

SMART ASSISTANCE FOR DUMB AND DEAF

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Abstract— Communication is the main medium by which we can share our contemplations or pass on the message yet for an individual with handicap faces trouble in communication with typical person. The issues looked by the hard of hearing and unable to speak individuals right now and the challenges of their communication with typical people started our advantage and drove us to attempt to discover an answer for their challenges and to limit them as much as conceivable. Since they speak to a huge piece of society and they have to convey their thoughts in the easiest manner by straightforward gadgets. So our venture points to connect this hole by empowering communication among moronic and hard of hearing individuals from one perspective and typical individuals on other hand by presenting an reasonable electronic gadget that makes an interpretation of the fingers presses into the content and discourse.

Keyword-Communication, Assistive device;

1. INTRODUCTION

The improvement of the gadgets that help the hard of hearing and quiet individuals to speak with typical individuals started quite a while prior. They discover troubles to communicate their considerations or to pass on their message to others so that the analysts endeavor various courses so as to deliver a gadget that may give them a superior nature of the life to work in essential circumstances. To accomplish this, the framework joins the utilization of a lot of various modules, for example, motion acknowledgment, communication via gestures investigation and combination, discourse examination and amalgamation, haptics, into a creative multimodal interface accessible to crippled clients. In the late years, there is a fast increment in the quantity of discourse - crippled casualties because of a few reasons like by birth, oral illnesses, mishaps, and so forth and requirement for the Electronic Assistive.

This venture is helpful for the hard of hearing and idiotic, it can likewise be utilized for the (speechless) patients with half of their bodies deadened and who can't talk however can move their fingers. The undertaking has been utilized Glove which will help those individuals who are experiencing any sort of discourse deformity to convey through their hand pressures. The glove will record hand press made by the client and afterward the glove will make an interpretation of these press into visual structure just as in sound form. Demonstrated the utilization of flex power sensors to distinguish the finger's presses.

The hard of hearing is an individual who has issues or imperfections hearing, and a hard of hearing quiet is a term which was utilized generally to recognize an individual who was either hard of hearing or both hard of hearing and couldn't talk. The articulation proceeds to be utilized to allude to hard of hearing individuals who can't talk an oral language or have some level of talking capacity, however decide not to talk in light of the ominous or undesirable consideration and their talking cause clumsiness. Such individuals convey utilizing communication via gestures; the favoured term today is essentially "hard of hearing".

A gesture-based communication is a language which predominantly utilizes hand developments and body language to impart importance and thought. This can include at the same time consolidating arms or body, and outward appearances to smoothly communicate a speaker's contemplations. The gesture-based communication and the communicated in language have There are similitudes between them, yet there are additionally a few critical contrasts among marked and spoken dialects. Communication via gestures has gotten a typical and wide use on the planet and is at the centres of neighbourhood hard of hearing societies.

2. RELATED SURVEY

Glove based systems uses data gloves to detect the positions of hand gestures accurately as its positions are measured simultaneously. The Glove based methods uses sensor devices to digitize finger motions. Hand configuration and rotation can be easy to collect using extra sensors. However, the devices are expensive. Some gesture recognition systems also tried to decipher gestures using glove-based devices. These devices are very sensitive and usually connected to a computer with

required hardware and cables. This motivates use of non- cumbersome and inexpensive approaches for recognizing signs. The sensors used in these systems are available in the market and are quite costly. Flex Sensors have been used. Flex sensors are varying in resistance depending on the amount of bend on the sensor that are attached along the length of the fingers to detect the bend of the fingers that formulate the gesture. The proposed system aims to lower the communication gap. It is an electronic device which translates sign language into speech to improve the communication between normal and the mute people. Sensor glove technology has been used in a variety of application, which demands accurate tracking and interpretation of signs.[1]

