

Support System for Disable People



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Abstract: Technologies are advancing day by day at an incredible rate, but in respect of deaf and special people-related technologies advancements and new technologies are needed, such as a program that effectively translates the sign language to both text and audio. In this research paper authors have proposed a device that help in communication for deaf and dumb people and reduce the barrier of communication. Different people have trouble communicating with the person who does not know sign language, therefore, using this device they can communicate using gesture which will translate the gesture and display the text on the LCD and voice by speaker. The device is both composed of hardware and software.

Keywords: Flex sensors, Arduino Uno board, Gloves, SD card module, LCD

I. INTRODUCTION

The term deaf and dumb is referred to the person who is unable to hear and speak. Normal people have the ability to freely communicate between each other without any problem, however deaf and dumb people cannot communicate easily. Since such people are not able to present themselves to others i.e. friends, family, society, an irritation and frustration may develop in them which lead insecurity among them. There are lots of example to understand the problems occur with them on daily basis, however let's take a case where a deaf and dumb person is suffering from some disease. This is a difficult condition for the caretaker to interact with, since both (caretaker and suffering person) will face communication problem. It is known to all that voice is not the only the medium to communicate, however, it is most popular among all the other mediums. Like other mediums it also works good in case of normal people. A language communication is very popular among dumb people. However, if such person is wish to communicate with normal person which is totally new to this language, it will end up with no result.

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So the problem of communication between normal and dumb people is still a big challenge to the researchers [1]. There is a way to overcome this gap of communication to great extent. It is the use of Flex/Bend sensor, that is used to measure the mount of deflection or bending. By using this sensor and other system a sign language can be used to communicate with people. Therefore, an attempt is made in this paper to prepare a system which can reduce the problem of communication with deaf and dumb people [2-5].

II. SIGN LANGUAGE

Language is a medium required to have communication between two persons. But if we talk about communication between a normal people and deaf and dumb people a communication gap arises. Sign languages are natural languages that use different means of expression for communication by dumb & deaf people. It is a communication skill that uses gestures insisted of sound for communication. Postures or movements of the body, head, eyebrows, eyes, cheeks, and mouth are used in various combinations to show several kinds of information. Signs are used to communicate words and sentences to viewers. A sign language usually refer sign for whole world. For e.g. sign or a gesture used for 'hello' or 'bye' will have same meaning even if expressed in any language.

III. PROPOSED METHOD AND METHODOLOGY

The proposed method comprises of four flexi sensors which are placed on four fingers and each sensor has two specific ranges of voltage and each one of them specify one gesture. The gesture will display on the LCD and voice will vocalize by speaker. Using this proposed method, the deaf and dumb people will be able to express their need. It is also helpful to communicate with the normal people and live a life like them. Fig. 1 shows the flowchart of the proposed method.

Once the power supply of hardware is on and someone put the glove fitted with flex sensors come into step second and acquire a gesture, this gesture is compared with stored gesture in the software and if match is establishing, then according to that gesture corresponding voice will come out in speaker while the corresponding text will display in LCD screen.

For converting the sign language to speech users need to wear the Gloves in which flex sensors are attached.

When the user makes the hand gesture the fingers are either folded or may not be folded.

When fingers are folded the value of resistance of flex sensor changes it becomes 30KOhms. When fingers are not folded the value of resistance of flex sensors is 10KOhms.

These resistance values are used to determine the gesture of hand and text corresponding to which are stored in look up table. The same text wav file is search in SD card. This wav file consist of speech which is played and also the text is displayed on the LCD.

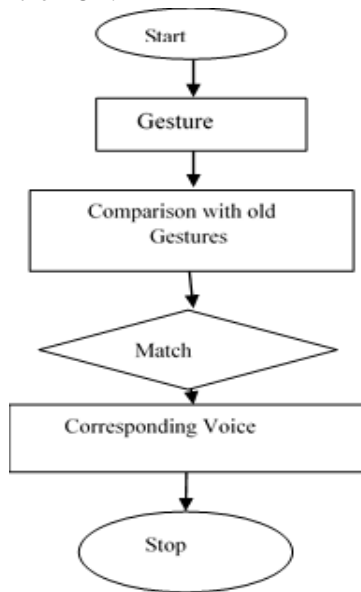


Fig. 1 Flow chart of the method

In the support system for deaf and dumb glove connected with flex sensor has been used. Flex sensors plays major role because with the help of these sensors the gesture can be converted by bending the surface of sensor. Every finger of glove is equipped with flex sensor.

The results of flex sensor performance are obtained by bend degree. Those performance data often varied as the degree of bend. The sensor-based glove's analog output is fed into Arduino Uno board. It processes signals and this also transforms analog signals into digital signals. This resulting digital signal is then transmitted to the next section, which is section on gesture recognition. The main role of this segment is to identify the gesture, and then to evaluate and display related text information in LCD. Fig. 2 shows the whole process of methodology.

