

HAND GESTURE BASED VOICE ASSISTANT

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In our country around 2.78% of peoples are not able to speak (dumb). Their communications with others are only using the motion of their hands and expressions. We proposed a new technique called artificial speaking mouth for dumb people. It will be very helpful to them for conveying their thoughts to others. Some peoples are easily able to get the information from their motions. The remaining is not able to understand their way of conveying the message. In order to overcome the complexity, the artificial mouth is introduced for the dumb peoples. This system is based on the motion sensor. According to dumb people, for every motion they have a meaning. That message is kept in a database. In the real time the template database is fed into a microcontroller and the motion sensor is fixed in their hand. For every action the motion sensors get accelerated and give the signal to the microcontroller. The microcontroller matches the motion with the database and produces the speech signal. The output of the system is using the speaker. By properly updating the database the dumb will speak like a normal person using the artificial mouth. The system also includes a text to speech conversion (TTS) block that interprets the matched gestures.

KEYWORDS: Arduino, Flex effect sensor, APR33A3 voice module, speaker, 16*2 LCD.

I. INTRODUCTION

Sign language is a natural way of communication between normal and dumb people. Sign language is mostly dependent on hand gesture recognition. It is sometimes not easy for normal people to recognize the signs properly and understand what they want to say. So the intension of the gloves is to make the life style of the dumb and deaf people easy. The gloves translates the hand gestures to text and further speech so that the normal people can read the recognized gesture and hear to the voice and understand what that person wants to tell, which will make the communication more efficient. The system consists of both physical and non-physical communication. Sign language differ from country to country it is not universally same. America developed American Sign Language (ASL); British developed British Sign Language and so on. Most of the countries follow the American Sign Language and our system is also based on the same. The gloves convert the specific gestures to text then to speech using Arduino as heart of the system. The flex sensors are used in the system which is attached onto the gloves which convert the gesture into resistance which is further converted to the text through Arduino nano. The flex sensors come from flexible sensors family, which are flexible enough. Along with flex sensors accelerometer and contact sensors are also used for accurate output. The accelerometer is used to monitor the motion of the hand and to monitor the contact between the fingers the contact sensors are used. The selection

of the sensors is based on the signs the language is consisting. Some signs are dependent on the movement of palm so to monitor that accelerometer is used while some signs are dependent on the contact of the fingers so to get the specific output if that signs contact sensors are used. The output of the sensors is processed on Arduino nano to get text as an output displayed on LCD. Further that text is sent via Bluetooth module to mobile phones/computers. Further that data is converted to speech via text to speech conversion software. There is no such commercial system available in the market to convert sign language into speech. However research is being made to convert sign to speech and make it portable, efficient and highly accurate

II. LITERATURE SURVEY

A. "Real-time sign language gesture recognition for voice synthesis using depth sensor" by Ali, et al. (2014): This study proposes a real-time system for recognizing American Sign Language (ASL) gestures using a depth sensor and then synthesizing voice output in real-time.

The authors evaluate their system on a dataset of 200 ASL gestures and report an average recognition accuracy of 95%.

B. "A review on hand gesture recognition techniques, challenges and applications" by Shamsuddin, et al. (2016): This review article provides an overview of various techniques for hand gesture recognition, including traditional approaches such as template matching and machine learning-based approaches such as neural networks and support vector machines. The authors also discuss the challenges and applications of hand gesture recognition, including its use in sign language recognition and human-computer interaction.

C. "Hand gesture recognition using depth and color information with convolutional neural networks" by Cai, et al. (2017): This study proposes a hand gesture recognition system that uses both depth and color information from a camera and a convolutional neural network (CNN) for classification. The authors evaluate their system on a dataset of 15 hand gestures and report an average recognition accuracy of 93.4%.

D. "Real-time American Sign Language recognition using convolutional neural networks" by Pu, et al. (2018): This study proposes a real-time system for recognizing ASL gestures using a CNN and a depth sensor. The authors evaluate their system on a dataset of 44 ASL gestures and report an average recognition accuracy of 98.8%.

E. Overall, these studies demonstrate the effectiveness of using machine learning-based approaches such as CNNs for hand gesture recognition and conversion into voice output. These approaches have the potential to greatly improve communication and accessibility for individuals who use sign language or other forms of hand gestures to communicate.

III. EXISTING SYSTEM

- Existing system of this project is There have been several solutions for hand gesture recognition and conversion into voice in the past. One of the earliest systems was developed by IBM in the 1990s called "Sign Language Recognition and Translation using Hidden Markov Models"

(SLRTHMM), which used video cameras to capture sign language gestures and then processed the data using hidden Markov models to convert the gestures into speech. Overall, hand gesture recognition technology has been advancing rapidly in recent years, and there have been many innovative solutions developed for converting

PROPOSED SYSTEM

The proposed system makes use of data gloves for data gaining (flex sensors) trailed by the presence of Processing unit and the output unit that brings an output. Fig.1 gives an insight as to what the proposed system shall look like on completion. This system custom a data glove for data acquisition to safeguard user friendliness. The proposed system makes use of data gloves for data gaining (flex sensors) trailed by the presence of Processing unit and the output unit that brings an output.

