Implementation Paper on Sign Language Using Flex Sensor

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ABSTRACT:A Dumb individual all through the world uses gesture based communication for the correspondence. Imbecilic individuals are uncommonly prepared to utilize this gesture based communication. Be that as it may, ordinary individuals are not ready to comprehend what the stupid and hard of hearing individuals are endeavoring to state. The progression in implanted framework can give a space to plan and build up an interpreter framework to change over the communication via gestures into discourse. These days implanted framework has turned into a critical pattern in all applications. The work exhibited in this paper fundamentally lessens the correspondence hole amongst imbecilic and standard individuals and intends to encourage stupid individual's way of life.

KEYWORDS: Flex sensor, sign language.

I. INTRODUCTION

This framework offers voice to voiceless i.e. voice is given to the individual who can't talk. Imbecilic/quiet individuals utilize gesture based communication for correspondence reason. Communication through signing utilizes signals rather than sound to pass on data. This dialect incorporates consolidating hand shapes, hand developments, outward appearances to express person's considerations. In this framework flex sensors assumes the real part. Flex sensors are joined to the glove utilizing needle and string. Flex sensors are the sensors whose resistivity changes with the measure of curve.In this project, Arduino microcontroller is used to take input from flex sensors and then this analogue data is converted to digital form by using micro controller. Every one of the information from microcontroller is sent to android telephone and as needs be the android telephone will talk the comparing character, which has been detected.
This framework show fill in as an attractive Interpreter used to deciphers Sign Language in type of Gesture by a Dumb Person to Synthesized English Word which has a relating significance in Sign Language which translates a specific thing, as an Audio Output for Normal Person. This will expel correspondence hole amongst Normal and Deaf and stupid groups. Here in this venture Arduino Uno atmega328 microcontroller utilized as focal unit. No of flex sensor associated with the five fingers of hand for getting the gesture based communication information and pass it to the microcontroller. Microcontroller can change over this information to advanced shape and send it to the android application utilizing Bluetooth module.
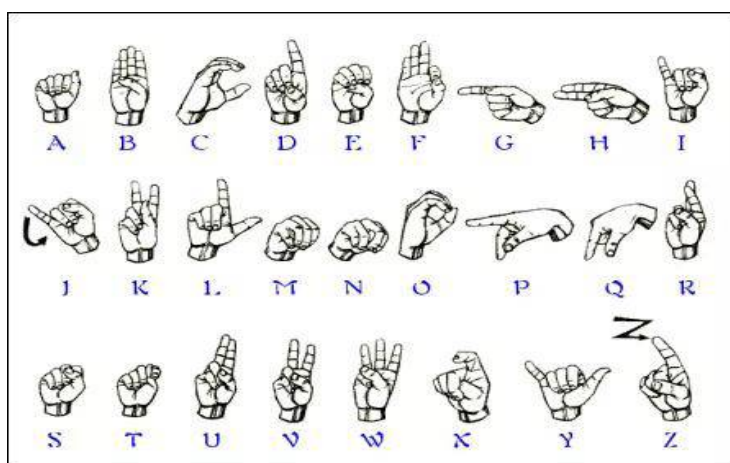
Fig 1 - Sign Language representation by hand

Hard of hearing and Dump individual and ordinary individual correspondence is as same as two distinct people from various nations utilize two unique dialects for correspondence with no regular dialect then they will have issue of seeing each other. Almost totally senseless populace is an aftereffect of the physical incapacity of hearing for hard of hearing individuals and inability of representing idiotic individuals. Due to absence of correspondence between typical individual and hard of hearing and dump individual, the proportion is diminishing of Literate and Employed Deaf and Dump. What's more, Dump individual uses gesture based communication for correspondence, which isn't known to typical individual for correspondence they requires an interpreter physically, which isn't generally helpful to organize. To beat this issue, we built up a one of a kind application. Our application demonstrate fill in as an alluring Interpreter used to deciphers Sign Language in type of Gesture by a Dumb Person to Synthesized English Word which has a relating importance in Sign Language which translates a specific thing, as an android application for giving content of hint transformation. This will evacuate correspondence hole amongst Normal and Deaf and idiotic groups.

II. RELATED WORKS

This framework expects to bring down this boundary in correspondence with ordinary individual. The primary point of the proposed framework is to build up a financially savvy framework which can offer voice to voiceless individual with the assistance of Smart Gloves. It implies that utilizing brilliant gloves correspondence won't be obstruction between two distinct groups and they will have the capacity to discuss effortlessly with the typical individual. Utilization of keen glove by individual with incapacity influences country to develop and furthermore they won't vary themselves from the typical individuals [1].