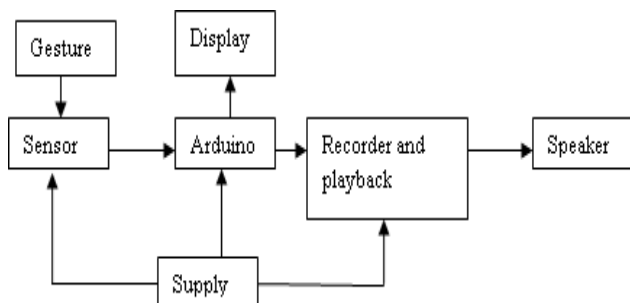


Fig. 2 Methodology

IV. HARDWARE

The device's structural arrangement consists of flex sensors connected through each finger to a glove and each gesture acts as a sign. The gesture shape depends on the flex sensor bending angle imposed on different fingers and by collecting

data from different flex sensors, we send it to Arduino Uno to turn it into text and voice using speaker. A pull-up resistor is used to supply the voltage. These basic flags were found by the ADC foreground in Arduino Uno and after that converted into computerized signals. The hardware consists of different components, which will be used to create the model described in Fig. 2.

A) FLEX SENSORS

Flex Sensors are also called bend sensors. The sensor measures how much device deflects when these sensors are bended, and then establishes a resistance output that corresponds to the bend radius. The resistance varied in range between 10 kilohms to 40 kilohms.

A general organisation device had a range of 10 kilohms but when it bends its resistance increases upto 40 kilohms. These sensors are varied at angle of 90 degrees. The device integrates within the device apply a potential divider network. The potential divider operates to line voltage which is output voltage and these are connected in non-parallel manner across 2 resistors as shown in Fig. 3. The potential divider is created with the assistance of electrical system and flex. This device is used to divide input voltage by a significant variable-and glued-resistor-regulated relation.

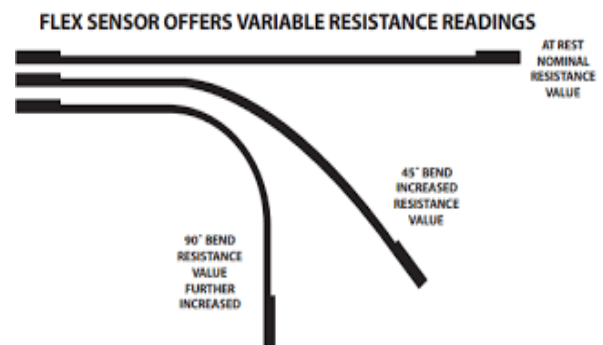


Fig. 3 Flex sensor

B) ARDUINO UNO BOARD

The Arduino Uno is an open source microcontroller module, which is essentially based on the microcontroller Microchip ATmega328P and is developed by Arduino. The board is equipped with analog and digital input / output (I / O) pin sets that can be attached to different enlargement boards and other circuits. The board has 6 analog I / O pins, 14 optical I / O pins (six with PWM output capabilities) and these pins are programmable to the Arduino IDE (Integrated Development Environment), which is connected to the USB cable. The power is supplied to the circuit by a USB cable or an external 9 Volt battery, and this voltage ranged from 7 to 20 Volts.

An Arduino board contains an Atmel-8 microcontroller (ATmega8, ATmega168, ATmega1280, ATmega2560). In this undertaking both programming and equipment is accomplished by Arduino Uno. Simple flag is transformed into advanced flag in the equipment stage. Fig. 4 shows the unit of an Arduino Uno controller.

Various features of Arduino are given as following: -

- It is operated on 5V
- The input voltage recommended to Arduino Uno has a range of 5V to 12V.
- DC current given to each input/output pin is 40ma.
- CLK speed is 16 MHz.



Fig. 4 Arduino Uno

C) LCD (Liquid Crystal Display)

A LCD (Liquid Crystal Display) is a flat panel monitor, video monitor, or visual electronic display. For this work, authors have used 16 * 2 LCD display. It is one form of electronic video display module that is used in a wide range of applications such as various circuits and appliances, such as cell phones, computers, calculators, TV sets etc. These displays are preferred mainly for light emitting diodes in multi segment as well as for seven segments. There are several benefits of using this module because it is not costly and easily programmable, and hence there are also no limitations of viewing custom characters, special animation etc. An LCD module is given in Fig. 5.

