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Let's talk model for converting Gesture to voice using hand glove and IOT

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***Abstract*—** Inability to speak make difficult to convey Message. People with disability use sign language for communication. Mute deaf uses hand gestures to convey there say. This hand glove prototype will help them to communicate with others. The model is developed with the help of an electronic device which translates the sign language into speech so that they can communicate. On hand glove, shirt buttons are stitched which work as a point of contact for the different gesture. The generated gestures are being captured by the Arduino Uno which transmits the corresponding instruction to the mobile application with the help of Bluetooth sensor, the mobile application responds with voice. Not only it will help mute deaf but it will also help half paralysis patient to covey the daily routine or basic say in an easy way. The goal of this paper is to provide a simple solution for fewer instructions with maximum accuracy including innovative and cost-cutting hardware solution**.**

Keywords—Bluetooth sensor, hand glove, shirt buttons [tap buttons], Arduino Uno

I. INTRODUCTION

The research on development hand gestures acquisition, hand glove based models started 40 years ago and continues to engage a growing number of researcher's. Basically mute deaf uses sign language for communication in which gestures are used to convey message instead of sound. It's a nonverbal form of language used by mute deaf.

Mute deaf uses gesture-based communication. This prototype acts as correspondence for trading data between the normal and mute community. This prototype utilizes the gestures and converts it into text and voice which is read and understood by normal people. In this prototype the major role is played by the tap button which is being stitched to the hand glove there are thirteen tap buttons each one of them represents different gesture. Different gesture generated by tapping buttons conveys a different sentence. This message is being conveyed by using an image a text and voice to the audience by using a mobile application which is connected to the Arduino Uno through a Bluetooth sensor which is responsible for transmitting the signals back and forth. It's a smart mobile application which is being used to correspond in real time with voice when the appropriate gesture is generated. The paper illuminates the sketching out necessities, components of digitalized gloves. The paper clears up the plotting necessities, components of digitalized gloves. This paper advisers to developing twelve sign vocalize gloves. It gives the related work, clears up the system structure, characteristics, positive conditions and shortcomings of this device. In the future, the structure would be moved up to the cloud platform for processing and remote gloves which would be more reliable.

II. The proposed system details are provided in Section III followed by experiments and results in Section IV. The conclusion of this paper is provided in Section V with future work direction.

II. RELATED WORK

Communication through sign acknowledgment framework chiefly have two understood methodologies these are image processing system and another is microcontroller and sensor-based information glove [1]. These methodologies are otherwise called vision based and sensor-based systems. In the picture preparing strategy camera is utilized to catch the picture/video, in this static pictures are broke down and acknowledgment of the picture did utilize algorithms that produce sentences in the showcase. The algorithms utilized in vision-based communication through signing acknowledgment framework are Hidden Markov Model (HMM), Artificial Neural Networks (ANN) and Sum of Absolute Difference (SAD) Algorithm used to extricate the picture and take out the undesirable foundation clamor [2]. In gesture-based communication acknowledgment framework which utilizes picture handling strategy, picture obtaining process has numerous ecological fears, for example, foundation condition and lightning affectability. Higher goals camera occupy more calculation time and consume more memory space, client dependably needs camera always and can't execute in open spot. These are the downsides of this framework. In another methodology, information gloves are utilized for communication via gestures acknowledgment .In

this client need to wear glove comprises of flex sensor and movement tracker [3]. Information is legitimately acquired from every sensor relies on finger flexures and PC investigation sensor information with static information to create sentences. It's utilizing the neural system to improve the exhibition of the framework. Another methodology is utilizing a convenient Accelerometer (ACC) and material sensors used to quantify the hand motion [4]. ACC used to catch development data of hand and arms. EMG sensor put on the hand, it produces distinctive sign motion [3]. Sensor yield signals are nourished to the PC procedure to perceive the hand motion and produce speech/text. In the instrumented methodology [5] of gesture-based communication, acknowledgment instrumented some portion of the framework consolidates an AcceleGlove and a two-connect arm skeleton. This paper presents Arduino Uno and touch button based data glove approach for sign language recognition which cause of less computational time and fast response. It is a portable device so easy to use and the cost of the device is also very low.