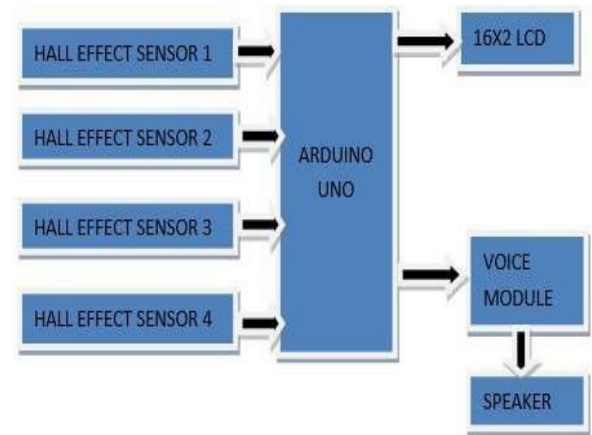


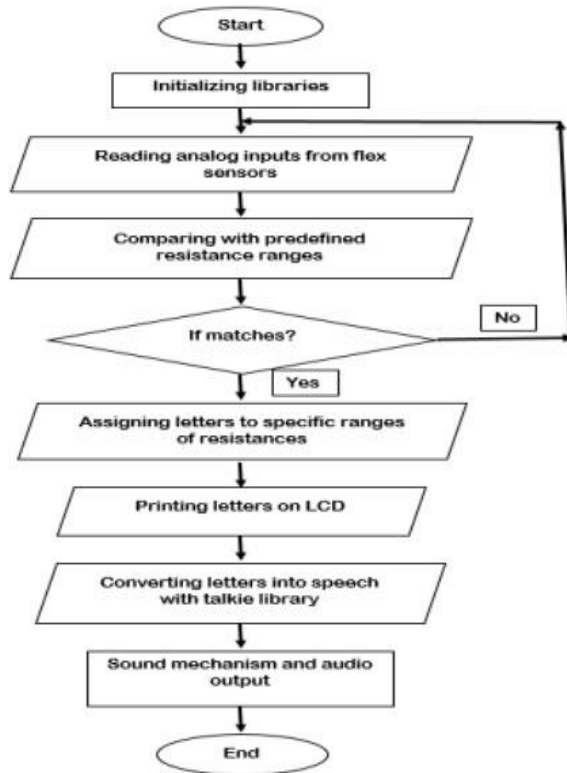
Figure.2: Block Diagram of Proposed System

IV. SOFTWARE

The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++. IDE stands for "Integrated Development Environment" it is an official software introduced by Arduino.cc, that is mainly used for editing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go Arduino IDE Definition 1.Arduino IDE is an open-source software that is mainly used for writing and compiling the code into the Arduino Module. 2.It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process. 3.It is easily available

foroperating systems like MAC, Windows, Linuxand runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment. 4.A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more. 5.Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code. 6.The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. 7.The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module.

V. METHODOLOGY



ADVANTAGES

- The main advantage of this is it is a simple hardware structure and it can be carried to many places as usual. So, in this way are mainly focused on Sensor Based Recognition System for Converting SL to Speech and Text conversion without effecting their respective languages.

- Gesture vocalizer is an easy-to-use hand glove device which will help the deaf and dumb community to communicate with the rest of the world using Acoustic sounds.

- HGRVC (Hand Gesture Recognition and Voice Conversion) system localizes and track the hand gestures of the dumb and deaf people in order to maintain a communication channel with the other people.

- Gesture recognition provides real-time data to a computer to make it fulfill the user's commands. Motion sensors in a device can track and interpret gestures, using them as the primary source of data input.

APPLICATIONS :

- Gesture recognition to remotely control a television set.
- Home automation.
- Robotic arm controller.
- Gesture recognition for wheel chair control.
- Gesture recognition for games.
- Gesture recognition for character-recognition.

VI. EXPERIMENTAL RESULTS



RESULT

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The work helps in reducing the road fatalities due to alcohol consumption and rash driving. By installing such device, the ignition of the vehicle is also controlled i.e. the vehicle doesn't start if the driver consumes alcohol and the speed of the driver is continuously supervised and by sending alerts to authorities while crossing the limit promotes the road safety not only to the people driving but also the pedestrians. Thus the work reduces the road fatalities caused by two major reasons which are alcohol consumption and rash driving.

VIII. FUTURE SCOPE

- With the help of different gesture commands, different other commands can be added.
- For more reliable and low complexity of the circuit microcontroller can be replaced by the Arduino or other Advanced Microcontrollers.
- In this project many types of other applications can be added with using the different type of sensors like Heartbeat sensors for heartbeat monitoring and Temperature sensor for body temperature monitoring.
- Using the Xbee Module we can create a wireless zone and this device may communicate with the other devices also.
- Using the IOT technology we can connect this for live updates of the patient or person like locations, status body conditions etc.

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