ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 4, April 2017

Hand Gesture Based Communication for Specially Abled People

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ABSTRACT: This paper presents the technology of using hand gestures as a means for interacting with normal human being and other physical disabled people. The gesture recognition plays a trivial part of individual communication systems.It boons the foundation for gesture based control technology, methods of attaining and handling such signals from human operators. The emphasis is done in systems that are based on accelerometers, flex sensors, and on hand glove based apparatus's. One of the effectual approaches of sign language detection is detailed in this paper.

KEY WORDS: LCD, FNMP3, Gesture, Accelerometer senor, Flex sensor, Hand Glove-based.

I. INTRODUCTION

Gestures are natural means for interacting and communicating among people Correspondence is a procedure of trading thoughts, musings, sentiments and data in the form of verbal or non-verbal message. Over the world 7.6 million of the aggregate population experiences deafness and ineptitude. However, correspondence for a man who can't hear is visual, yet not sound-related. These individuals do not have the abilities which a typical individual should have. The deaf individuals can't tune in and dumb individuals can't speak. The gesture based communication is a critical and just strategy for correspondence for deaf and dumb people. As communication through signing is a formal dialect, utilizing an arrangement of hand motion for correspondence (by the deaf and dumb).

It really turns into a similar issue for two people who know two distinctive dialects. Nobody of them knows any regular dialect so its turns into an issue to chat with each other, thus they requires an interpreter physically which may not be constantly helpful. The similar kind of issue happens in the middle of the Normal Person and the Deaf individual or the Normal Person and the dumb individual.

To conquer this issue, this project has been proposed. In this venture the accelerometer and flex sensors are utilized for communication through gesture recognition. For each gesture the individual voice yield is acquired by means of FNMP3 module and moreover those individuals can work home apparatus like fan and lights through hand gesture.

II. RESEARCHAND LITERATURE SURVEY

[1] V Rajalakshmi,NVasudevan, proposed a model that assists in finding the dissimilarity between the sentence and vision based solution, using the same dataset. Since in the suggested system they used glove with sensors, that helped to overcome the boundaries of vision based systems.

[2]PriyaMatani,presented a literature review on accelerometer sensor based sign language recognition. In this paper they Discussed about sign language interpretation, cockpit application and virtual-augmented reality.

[3] GowriD,Vidhubaala D, suggested a model that helps in communication between specially abled people. In this model they make use of MEMS sensor for detecting hand gesture. And same will be displayed on LCD.

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III. WORKING OF MODEL

Many embedded systems have significantly different designs according to their purposes and conveniences. In this project design, structured modular design concept is adopted and the system is mainly composed of a single microcontroller, LCD, mp3 module, speaker, relay, switch, accelerometer sensor and flex sensor.

The microcontroller situated at the core of the block diagram forms the control unit of the wholeventure. Embedded within the microcontroller is a program that helps the microcontroller to take action based on the inputs provided.

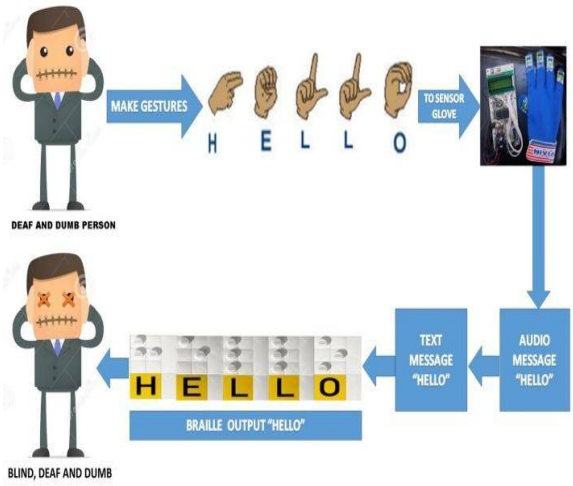

Figure1 : Block diagram of system

The accelerometer and flex sensor will be located on hand glove. The hand glove will be weared by the person who wants to communicate. Slanting of the palm can be recognized by the accelerometer, while Flex sensors can measure the bend of the five fingers when making a sign. For each sign the voice will be recorded and stored in Sd card. When the user carries out a gesture the signs are seized by the microcontroller which converts the analog motions to digital values through its 8-channel ADC.For each sign the respective voice output is obtained, and home appliance like fan and blub is turned on and off through signs.

A LCD used in this model is an electronic visual display. It consists of a range of tiny segments (pixels) that can be influenced to present information. LCDs have its significance in an extensive range of applications containing monitors, gadget panels etc. These are common in customer devices such as, gaming devices, clocks, calculators, and telephones.

FNMP3 module is a serialized MP3 module, which is with an ideal integrated MP3 and WMV decoder chip. It provides micro SD card driver, and supports different file systems. It is able to playback particular sound files and understands other functions through simple serial instructions. In the meantime, this unit ropes AD key control mode that facilitates users to expand their jobs in some straightforward applications. Without the cumbersome underlying action it is easy to use, steady and dependable. These are the major features of this section.

A. FLEX SENSOR BASED GESTURE DETECTION

The flex sensors are the one which alter their resistance when curved. The modification in resistance is linear in forward direction. An unflexed /unbent sensor has a resistance few hundred ohms. As the flex sensor is bent, the resistance increases to kilo ohms. The sensor measures quarter inch wide. Flex sensors are submissive resistive apparatus that can be worn with the intention of sensing the movements.

