on. This paper gave us insights into how gestures can be mapped to a particular device in our home. Martin Curic proposed a Bluetooth connected hand glove which can function as a computer mouse. It will be helpful for the disabled to control the computer system without using the traditional keyboard and mouse which had many design flaws. With the help of this glove even the bedridden can operate a computer.

Prof. Shimi S.L and Pallavi Verma also proposed a smart glove with gesture recognition. The output of the glove was the voice section. They proposed a very simple mechanism in which the sign language was converted and communication was established.

M.Muthiah came up with a unique glove to control universal IR sensors. It acts as a universal remote control. The glove has inbuilt contact sensors to detect our gestures which will be sent to the devices via radio frequency. Nikitha Praveen developed a smart glove which will act as a sign language interpreter. The LED-LDR pair will be used to detect the gesture and the appropriate message will be printed on the LCD screen.

The above mentioned are the prominent works which were conducted in the field of smart gloves in the last decade. All these works were instrumental in making our model.

III. OBJECTIVES

- To build a simple design of glove which can help the disabled in their day to day activities.
- Simple gestures with accuracy.
- Cheap and easy to construct user friendly glove.
- Easy configuration module of glove.

IV. MAIN COMPONENTS

1. Flex Sensors

A flex sensor is also called the bend sensor. It measures the amount of deflection or the bending caused to the sensor. The resistance of the sensor is directly proportional to the amount of bending moment. It is often called the flexible potentiometer. Flex sensors are widely used in areas of research from computer interfaces, rehabilitation, security systems and even music interfaces.

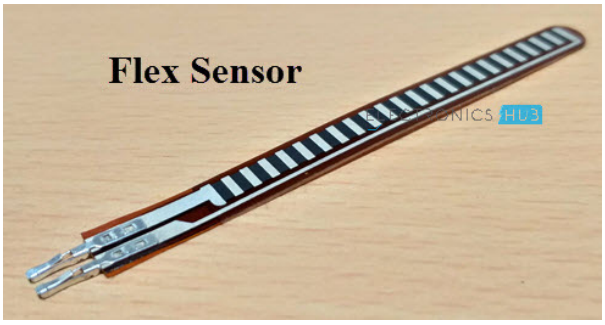

Fig. 2 Flex Sensor

2. Arduino UNO

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.

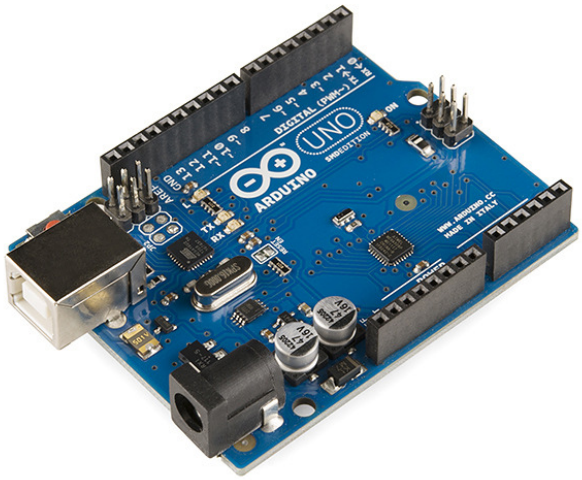

Fig. 3 Arduino UNO

V. CONSTRUCTION AND PROPOSED METHODOLOGY

Construction: The glove will be designed using the flex sensors and Arduino Uno. The flex sensors will be attached to the index, ring, middle and small fingers respectively. The flex sensors will be connected to the resistors which will help to decrease the sensitivity of the flex sensors. The microcontroller Arduino will be connected to the laptop. The power supply will be supplied to the microcontroller from a 5v battery or the laptop. The output will be printed on the screen.

Methodology: The Glove connected with the flex sensor will read the hand gestures of the user. Recognized gestures are matched with prefeeded data and if it matches given to the speaker using the voice section. The gesture would be then converted into the text.

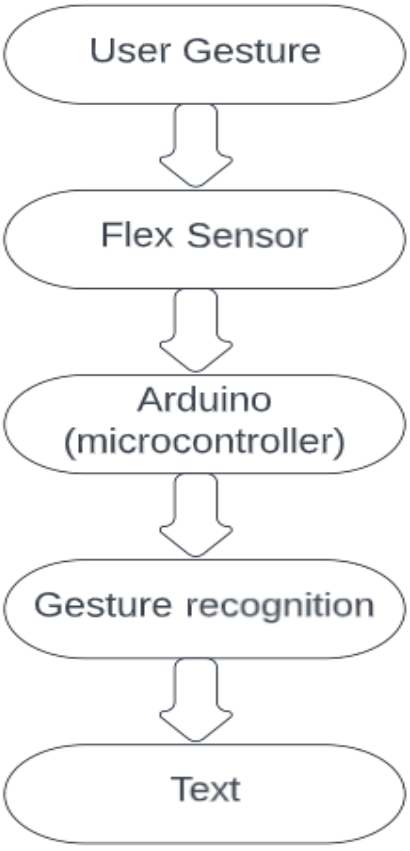

Fig. 4 Flow Chart

Gesture Recognition System : The gesture manager is the principal part of the recognition system. It contains data to match with incoming data. The system tries to match incoming data with existing posture. The bend values of the fingers and for each posture definition the distance to the current data is calculated. Then, the position/orientation data is compared in a likewise manner

VI. CONCLUSION

Sign language is a method used for communication by disabled persons. Here we are converting sign language into text so that communication is not limited between them only, utilizing data gloves communication barrier between two different communities is eliminated. Thus, by just moving the fingers, the messages can be conveyed. The blind are generally confined to their houses because traversing along the busy roads is a very hard task. Using data gloves disabled people can also grow in their career and the nation will grow automatically. Making their future better ,making the nation better.

VII. FUTURE REFERENCE

The Present Project has a lot of scope in the future. A lot of features can be added to the Smart Glove :-

- A Sensor can be added to the Glove. The glove will act as an obstacle detector. As when an obstacle comes in front of the glove, the buzzer will ring in order to indicate its presence.
- A Heart-rate Sensor can be added which will act as a heart rate detector. The sensor will detect the heart rate and print it on the monitor. This functionality will be helpful for the heart patients.
- Text to Voice Generator can used to convert the gestures into sound, which can be more handy and helpful to the disabled person. It will also act as a confirmation for the blind if their gesture showed the desired output or not.
- Wireless communication is the future. Keeping the glove connected to the laptop all the time is not feasible. We can use a transmitter and receiver of high frequency range(1.6GHz) to perform wireless communication. By using such high frequencies, the total range of communication will be in a radius of

1.6km.

- A beginner mode can be added, where the app connected to the glove can teach a person gestures and their meanings.

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