International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 03 | March - 2023 Impact Factor: 7.185 ISSN: 2582-3930

SIGN RECOGNITION AND VOICE CONVERSION DEVICE FOR DUMB

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Abstract

At most of us are blessed with natural capability to see, hear and interact. Still, numerous people do not have this capability. Due to various reasons like birth scars, accidents, oral conditions, and environmental impacts the number of analogous people is swiftly adding in the recent times. Ultimate of the deaf and dumb use gesture and subscribe symbol for the communication. Subscribe language is the form of communication where shapes, arms or body, exposure and movement of hands, and facial expressions are completely combined. The communication gap between two persons is because of a dumb person uses sign language which is not comprehensible by a normal person. This design mainly focuses on removing the barricade of communication between the mute community and the people not familiar with the generality of sign language so that the dispatches that a dumb person is trying to bear is accessible to a person with no knowledge of sign language. The design of the device is predicated on bedded systems.

Keywords

Arduino, Dumb, Bedded systems, Gesture recognition, Speech recognition, Speech processing.

1. Introduction

Currently we always hear about new technology that improves our life, which makes our life easier. Technology has revolutionized the mortal humanity. Mortal race has put a gear in technology and they are not in a mood to move the pedals down from this gear. There's huge exploration on colourful technology sectors similar as Artificial Intelligence, Smart phones and numerous further. This exploration leads to new inventions and making one's life easier. But there has been a veritably lower exploration for Deaf and Dumb people. This content has got lower attention as compared to other sectors. The Main challenges that this special person facing is the communication gap between-special person and normal person. The Deaf and Dumb people always find difficulties to communicate with normal person. This huge challenge makes them uncomfortable and they feel discerned in society. Because of miss

communication Deaf and Dumb people feel not to communicate and hence they no way suitable to express their passions. HGRVC (Hand Gesture Recognition and Voice Conversion) systems localize and track the hand gestures of the dumb and deaf people in order to maintain a communication channel with the other people. The discovery of hand gestures can be done using web camera. The film lands are also converted into standard size with the help of pre-processing. The end of this design is to develop a system that can convert the hand gestures into textbook. The focus of this design is to place the film land in the database and with database matching the image is converted into textbook. The discovery involves observation of hand movement. The system gives affair in textbook format that helps to reduce the communication gap between deaf-mute and people.

About nine billion people at intervals the earth unit of dimension dumb. The communication between a dumb and hearing person poses to be an important disadvantage compared to communication between eyeless and ancient visual people. This creates an extremely little house for them with communication being associate degree abecedarian aspect of mortal life. The eyeless people can speak freely by implies that of ancient language whereas the dumb have their own primer-visual language appertained to as language. Language is also an on-verbal form of intercourse that is set up among deaf communities at intervals the earth. The languages have not got a typical origin and thence hard to interpret. A Dumb communication practitioner is also a tool that interprets the hand gestures to sensibility speech. The gesture in associate degree extremely language is also a certain movement of the hands with a particular kind created out of them. Facial expressions inclusively count toward the gesture, at constant time. A posture on the other hand is also a static variety of the hand to purpose a hallmark. Gesture recognition is codified into a brace of main orders vision grounded substantially} and sensor grounded. The disadvantage of vision grounded completely ways includes advanced algorithms for process. Another challenge in image and videotape system includes varied lighting conditions, backgrounds and field of check-up constraints and occlusion. The sensor grounded completely fashion provides larger quality.

The person with speaking disability faces difficulty in communicating with the rest of the population. This device is developed to ameliorate the life of a person who has speaking disability. Device converts the gesture to speech i.e. gives voice to a mute person. Speech is one of the important factors needed for the humans to convey their dispatches. In this design, Flex detectors play the major part. They're sutured to the gloves. The affair from the flex detectors is fed into the Arduino. The detectors gives the analog signal that data will be shoot to Arduino and also textbook will be displayed in LCC and gives voice affair where the speech affair is attained using an Android app.

