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ELECTRONIC SPEAKING SYSTEM FOR SPEECH IMPAIRED PEOPLE

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Abstract: This the most challenging task is the communication between Deaf-Dumb and a normal person. Our proposed project aims to help people by means of a Glove based interpreter system. The glove is equipped to our hand and with the help of glove we can do Hand gestures. For each unique gesture, the gesture module produces a equivalent change in resistance and accelerometer measures the orientation of hand. Hand gestures are controlled in the controller. The glove works in two types of modes of operation. Training mode is used to benefit every user and 2. An operational mode. The combination of letters to form words is also done in Controller. Additionally, the system includes a text input to speech conversion output (TTS) block that is used to translate the gestures.

One of the difficult methods used in sign language for non-verbal communication is The Hand Gesture. Generally, the people who are having hearing or speech problems use such type of communication to communicate among themselves or with normal people. Various sign language systems have been developed around the world by various manufacturers but they are neither flexible nor cost-effective for the users. In our paper we show a system prototype that is able to automatically identifies the sign language to help normal people to communicate effectively with the deaf or dumb people.

Index Terms **- Deaf & Dump People, Communication for Impaired People**

I. INTRODUCTION

The main way of communication for normal human being is speaking. But think about a speech impaired person who can't able to communicate frequently with a normal person. Because speech impaired people use sign language for their communication. And most of the people don't understand sign language. So it puts the speech impaired person in a difficult situation. In recent years, hand gestures detections and been popular for developing applications are focused by researchers in the robotics field and extended in the artificial area or prosthetic hands that can imitate the behavior of a human hand and fingers. Our project also uses a same approach for the detection of the movement of hands, however we are trying to implement the idea in a little bit different perspective and came up with a small but significant application in the field of bioengineering. The main objective is to lessen this communication problem by designing a Electronic speaking system. This device benefits a dumb person to communicate with a normal person as well as with a deaf person. This project consists of the main component that is a glove with mems sensors that are connected to Arduino UNO which is the main control unit of this project. A feature of user input is used in this device. So dumb person can easily use their own chosen commands for specific gestures

II. PROPOSED FRAMEWORK

This project presents a system prototype that is able to automatically recognize sign language to help normal people to communicate more effectively with the hearing or speech impaired people. This project consists of an arduino controller interfaced with flex sensors and voice play back circuit. By using flex sensors we can produce different gestures, for each gesture we coded a voice track. So other normal persons will easily understand the impaired person. In addition to it we using a bluetooth communication device. By using bluetooth and android application we can convert the voice commands into text. This text commands will display on lcd which is useful for deaf persons also.

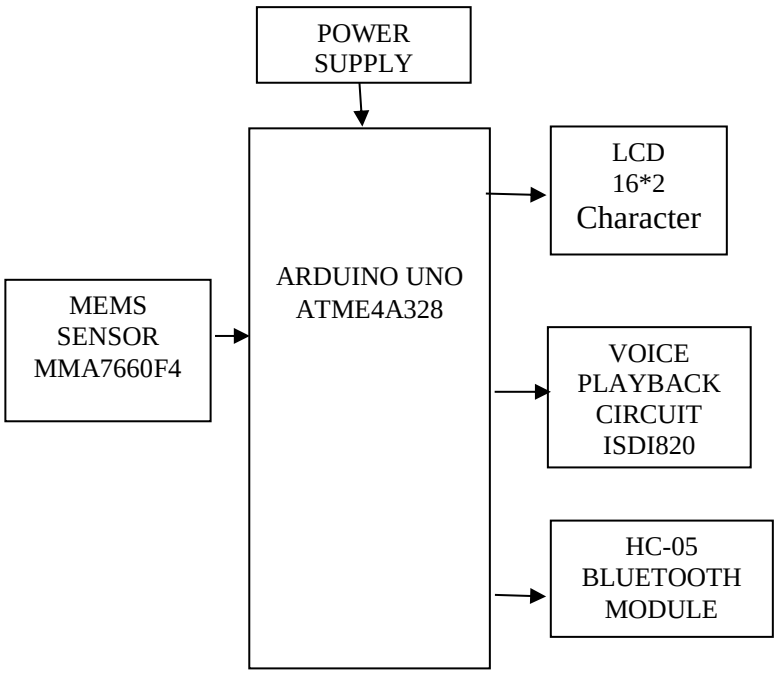

Figure 1. Block Diagram

A) Arduino Uno:

The Arduino Uno is a microcontroller board that is based on the ATmega328. It contains 14 digital i/o pins (of which 6 of them can use as PWM outputs), 6 are analog inputs, a 16 MHz ceramic resonator, a USB connection, and a power jack, an ICSP header, and also a reset button. It also contains all that needed to support the microcontroller; simply we can connect it to a computer with the USB cable or power it with a AC-to-DC adapter or battery to get started.