The glove is designed to recognize the movement of the fingers and the palm, as well as the motion of the hand over a certain period of time. The data received from the glove is transmitted to a micro controller which will then process the inputs and send to the main processing unit. This processing unit identifies the received data and processes them so that it outputs the relevant voice signal corresponding to the hand gesture. The signal flow of the gesture recognition system. Glove is implemented using the flex sensors which will respond to the bending of the fingers. These flex sensors will change the resistance according to the angle of the finger and corresponding analog output voltages are fed to the microcontroller-based system. Using the built in ADC unit 10-bit digital data is produced giving high accuracy to the finger movement capturing. Also, the sensor consists of a tri-axis gyroscope which will provide gyroscopic data. [2]

This sign language recognition system will provide communication between normal people and the people with speech impairment. In this flex sensor- based gesture recognition system, Atmega 328 processor along with five flex sensors recognizes the sign language performed by user. Arduino microcontroller is advantageous over other platforms as it is of low cost and available as open source software. Accelerometer is used to measure the orientations of hand movements. Tactile sensor measures the force applied on one finger by another finger. The letters such as M, N and T have similar gestures and also the letters U and V show similarity in their gestures, which is shown in Fig. 3. To overcome the difficulty in recognizing these letters tactile sensors are used. In this work tactile sensor is used to improve accuracy in recognizing these letters. [3]

The flex sensors are attached to a hand glove, along each finger length, to work as a gesture recognition. The output of the flex sensors will vary with the bending degree of each finger, and the analog output voltages, which are obtained from these flex sensors, are fed into the microcontroller. The microcontroller processes these analog signals and converts them into digital signals. To make it more flexible for the user, there are three push buttons connected to the Arduino nano, one of them is to erase one character, the other one is to clear everything written on LCD and the last one is to read from the LCD. Moreover, the program stored in the microcontroller will also convert the recognized gesture into its equivalent text information. RF trans- receiver has been connected to the Arduino to transmit the digital signals wirelessly. In the receiver side, the digital signals obtained will be received wirelessly via RF trans- receiver. Finally, the text information will be displayed on the LCD screen and the text to speech conversion will play out the sound through the speaker.[4]

The data glove will be fitted with flex sensors along the length of all fingers. The flex sensors give output as a stream of data that varies with the degree of bend. The analog outputs from the sensors are then fed to ADC (Analog to Digital Converter 0809). ADC processes the signals and converts analog signal into digital signal. This is then fed to the 8051-micro controller. At the micro controller a particular output corresponding to the gesture is generated. This output is sent via the Blue tooth module to the android phone. The corresponding output is then converted to speech. Here we converted hand signs in to the corresponding speech equivalent.

Converted to speech. Here we converted hand signs in to the corresponding speech equivalent signal, hence the system is efficient for effective communication. The hardware components used in designing. The system was low in cost, indicating the incurred cost was low in comparison to other available prototypes. It hence implies that the system is flexible enough for a user to add, modify or remove hardware in a cost-effective manner ensuring a customizable system.[5]

A word can be form using group of sign collected as dataset. Gestures performed by a mute person acquire by data acquisition module. Unidirectional FlexSensor

[6] as shown in has a unique component whose resistance varies when bent or flexed. As the flex sensors attached with all fingers bent in one direction resistance increases gradually. Amount of bend generates data which is provide by sensors. The entire flex arrangement follows a voltage divider network. The bend amount is recorded and it is mapped to a particular voltage which is then subtracted from the total voltage available at that point which denotes a corresponding resistance change. The output obtained from flex sensors is in analog form. This output is fed to the ADC (analog to digital converter) to convert it into digital form. The digital data is then fed to the processing unit.[7]

3. PROPOSED SYSTEM

A system architecture or frameworks design is the theoretical model that characterizes the structure, conduct, and more perspectives on a framework. A design portrayal is a proper depiction and portrayal of a framework, composed such that supports thinking about the structures and conduct of the framework. A framework design can comprise of framework segments and the sub-frameworks created, that will cooperate to execute the general framework. There have been endeavors to formalize dialects to depict system architecture, all in all these are called design portrayal dialects.