1.1 OBJECTIVE

The main objective of this proposal is to recognize signs of dumb people and convert into voice commands which very useful to dumb people to express their feelings, expressions to normal people and to meet their basic needs. This proposal helps dumb people can interact with normal people by communicating with them and share their emotions, feelings to normal people. This proposal helps dumb people to live life like a normal people.

1.2 SCOPE

The scope of the proposal is to convert signs of dumb people and convert into voice commands to communicate with normal people. This proposal helps dumb people to share their feelings, emotions and expressions with normal people. It establishes communication between dumb people and normal people.

2. Related work

S.NO	AUOTHER	JOURNAL/ YEAR	TITLE	OUTCOMES
01	Darshan Keny , Mousumi Karmakar , Nilesh Kamtekar, Akshay Mehta , Mohan Kumar	2019, ijert	Hand Gesture Recognition and Voice Conversion System for Speech Impaired	This system is based on motion sensor. For every action the motion sensors get accelerated and give the signal to the microcontroller. The microcontroller matches the gesture with the database and produces the speech signal. The output of the system is using the Audio Module. By 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.
02	S. Vigneshwaran M.Shifa Fathima V. Vijay Sagar R. Sree Arshika	2019,IEEE	Hand Gesture Recognition and Voice Conversion System for Dump People	There are two major techniques available to detect hand motion or gesture such as vision and non-vision technique and convert the detected information into voice through raspberry pi.In vision based technique camera will be used for gesture detection and non-vision based technique sensors are used. In this project non-vision based technique will be used. Most of the dumb people are deaf also. So the normal people's voice can be converted into their sign language.
03	Shweta S. Patil ,Mr .G.P.Jain	2019, ijert	Sign Language converter for deaf and dumb people	Glove based technique can be made by using potentiometer, copper plate or sensors like flex sensor, accelerometer sensor & contact sensor. Instead of raspberry pi, arduino board(nano orUno), Atmega controller(8&16 or 168 or 328 or 2560),ARM processor(LPC2148), PIC controller,8051 can be used. Output is displayed either on LCD or on mobile through Wi-Fi-module or Bluetooth module. Like this text is Displayed on LCD or mobile. For obtaining voice output, Text to speech converter (TTS) is used. On mobile or laptop or computer, output as voice can be obtained.
04	Takenori Yoshimura, Tomok Hayashi, Kazuya Takeda, Shinji Watanabe	2020,IEEE	End-to-End Automatic Speech Recognition Integrated with CTC-Based Voice Activity Detection	We focus on connectionist temporal classification (CTC) and its extension of CTC/attention architectures. As opposed to an attention-based architecture, input-synchronous label prediction can be performed based on a greedy search with the CTC (pre-) softmax output. This prediction includes consecutive long blank labels, which can be regarded as a non-speech region. We use the labels as a cue for

				detecting speech segments with simple thresholding. The threshold value is directly related to the length of a non-speech region, which is more intuitive and easier to control than conventional VAD hyper parameters
05	Vibhu Gupta, Mansi Jain, Garima Aggarwal	2022,IEEE	Sign Language to Text for Deaf and Dumb	This paper proposes a CNN-based method for deciphering sign language and then converting it to text. In the proposed scheme of this paper the main focus is on fingerspelling and an additional feature of emotion recognition to support the interpretation with the 3rd component of sign language i.e non-manual features, a real-time solution for easy interpretation of sign language for normal human beings as well as Deaf & Dumb people using convolutional neural networks breaking the language barrier.

3. EXISTING SYSTEM

To Two traditional ways of communication between deaf person and hearing individuals who do not know sign language exist through interpreters or text writing. The interpreters are very expensive for daily conversations and their involvement will result in a loss of privacy and independence of a dumb person. Thus, a low-cost, more efficient way of enabling communication between normal person and dumb person is needed.

3.1 Drawbacks for existing system

- Only writing on notes can convey the messages.
- No automatic sensing of gestures.
- Uncomfortable to understand if the other person doesn't know the Sign Language.

4. PROPOSED METHOD

In this proposed system flex sensors is implemented to capture the hand gestures of a user. The flex sensors are the output a stream of data that varies with degree of bend. This is given to Arduino and it will give voice commands in Android App by using Bluetooth module. Here the flex sensors are used to detect hand posture. Flex sensors are carbon resistive elements. When the sensor is bent, corresponding to the bend radius it produces the output resistance. So by using this people can communicate.