Microcontroller: ATmega328
Operating Voltage: 5V
Input Voltage (recommended): 7-12V
Input Voltage (limits): 6-20V
Digital I/O Pins: 14
Analog Input Pins: 6

Figure 2: Arduino Controller

B) MEMS SENSOR:-

The MMA7660FC is a ±1.5 3-Axis Accelerometer with Digital Output(I2C). MEMS sensor is a very low power, low capacitive MEMS sensor. It features a low pass filter, which is compensation for 0g offset and is used to gain errors, and conversion to 6-bit digital values takes place at a user configurable samples per second. MEMS sensor is used for sensor data changes, product orientation, and detection of gestures through an interrupt pin (INT). It is housed in a small 3mm x 3mm x 0.9mm DFN package

Figure 3: MEMS Sensor

C) LCD:-

A liquid crystal display (LCD) is a very thin, flat display device that is made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. Each pixel contains a column molecules of liquid crystals suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without all the liquid crystals between all of them, light passing through one of them would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other

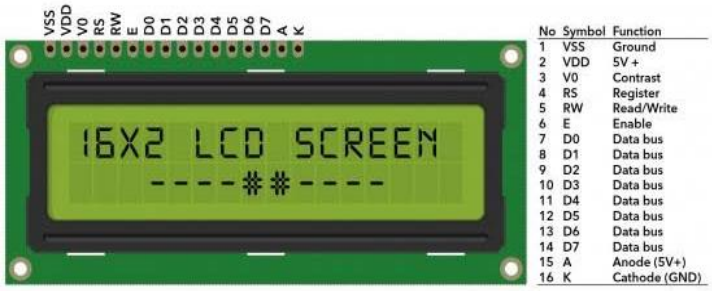

Figure 4: Pin diagram of 2x16

D) HC-05 BLUETOOTH MODULE:-

The HC-is really a cool Bluetooth module which can add two-way (full-duplex) wireless functionality to our projects. This module is used by us to communicate between two microcontrollers like Arduino or can be used communicate with any device with Bluetooth of a Phone or Laptop. Many android applications are there that are already available that makes this process a lot easier. TheHC-05 Bluetooth module is used to communicate with the USART at 9600 of baud rate and therefore it is really very easy to interface with any of the microcontrollers that supports USART. We can configure the module default values by using the command mode. So if we are looking for a Wireless module that can transfer data from our computer or mobile phone to microcontroller or vice versa then this module may be the correct choice for us. However we do not expect this module to transfer multimedia like photos or songs; because we may have to look into the CSR8645 module for that.

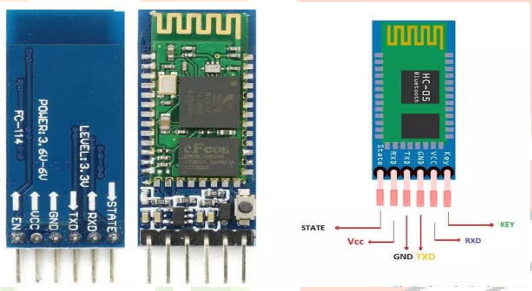

Figure 5: HC-05 Bluetooth Module Pin out

E) VOICE PLAY BACK MODULE:-

This Voice playback module is depended on ISD1820, which is a multiple-message record/playback device. This device can offer true single-chip voice recording, no-volatile storage, and playback capability for 10 seconds. The sample is 3.2k and the total maximum of 20s for the Recorder. This module use is really very easy which you could direct control by push button on board or by Microcontroller such as Arduino, STM32, Chip Kit etc. From these, you can easily control record, playback and repeat and so on

Figure 6: Voice Play Back Module

F) Power Supply:-

Power supply is given to all of the components that are present in the circuit either directly or indirectly. Here ADC is used to give the required power supply to the kit in our project. 12V is supplied and a total of 5V power supply is required

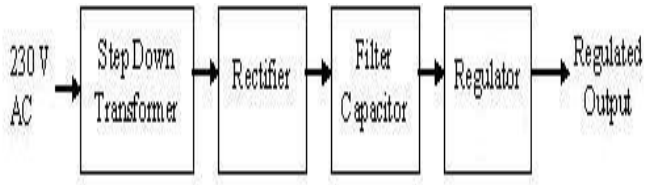

Figure 7: Basic Block Diagram of A Fixed Regulated Power Supply.