Frameworks design relies intensely upon practices and procedures which were created more than a huge number of years in numerous different fields, maybe the most significant being respectful engineering. Preceding the coming of computerized PCs, the gadgets and other designing orders utilized the term and statement framework and statement as today is still generally utilized.

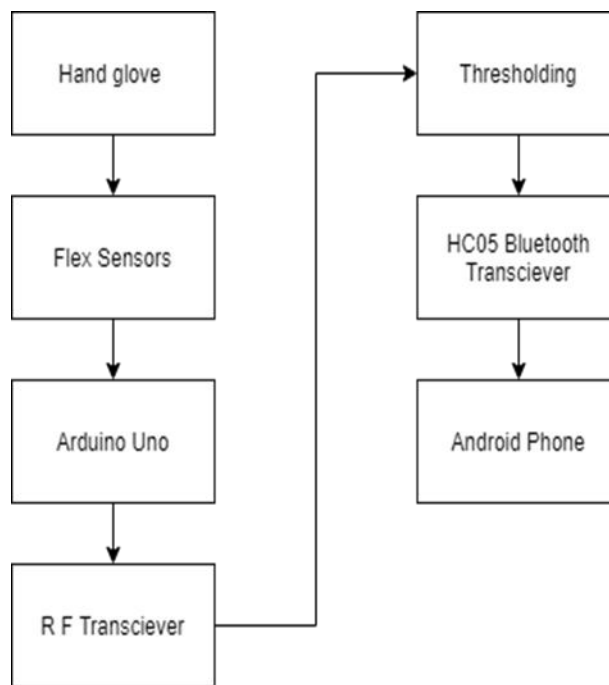


Figure 1: Block diagram

However, with the arrival of digital computers and the development of software engineering as a separate discipline, it was often necessary to distinguish among engineered hardware artifacts, software artifacts. shows the System Architecture of the proposed framework. Input is taken as sign language from gloves. the sign language motion exhaustive the flex sensors joined to the gloves which is associated with the Arduino nano board which makes an interpretation of the motion into discourse and composed content. This composed content is then sent to the cell phone utilizing HC05 Bluetooth module to android gadget, which will show the content on the screen.

This system utilizes a data glove for data acquisition to ensure user friendliness. Accuracy of proposed system can be increased by increasing number of sensors. The degree of fingers produces output voltage. Produced voltage is recorded for respective finger and converted into digital form to get required voice.[5]

Figure 2 describes the basic approach of the system which can be very useful tool in forgoing the barrier of disabilities in communication of the people suffering from any of the possible combination of deafness and dumbness among themselves as well as with normal people.

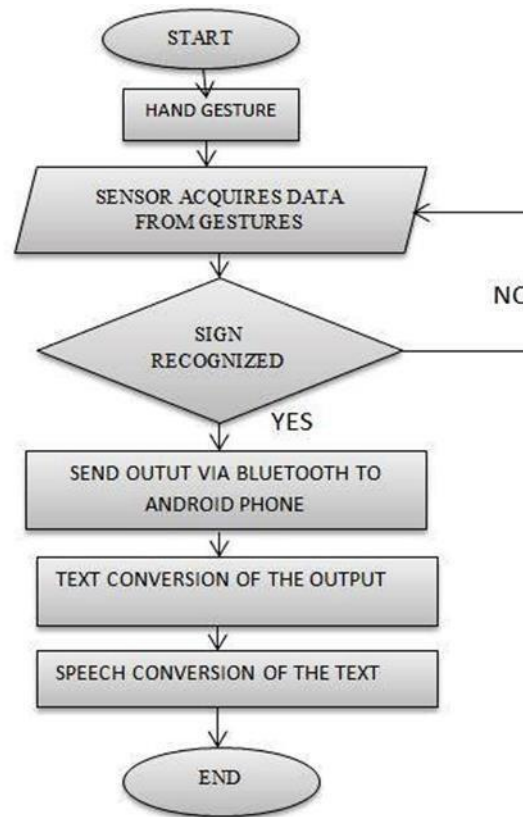


Figure 2: Flow Chart

4. SYSTEM ARCHITECHTURE

This will make the communication easy between the disabled people based on the extent of their abilities. This device takes the input message from the differently abled sender whether it be text, hand gesture, as per his/her disabilities and facility and that message will be transferred to long or short distances as per the requirements. Once the message is transmitted to the receiver then it is again converted into text, voice, output as per the facility and abilities of the receiver.[2]