Proposed **architecture**

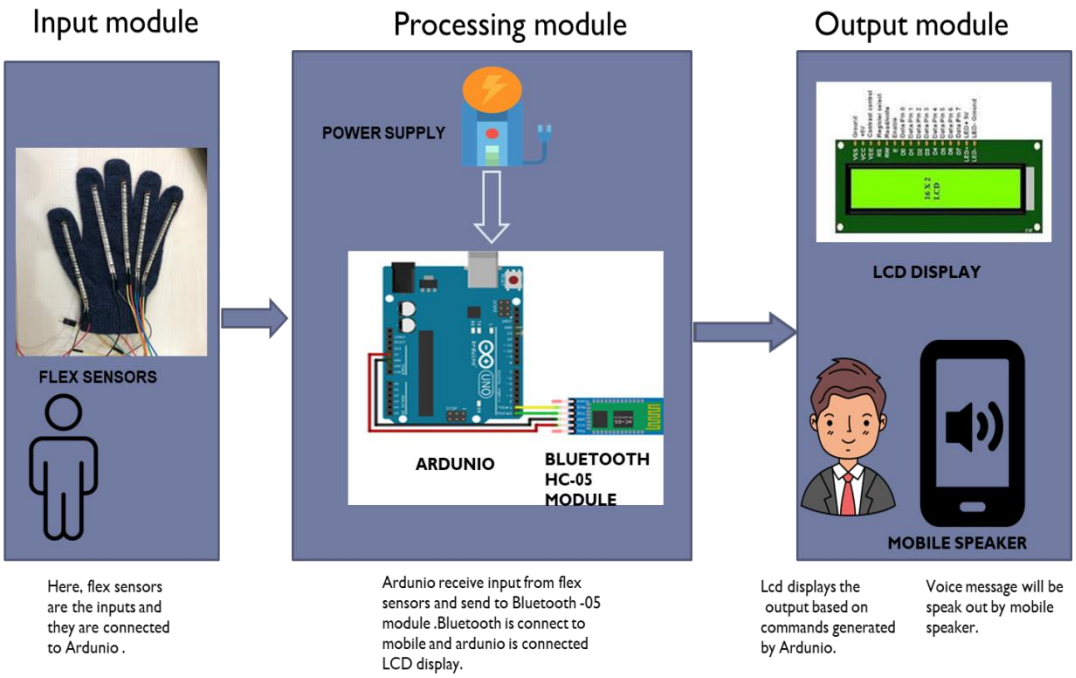

FIG 1. PROPOSED ARCHITECTURE

Description

The user wears the glove which is connected with flex sensors. Here, flex sensors are the input and flex sensors are connected to arduino. Arduino receive input from flex sensors and processes the input. Here, arduino is connected to Bluetooth hc-05 module and LCD. After, processing the input received from the flex sensors, arduino sends the output commands executed are displayed at LCD. And the Bluetooth hc-05 module is paired with user mobile by mobile application. The voice message will be speak out by mobile speaker which is audible to normal people and communicate with dumb people. So, dumb people can share their feelings and emotions with normal people.

- Input module
- Processing module
- Output module

Input module

In input module the components are flex sensors. Where flex sensors are connected to glove. When the user wear the glove connected with flex sensors, if the user bends the finger then flex sensor connected with that bending finger send the input to arduino.

Processing module

In the processing module, the components are ARDUINO, Bluetooth hc-05 module, Power supply. ARDUINO is connected to both Bluetooth hc-05 module and LCD. When input is send by flex sensors to arduino, then the arduino processes the input flex send by the flex sensors and send the output through Bluetooth hc-05 module and LCD.

Output module

In this module the components are LCD and mobile speaker. Bluetooth hc-05 module is paired with mobile by mobile application. The output commands send by ARDUINO are displayed on LCD and voice message will speak out by mobile speaker.