III. RESULT OUTPUT

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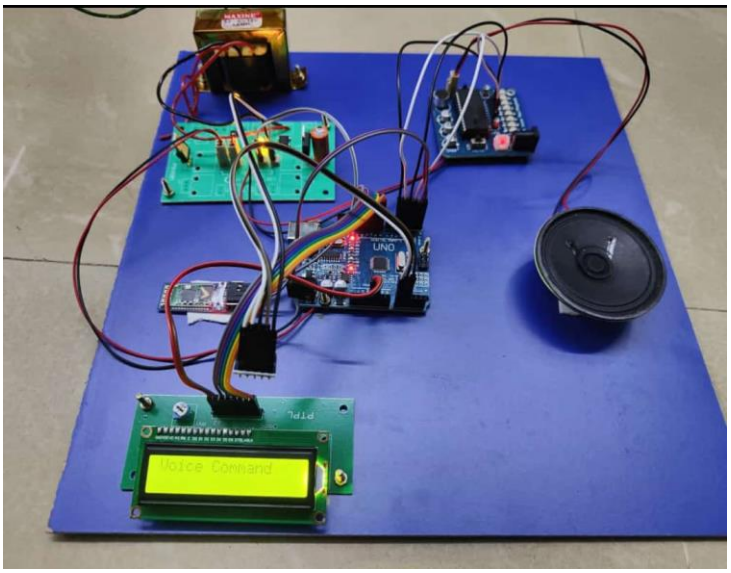

Figure 8: Project output for speech impaired people.

This project helps to overcome the drawback of communication barrier between deaf &dump and normal people.

First of all recorded voices are stored in the voice playback module when the switch is in record mode. In this project, the MEMS Sensor is attached to the Hand Glove. There will be 4 recorded voices each of them connected to the Hand Gesture Posture. For example if the hand is placed Horizonal to ground then there will be no voice. If the hand is moved upwards then will be played and output comes from the speaker. In the same way the other three voices are played. This helps the deaf & dump people to communicate with the normal people.

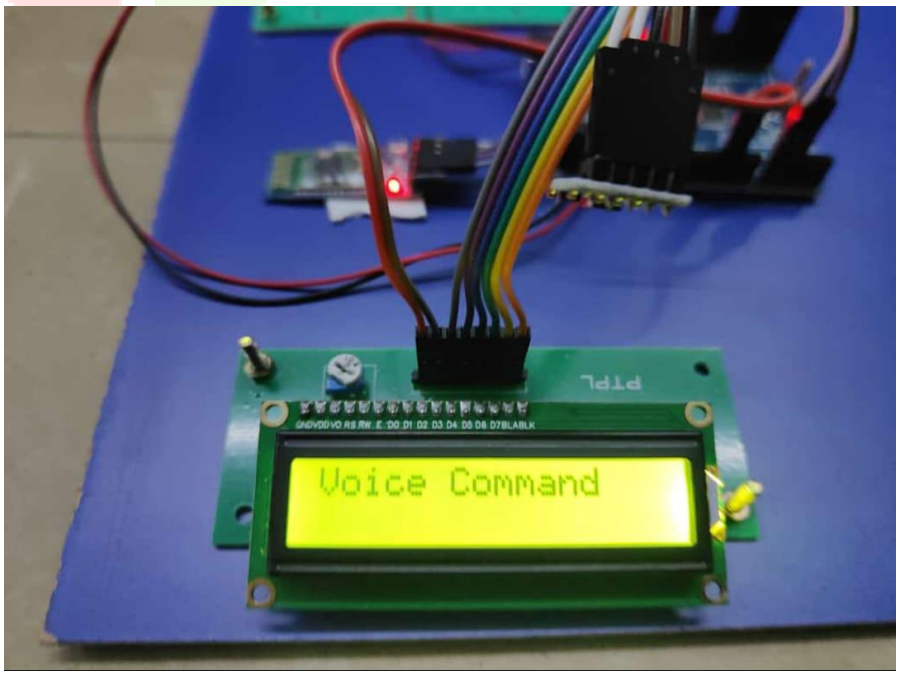

Figure 9: Voice command display for deaf people

Secondly, Lcd screen which is used to show 16*2 characters on it is placed HC-05 Bluetooth Module is used to connect to the device which we are using. No, when the device is connected to the Bluetooth Module and the Device, then when we speak something the display of the voice command is shown on the LCD Screen. This is used to communicate between the deaf people and normal people

IV. CONCLUSION & FURURE SCOPE

CONCLUSION:

An inclusive review available in literature to faciliate people by means of a glove based deaf- mute and normal persons communication interpreter system is presented in this paper. The merits and potential applications of each technique also described. This can be most commonly used by people who have hearing & speech problems to communicate among themselves or with normal people

FUTURE SCOPE:

The system forms the base infrastructure for a complete communicational aid system for the deaf and mute. To expand its capabilities, more languages can be easily added by adjusting sensor values. Further, reliance on a dedicated computer system to enable the TTS functionality can be eliminated by adding a portable computer like the Raspberry Pi, which can handle the TTS while retaining portability of such a system. The system can be waterproofed by adding a waterproof coating to the gloves and the electronics components can be concealed in a waterproof packaging**.**

V. ADVANTAGES & APPLICATIONS

- The proposed system is cheap, cost efficient and portable.
- This system uses simple techniques. It helps deaf and dump people
- People in marking areas, public sectors, working areas for communication with others. This project play major role in various fields
- Major roles in various fields such as Robotics Biometrics
- Automatic control in Industries
- Musical instrument is being replaced by physical buttons and switches are replaced by hand gestures

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