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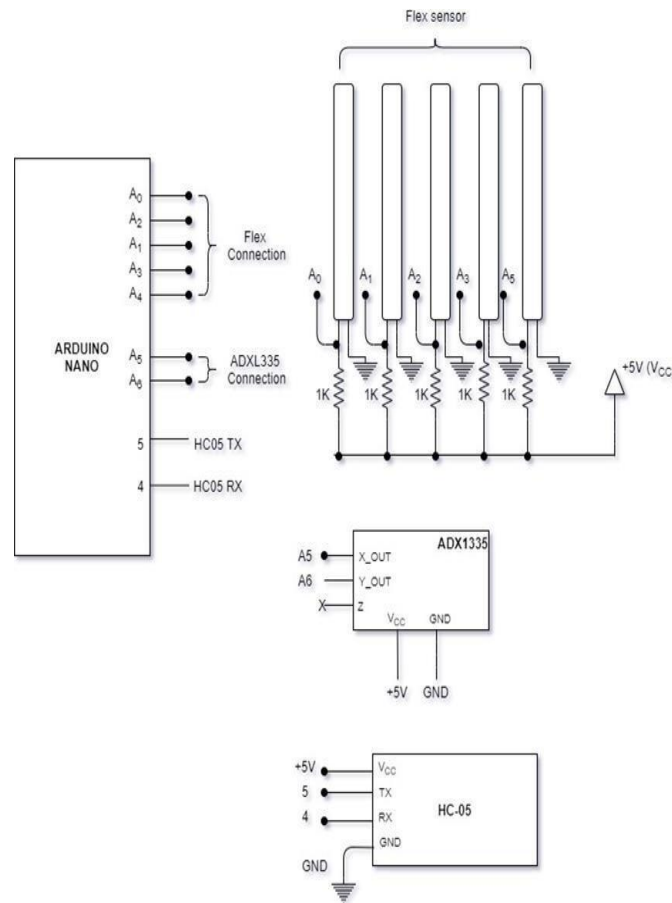


Figure 3. System Architecture

A. Sensor Glove

The Sensor Glove is used to convert the American Sign Language (ASL) into audio using voice board which can further be converted into text to be displayed on the LCD screen as per the requirements. The Sensor Glove consists of 2 major components namely Arduino Circuit board and Flex Sensors. The Gestures made by the hand is fed as an input to the Flex Sensors and their output is given to the Arduino Circuit Board for gesture recognition. Once the gesture is recognized, it is converted into speech which is taken as an audio output with the help of voice board and speaker.

B. Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. In this project we are using 2 Arduino boards one as master device and the other one as slave.

The inputs are connected to master device and the signals are received by the slave device.

C. Flex Sensor

A flex sensor or bend sensor is a sensor that detects the amount of deflection by the change in resistance. Since the resistance is directly proportional to amount of bend it is often called flexible potentiometer. Here we use 5 flex sensors each for each finger. Upon bending the effective input resistance is given to the master device and based on the gesture the resistance the output is displayed on the LCD connected to the slave device. Usually they follow American Sign Language (ASL) for gesture recognition. Finger spelling is a method of spelling words using hand movements. The following are the gesture patterns in American Sign Language (ASL) for the deaf and dumb person which is given as flex input to the Arduino board.

D. Software

Arduino programming sketch as seen by the Arduino IDE programmer has two functions namely:

Void setup():When a sketch starts and the function is called, this function is used to initialize variables, input and output pin modes, and other libraries needed in the sketch.