When the user bends one finger the outputs are:

- If the user bends thumb finger, then the output command display at LCD is **"I NEED WATER"** and a voice message will speak out by mobile speaker.
- If the user bends index finger, then the output command display at LCD is **"I WANNA GO OUT"** and a voice message will speak out by mobile speaker.
- If the user bends middle finger, then the output command display at LCD is **"I NEED FOOD"** and a voice message will speak out by mobile speaker.
- If the user bends ring finger, then the output command display at LCD is **"I WANT TO BE ALONE"** and a voice message will speak out by mobile speaker.
- If the user bends small finger, then the output command display at LCD is **"I NEED NEWS PAPER"** and a voice message will speak out by mobile speaker.

When the user bends two fingers at once the outputs are:

- If the user bends both thumb finger and index finger at once, then the output command display at LCD is **"SWITCH OFF THE FAN"** and a voice message will speak out by mobile speaker.
- If the user bends both thumb finger and middle finger at once, then the output command display at LCD is **"SWITCH ON THE FAN"** and a voice message will speak out by mobile speaker.
- If the user bends both thumb finger and ring finger at once, then the output command display at LCD is **"SWITCH OFF THE LIGHT"** and a voice message will speak out by mobile speaker.
- If the user bends both thumb finger and small finger at once, then the output command display at LCD is **"SWITCH ON THE LIGHT"** and a voice message will speak out by mobile speaker.

5. Results and Discussion

Screes shot

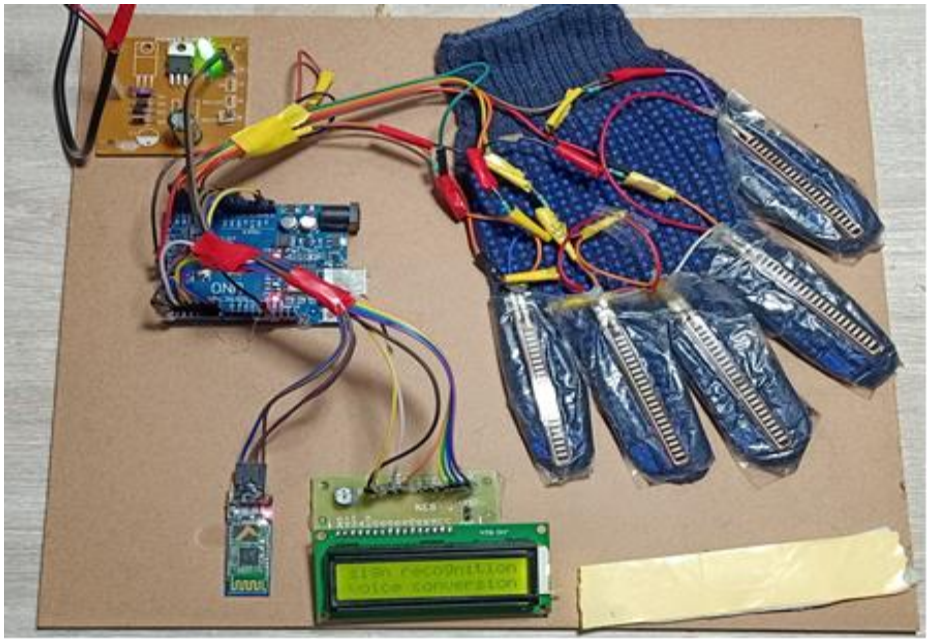

FIG 2: SIGN RECOGNITION AND VOICE CONVERSION DEVICE FOR DUMB

Output of user bends thumb finger

FIG 3 OUTPUT WHEN THE USER BENDS THUMB FINGER

Output user bends thumb finger and index finger at once

FIG 4 OUTPUT WHEN THE USER BENDS BOTH THUMB FINGER AND INDEX FINGER AT ONCE

6. Conclusion and Future Work

The lifestyle of the mute person can also be improved by providing them a means to have a voice for communication even without having a voice. Overall System is very effective and efficient because of the use of Arduino. In future this proposal can be enhanced for all fingers combinations such as three fingers, four fingers bends at time and increases number of commands to user which helps user to communicate and share all feelings to the normal person. This proposal helps both dumb and normal persons to communicate with each other to share feelings, emotions.

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