This errand tries to associate the correspondence opening by arranging a flexible glove that gets the customer's American Sign Language movements and yields the deciphered substance on a workstation or a PC. The glove is furnished with flex sensors, contact sensors, and an accelerometer to evaluate the flexion of the fingers, the contact among fingers, and the turn of the hand. The glove's Arduino microcontroller researches the sensor readings to perceive the flag. Using this contraption, one day speakers of American Sign Language may have the ability to talk with others in a direct and accommodating way [2].

Sharp glove is a system which goes under the class of Augmented and elective correspondence. Augmentative and elective correspondence (AAC) is an obvious section in the headway of assistance organizations for individuals with failures, especially those with genuine impediment. Advances, for instance, augmentative and elective correspondence (AAC) structures can confine this separation from different people. An AAC structure is a fused assembling of fragments, including the pictures, helps, frameworks, and techniques used by individuals to overhaul correspondence. These advances keep running from by and large low-tech structures (i.e., fundamental alterations with no batteries or equipment, for instance, correspondence sheets). [3].

Gesture based communication makes ready for hard of hearing quiet individuals to convey. Through gesture based communication, correspondence is feasible for a hard of hearing quiet individual without the methods for acoustic sounds. The point behind this work is to build up a framework for perceiving the gesture based communication, which furnishes correspondence between individuals with discourse hindrance and ordinary individuals, along these lines decreasing the correspondence hole between them. Contrasted with different signals (arm, face, head and body), hand motion assumes an essential part, as it communicates the client's perspectives in less time. In the present work flex sensor-based signal acknowledgment module is created to perceive English letters in order and few words and a Text-to-Speech synthesizer in view of HMM is worked to change over the relating content [4].

In this paper we surveyed diverse methodologies proposed for hand motion acknowledgment. These methodologies fluctuate dialect to dialect. Essential usage of sensor glove is finished utilizing flex sensors, contact sensors and accelerometer. There are essentially two sections in all methodologies, one is perceiving hand pose without motion(static) and one with motion(dynamic), where the accelerometer have their influence. Our approach is to play out these mind boggling calculation and activities on the server and create the discourse on cell phone. Additionally all the above work just is to perceive letters in order or letters of gesture based communication, which can be additionally reached out to Words and Sentences. [10]

III.   PROPOSED ARCHITECTURE

The figure given below shows the block diagram of proposed system.
The proposed model will be consisting of combination of hardware and software. Hardware part will include flex sensors on each finger, microcontroller, power supply, and android phone and Bluetooth module. Software part will include programming for android phone application. Hardware part will be consisting of flex sensors to take input from different gestures through gloves, microcontroller to convert input analogue data to digital data and for further processing, power supply to provide voltages to specific units, and finally Bluetooth module to send the data from controller to android mobile.
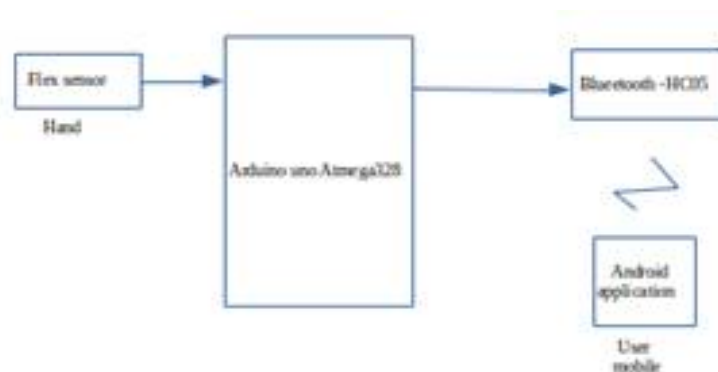

Fig 2 - Sign language to text conversion for deaf person.

Here HC-05 Bluetooth module will be used for sensing sign language data to the mobile phone. Android application run on mobile will show the text conversion for sign language.