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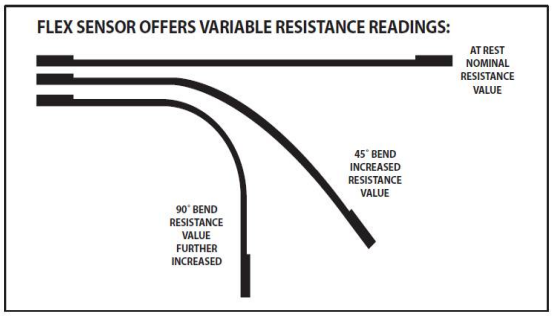

Figure 2 :Variation in Resistance of Flex Sensors

Flex Sensors are the one that changes the resistance depends on the overall deflection in the sensor. They adapt the change in bend to electrical resistance. More the bend, more the resistance value. They are usually in the form of thin strips from 1”-5” long that vary in resistance from approximately 10 to 50 kilo ohms. They are oftenweared in gloves to identify finger movements.

Flex sensors are used in impulsive analog voltage dividers. Inside the flex sensors carbon resistive elements are placed within a thick flexible substrate. More carbon means less resistance. When the tool is bowed the sensor yields a random resistance output, relative to the deflection radius. A flex sensor of zero degrees will grant a resistance of 10K and a flex sensor of 90 degrees will provide 30 to 40K ohms. The bend sensors list resistance of 30-250K ohms. In this model we used this sensor because it is one of the low cost and efficient in detecting gesture. It works on bending and identifies 45 and 90 degrees.

B. ACCELEROMETER BASED GESTURE DETECTION

A typical detecting approach utilized as a part of accelerometers is capacitance detecting. Here increasing speed is identified with change in the capacitance of a moving mass. This detecting method is known for its high precision, security, low power dissemination, and straightforward structure to assemble. It is not inclined to clamour and variety with temperature. Transfer speed for a capacitive accelerometer is just a couple of hundred Hertz. It is a gadget that measures appropriate increasing speed ("g-constrain"). Appropriate speeding up is not the identical as arrange increasing speed (rate of progress of speed).

For instance, an accelerometer on the ground will quantify as 9.81 m/s2. By differentiation, accelerometers without gravity will quantify zero. Here we are utilizing this sensor since it takes a shot at diversion in x and y hub, giving greater adaptability to distinguish the signal. The mix on flex sensor and accelerometer sensor is the preferred stand point in this venture, which helps in identifying more blends of motions.

IV. EXPERIMENTAL RESULTS

The arrangement of the components in the proposed system is as shown, where the glove is embedded with sensors and connected to the microcontroller where analog to digital conversion happens. Further it is connected to LCD and FNMP3 to produce textual and voice output respectively.

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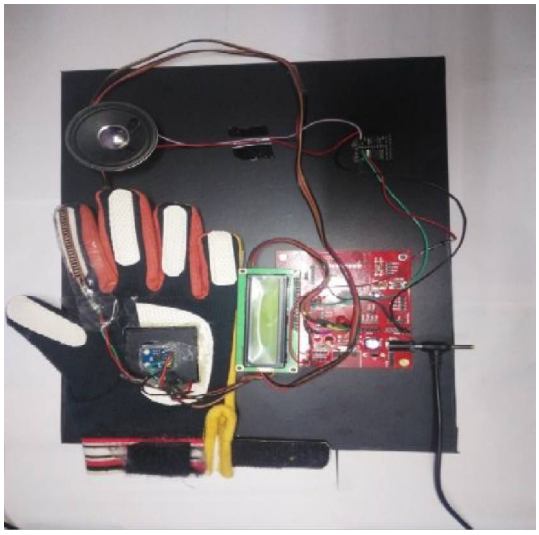

Figure 3: Component setup of proposed model

A 64 pin renesas microcontroller board will be used and the power supply will be provided. A Speaker will be placed using which voice output will be produced. The mp3 voices will be stored in the SD card with proper naming, from which the appropriate voices will be fetched. And it depends on the instruction given by microcontroller.

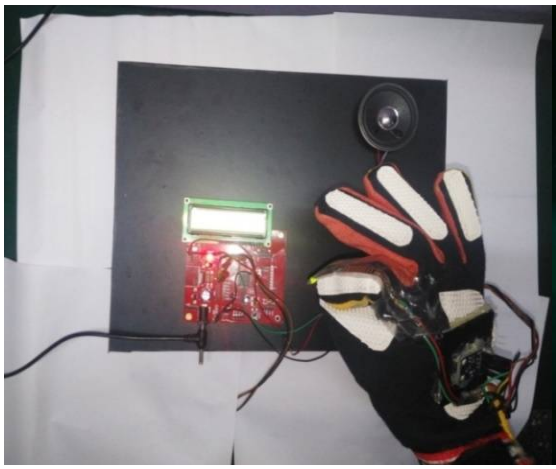

Figure 4: Gesture made by hand

Figure 5: LCD display for particular gesture made by hand

When the particular deflection happens or gesture made by the hand, text output will be displayed. And also voice output will be produced. Some range of deflection value will be given to each sign. When the gesture is made within that range, it will be sensed and processed by the flex and accelerometer sensors .The snapshot shows only one example of output message. Likewise huge amount of messages can be stored and fetched by the SD card. This model helps specially abled people to overcome the communication barrier.

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V. CONCLUSION

The proposed goals were effectively accomplished in the model created. Where the hard of hearing, moronic group and visually impaired individuals can comprehend the message. The proposed model is low cost and doesn't need any extraordinary preparation.Use of combination of two sensors is an advantage here. This helps to fetch more number of signs. With little modification in this module can be used to build a correspondence between moronic, hard of hearing and visually impaired on business premise.

VI. FUTURE SCOPE

In future, this project can be taken to the product level. To make this project as user friendly and durable, we need to make it compact. Going further, most of the units can be rooted along with the controller on a solitary board, with change in technology. Thus reducing the volume of the model. This project can be taken into further level and make use of it in military applications and automatic control over home appliances etc.

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BIOGRAPHY

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