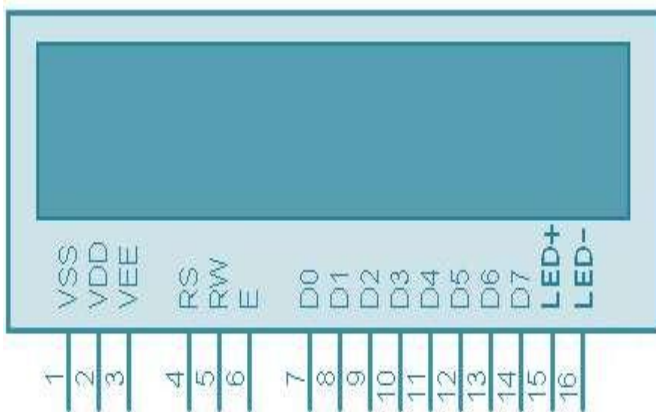


Fig. 5 LCD Module

D) SD Card Module

The Micro SD Card Module is used to transfer data to and from a regular SD card. The pin out is specifically adaptable in SD card with Arduino but can also be used with other microcontrollers. It helped in adding mass storage, Logging data in this work.

This module has an SPI interface and is adaptable for use with any SD card. it can be supply with 5V or 3.3 V power supply and is compatible with Arduino Uno or Arduino Mega. SD card module has many applications some of which include: - data logger, audio, video graphics. Module SD card. Expand the versatility that Arduino can do with its very small memory, too. Fig.6. shows module of a SD card.

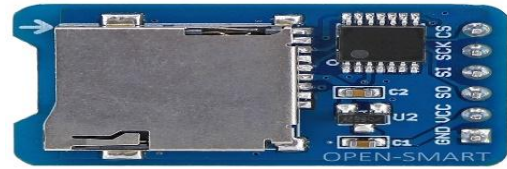


Fig. 6 SD card Module

V. SOFTWARE

In this work, Arduino Software (IDE) is used to program the framework. This work is a combination of hardware and software wherein hardware does the physical activities part while software prepares the base for hardware working. The software is used to process the sign language so that it can be displayed in the LCD. For data storage SD card has been used. Whenever the user operates finger corresponding sign language can be processed and display in LCD along with a voice command in speaker. Different movement and interaction visualize using processing. It combines programming language, teaching methods, and production environment and forms a cohesive structure. The main aim of processing is to teach basic computer programming fundamentals within a visual framework to be used as a software sketchbook and as a production tool. Fig. 7. shows block diagram of the module.

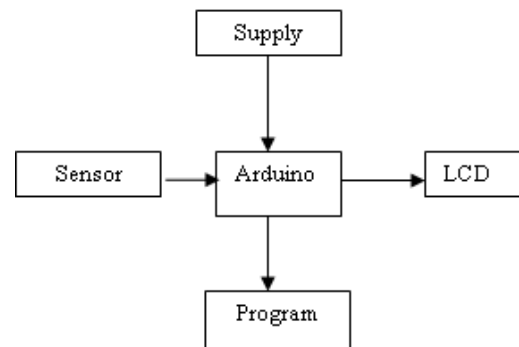


Fig. 7 Software processing

Some advantages of the module are given as follows:

- It eliminates the need of interpreter.
- It is easy to operate.
- Reliable for dumb people.
- User-friendly interaction with the user.

VI. RESULT

Fig. 8 shows the snapshot the hardware module of this work. It is seen that in this work six flex sensors have been used. Therefore, whenever a person with glove move the hand a gesture will form. The flex sensor has different resistance according to which the gesture will work. The gesture is fed to Arduino Uno which helps to convert the analog signal came as input from flex sensor and converted in digital signal by the help of Arduino. Arduino basically work as analog to digital converter.

This is all about the hardware part and software is prepared using coding done in C programming. So according to the programming and hand movement the gesture appeared as a text in LCD screen. This gesture is also converted into audio file with the help of speaker. Let's take a case where a user is willing to have water and it moves its index finger, the corresponding gesture will have processed into processor and it will come out as a voice of water and will display too in LCD. It is very helpful to the person as well as for the person nearby him/her.



Fig. 8 Snapshot of Project Hardware

VII. CONCLUSION AND FUTURE SCOPE

This paper covers glove based device for dumb people. This device is used to convert a gesture into a voice and display. The device consists flex sensors, microcontroller, LCD, SD card to perform a task originated by user.

These gloves make the life of dumb people easier as with the help of these gloves the gesture used by the disabled people is converted to voice in the speaker and the text to display on LCD. The user can easily operate this device since it consists user friendly structure. Through this device a person in need easily communicate with others. This device will help the user interaction to other people and will make their life easier in terms of communication.

Talking about the future scope of the work, the main Focus is on reducing the size of the device. More addition can also be done on the device by embedding more sensor on it, so that it can sense more sign easily and effectively. To make the system more portable the device should be able to process different language. As we know that mobile are now part of human life and users are more flexible with it, the device should be compatible with the mobile too.

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