III. METHODOLOGY

In this model, the hand glove is used to catch the hand gestures of a user. On the hand glove, the tap buttons are mounted along the length of each finger and the thumb. Thumb tap button is used to tap on the finger tap button to generate the associated gesture which is being captured by the Arduino for processing.

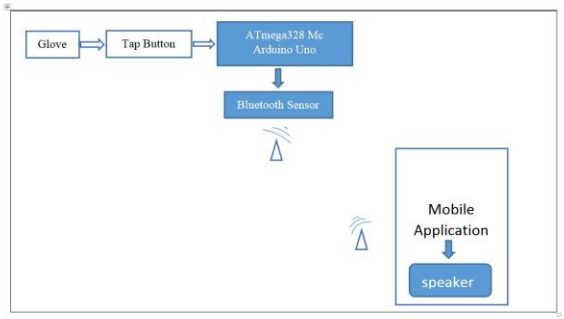

Fig.1 Block Diagram of Proposed Model

Figure illustrates the proposed system framework. The framework consists of various components including the tap buttons, ATmega328 microcontroller, Bluetooth sensor and a mobile application. The hand glove as an input acquires gesture performed by the mute deaf for communication. Based on the thumb tapped on the finger which generate an appropriate gesture to convey their message a mobile application is being used which respond to the signals which are being sent by the Microcontroller through Bluetooth sensor .when the Smart Mobile application receives the signal it generates the corresponding text, voice, and image to convey the message of the deaf. Because of this patient or deaf is able to explain there saying in a better way using text, voice, and image.

A. Algorithms Used

- Stage 1: The hand glove is stitched with tap buttons at each proximal, Intermediate, distal joints of Finger.
- Stage 2: Thumb tap button when comes in the contact with other finger tap button it generates output data stream .A each output data stream represent a different gesture
- Stage 3: This output data stream received by the ATmega398P microcontroller processed it and send appropriate values to the mobile application using Bluetooth sensor
- Stage 4: Bluetooth sensor sends a signal back and forth between the Microcontroller and the mobile application which is installed on android phone
- Stage 5: The appropriate signal received from the microcontroller to the mobile application generates the Text, voice and image.
- Stage 6: The mobile application displays an appropriate image and generates the text which is displayed on a mobile screen and generate voice to speak the message via the mobile speaker.

B. Mobile Application Used:

Specifically the mobile application is designed and build in MIT app Inventor to meet the above requirement .The design is easy to understand and the application is created in such a way to deliver the Text, image and speech for a given gesture in a minimum amount of time

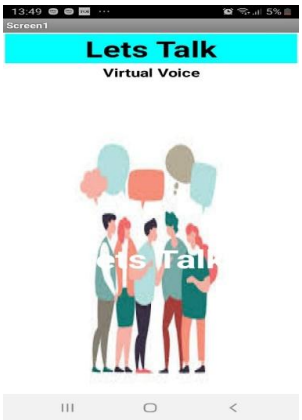

Fig 2 Let's Talk mobile application

The above Figure illustrate the application that is being used to convert gesture to speech and to display the message and image for the gesture that is being generated.