IV.   SYSTEM ALGORITHM

We propose an algorithm to describe the operation of the system.
a.   ALGORITHM
Below is the algorithm of the proposed system
Step 1   Start

Step 2   Gather value from all the sensors
Step 3   Are valuesforming any meaning?If yes then sends conversion of sign language to text data to Bluetooth.
Step 4   Android app gathers data from Bluetooth and displays it.
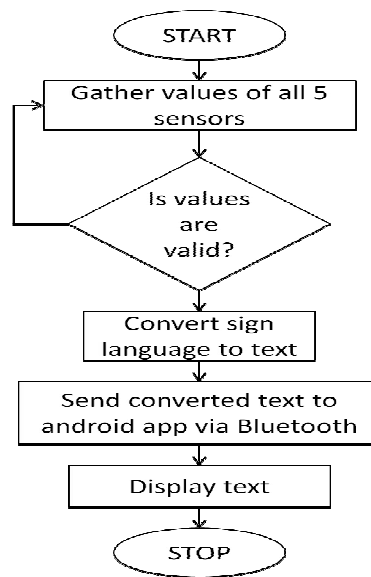Step 5   Stop.

b.   FLOW CHART

Fig 3- flow of proposed system

The Arduino Uno used as main controller, gathers data from flex sensor in the form of some no. (As the bend in flex sensor is converted into no.), if the data from flex is valid and not garbage one then the Arduino change that no. to text and convey this to the normal people by displaying and announcing it.
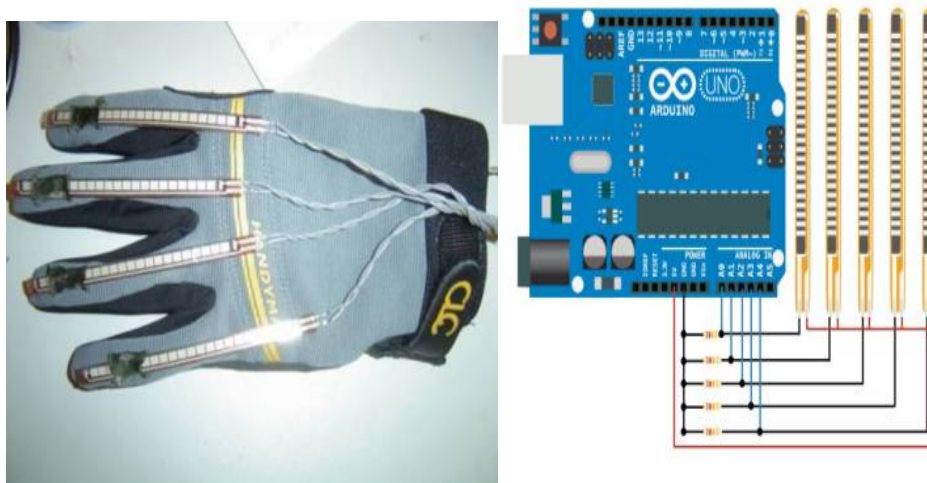
V.RESULT

a.   HARDWARE MODEL

Fig 4Hardware model of the system

Figure 3shows the actual hardware model of the proposed system which consistsofArduino Uno board, fiveflex sensorsfor five fingers and Bluetooth module to connect Arduino with Bluetooth.

b.   ANDROID APP

Fig 5: Android app displaying sign language to text conversion.

We build an android app to display the conversion of sign language to text. The display of app will appear as shown in above image. In figure 5a displaying hello word which is same as depicted by table 1 first row. Besides displaying this app also announce what it is displaying i.e. what the dumb and deaf person is trying to say.

VI.   ANALYSIS

Table 1: sign language to text conversion

Sr. no.	Sign language	Text conversion
1		hello
2		How are you
3		I am fine

4		Where are you
5		What are you doing

Rather than taking single letter, we have created complete package of 32 sentences, five of which are shown in above table.

For checking accuracy of a flex sensor, we took flex sensor 2 and bend it for some time. Input of Arduino i.e. output of flex sensor measured from analog pins is found in between 730-780 when it is not bending. Following table shows value of flex sensor at different time when it kept bend.

Table 2: checking accuracy of flex sensor

Sr. No	Expected values	Actual values	Accuracy
1	>790	788	
2	>790	795	
3	>790	800	80%
4	>790	810	
5	>790	791	

VII.   CONCLUSION

The task plans to lessen the correspondence hole between hard of hearing or quiet group and ordinary individuals. This framework will enhance stupid/hard of hearing individual's way of life. Indeed, even it will be useful for the correspondence between the hard of hearing individual and the idiotic individual. General System is successful and proficient due to the utilization of Arduino microcontroller and android telephone. With this task gesture based communication can be executed to convey, the objective individual. The framework has some preferred standpoint over past framework: Translation of discourse to content done effortlessly without squeezing catch. Hard of hearing individual's discourse effortlessly comprehends by individuals utilizing android telephone. Hard of hearing individual needn't bother with pen or paper for clarifying their discourse, this framework gives great exactness. In future it may be possible to convert individual character instead of converting complete sentence. In this proposed system, at max we can used 32 combination because for every flex sensor we use only one bend, but if all of the bends are used then the combination will become 7776 sentences.

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