Void loop():After the execution of the setup block loop function is called,. Here the main code which is to be executed repeatedly for example, LED blinking.

5. RESULT AND DISCUSSION

In this project we have planned the basic approach of the system which can be a extremely great tool in rejection the barrier of disabilities in communication of the oldsters laid low with any of the potential combination of handicap and slow-wittedness among themselves additionally like traditional folks. After having completed the design of the glove, the team ran tests on it to substantiate that it met our preliminary style specifications and development objectives. The preliminary specifications enclosed easy use, movability, affordability, responsibility, and aesthetics the development objectives were followed and achieved within the development of the glove. The person will communicate and transfer the message as per his ability and need. The deaf and dumb/dumbwill use the American language to transmit the message whereas those who area unit unable to understand the language will create use of the device to induce the output within the audio or traditional text on the robot device. This makes them interactive with the skin world. language could also be a good tool to ease the communication between the deaf and thus the mute community and thus the standard folks. nevertheless, there is a communication barrier between these communities with traditional folks.

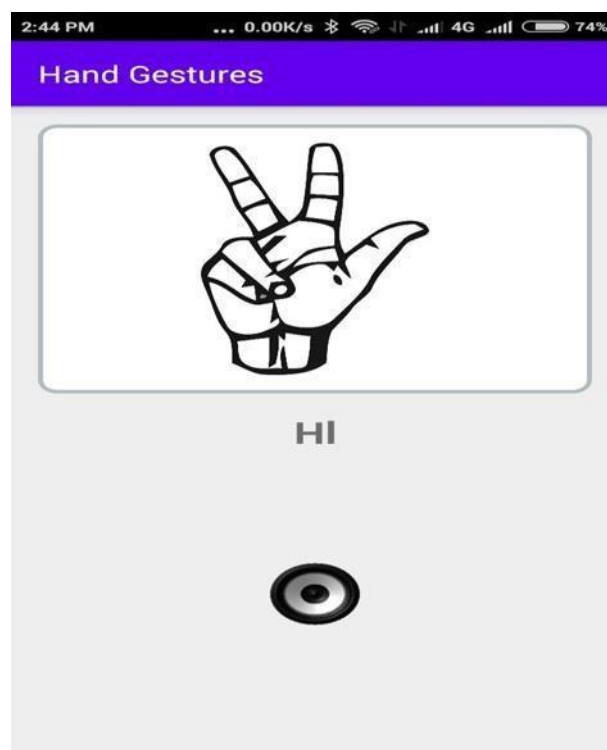


Figure 4. Snapshot of the Application showing the sign language with word description.

This project is useful for otherwise abled, speech- impaired and paralytic patients' administrative body cannot speak properly. This work is finished to visualize the practicability of recognizing language exploitation flex sensor and measuring device gloves and displaying the data, that well-tried to be Associate in Nursing economical system. Abled People use these gloves to convert sign performed by them into speech. From the convenience of easy flex sensors, a user is in a very position to act with others in additional comfy and easier manner. This makes it potential for the user to not solely act with their community however with others additionally which they'll live traditional life. The tip product can have a reasonable and oversimplified style creating it straightforward for users to act with.

The system is capable of recognizing signs plenty of quickly. Moreover, real time recognition quantitative relation of nearly ninety-nine could also be simply achieved.

6. CONCLUSION

In this project we developed a gesture for dumb and deaf people who is not able to communicate with normal people properly. In India there are almost 18 million people who is facing difficulty in communication with normal people this project is going to help them for communication purpose because we have developed a gesture with binary language here both normal people and deaf people can understand easily. Future work in this project we have N number of future work so we can use Arduino master-slave this is used for the long distance communication. For the betterment of long- distance communication, we can use by the internet connectivity which makes the device for betterment. Arduino will also provide the Bluetooth and WiFi connectivity this type of Arduino technology makes the device reliable and faster.

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