C. Arrangement of the Components:
The actually, structure in which the components are place and the tap button is attached to the hand glove and the wired that are connected with the microcontroller and Bluetooth sensor

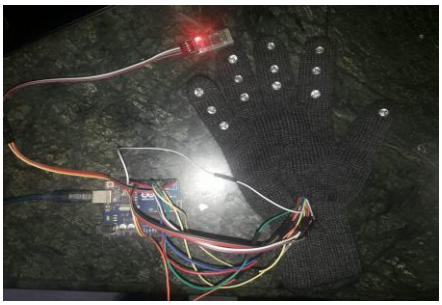

Fig 3 Components Arrangements

IV. RESULTS AND DISCUSSION

A. Working of the hardware
The gesture which is being shown in given fig.4 means "I am happy",Fig.5 means "In pain"

Fig.4 I am happy

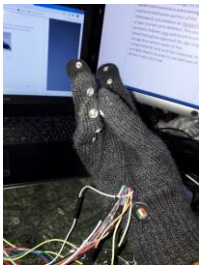

Fig.5 In pain

Table.1 Messages

Sr .No	Text	Value
1	Want to Eat	1
2	Want to go washroom	2
3	Want to drink	3
4	I am in pain	4
5	Call doctor	5
6	I am happy	6
7	Feeling Better	7
8	Need help	8
9	Good bye	9
10	I love you	10
11	I am ok	11
12	Sorry	12

The above table.1 contains all the message that can be conveyed by the mute deaf and it has also shown their respective values corresponding to each gesture.
When the gesture is generated the microcontroller generates the corresponding values that are being sent to the mobile application that display text, image, and speech is spoken via a speaker.

B. Message that are generated by application

Below table 2 contains the image and text that is generated by the mobile application on real time with maximum accuracy for each given gesture.

Sr.No	Image	Text	Value
1		Want to go to washroom	2
2		Call doctor	5
3		I am happy	6

Table .2 Text and Image generated

C. Serial monitor results:
Below fig.6 shows the respective values that are being generated for the given gesture

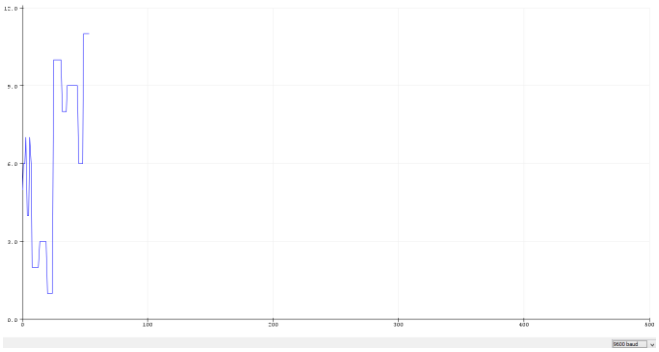

Fig .6 Values of gesture

II.Discussion : In this undertaking, we are going to make an electronic talking glove, by basically wearing that information glove quiet an individual can without much of a stretch speak with the ordinary individuals. In this framework, mobile display show is likewise utilized, after sign acknowledgment the perceived word will be shown as content on mobile display show so it turns out to be simple for a quiet individual to speak with hard of hearing individual. Along these lines, this undertaking will help to bring down the correspondence hole between quiet, hard of hearing and ordinary individuals. The client should shape a sign and holds it for two seconds to guarantee acknowledgment. The framework ought to be fit for perceiving signs more rapidly than this subjective two seconds limit.

I. Points of interest:

- Low expense
- Compact frameworks
- Flexible to clients
- It takes less capacity to work framework

II. Applications:

- Gesture acknowledgment and transformation.
- As an interpreting gadget for Mute individuals.
- It can be utilized for Mobiles for SMS sending.

V. CONCLUSION AND FUTURE SCOPE

Motion to content and discourse is intended to be a model to check the possibility of perceiving communication through signing and showing the characters and words so it is effectively comprehended by individuals. This venture fabricate the extension to cover the correspondence hole between the mute deaf, patient and the ordinary people. The exactness of the framework is accomplished almost 98-99%, however it depends for the most part on the user's performances.

II. The fulfilment of this undertaking recommends that these wired gloves can be utilized for fractional communication through signing acknowledgment. In future work of this proposed framework supporting increasingly number of signs and distinctive language mode. One can make this framework remote with the goal that it ends up helpful and compact for business use.

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