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Talking Hand – An Assistance to Disabled People

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Abstract:- This project is designed for physically disable people who are unable to talk and wish to communicate to a normal person who finds it difficult to understand his hand gestures .Here we have a hand glove with flex sensors connected to a hardware which receives the input in the form of voltage and sends it to the receiver end with the help of a zigbee modem which then helps to play the output in the form of a audio signal depending upon the voltage received and the signal fed for that respective voltage.

Keywords:- *hand gestures, Flex sensors,glove, zigbee modem*

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1. INTRODUCTION

In the current world of progressing technology it is the need of an hour to make use of the technology for the welfare of disabled people so that we could make their life easier to some extent. Here we design a system which consists of a hand glove having flex sensors and a small hardware used to get the information and transmit it to the receiver hardware with the help of zigbee

modem. The glove consists of five flex sensors each on a finger and which is connected to the hardware. As the flex sensors are used to convert the bend of it in the form of voltage,this voltage is then transmitted to the receiver through the zigbee modem which is used both at the transmitter and receiver end . the receiver receives the inut voltage generated by the flex sensors and gives the output for that particular voltage.Also the user cn feed a new gesture depending upon its need and convinence.

2. LITERATURE SURVEY:

[1] Two second-year university students in the US have developed a pair of gloves that can translate sign language into speech and text, a tool they hope will empower the deaf community. Gloves that convert sign language to speech 'to empower the deaf community' [1]

Figure(1):Sensors on the outside of the glove data of which is sent to the database

[2] This paper deals with human gesture application, in this paper a Hand Signal Transceiver system will introduce for military soldiers. It is based on hand gestures which will be useful for squad communication. The current hand signal system for soldiers has some shortages, such as unavailability in the darkness and sometimes hard to keep stealth. It will be also applicable for patient's emergency in hospital, security purpose. The transceiver will be able to detect several hand gestures and then send out the corresponding information, which will finally be received by another transceiver or computer and displayed on a LCD screen,Using zigbee technology the information will be displayed on the LCD screen but there is no provision to get the gesture in the form of audio signal.[2]

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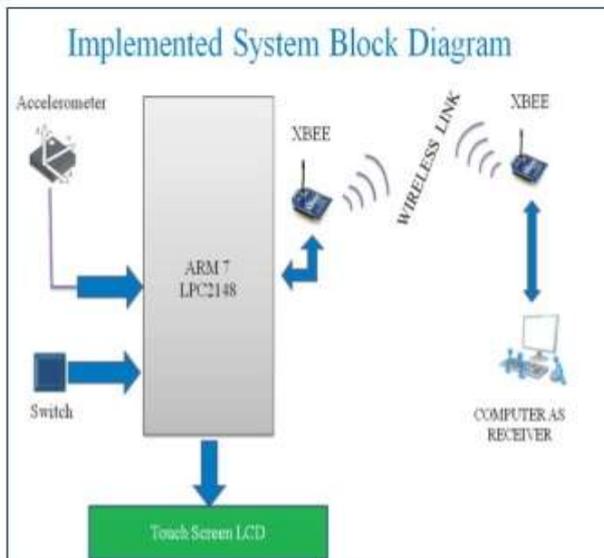
Figure(2): Functional Block Diagram of Hand Signal Based Transceiver for Multiple Utilization

[3] Sign language continues to be the preferred method of communication among the deaf and the hearing-impaired. Advances in information technology have prompted the development of systems that can facilitate automatic translation between sign language and spoken language. More recently, systems translating between Arabic sign and spoken language have become popular. This paper reviews systems and methods for the automatic recognition of Arabic sign language. Additionally, this paper highlights the main challenges characterizing Arabic sign language as well as potential future research directions. [3]
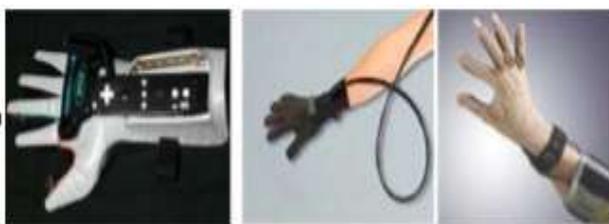
Figure(3):Different Types of Gloves that can be implemented

[4] Glove-based systems represent one of the most important efforts aimed at acquiring hand movement data.Generally dumb people use sign language for communication but they find difficulty in communicating with others who do not understand sign language. It is based on the need of developing an electronic device that can translate sign language into speech in order to make the communication take place between the mute communities with the general public possible, a Wireless data gloves is used which is normal cloth driving gloves fitted with flex sensors along the length of each finger and the thumb. Mute people can use the gloves to perform hand gesture and it will be converted into speech so that normal people can understand their expression. This paper provides the map for developing such a digital glove. It also analyzes the characteristics of the device and discusses future wok. A foremost goal of this paper is to provide readers with a basis for understanding glove system technology. [4]

3. COMPONENTS USED:

3.1 FLEX SONSORS:

The Flex Sensor patented technology is based on resistive carbon thick elements As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius—the smaller the radius, the higher the resistance value. Flex sensors are normally attached to the glove using hot glue. They require a 5-volt input and output between 0 and 5 V, the resistivity varying with the sensor's degree of bend and the voltage output changing accordingly. The sensors connect to the device via three pin connectors.

3.2 ARM PROCESSOR:

Whatever the analog input is from the flex sensor that is first converted into its corresponding digital from by use of ADC converter which may externally used or in some microcontroller like ARM Processor. The microcontroller will be interface with the memory to assign the corresponding text word to the input digital data i.e. sign in digital form. Microcontroller we can use of any family ARM 2148

Figure(4):Implemented ARM processor hardware system

3.3 APR VOICE PROCESSOR:

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The APR6008 offers non-volatile storage of voice and/or data in advanced Multi-Level Flash memory. Up to 8 minutes of audio recording and playback can be accommodated. A maximum of 30K bits of digital data can be stored.

Devices can be cascaded for longer duration recording or greater digital storage. Device control is accomplished through an industry standard SPI interface that allows a microcontroller to manage message recording and playback.

3.4 ZIGBEE MODEM:

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short-range radio. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking. ZigBee devices can quickly attach, exchange information, detach, and then go to deep sleep to achieve a very long battery life.

4. WORKING:

At the input stage LM7805 Series Voltage Regulator is designed to automatically maintain a constant voltage level. It may use an electromechanical mechanism, or passive or active electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. Secondly the heart of the system a ARM processor LPC2378 is used in consumer electronic devices such as smartphones, tablets, multimedia players and other mobile devices, such as wearables. Because of their reduced instruction set, they require fewer transistors, which enables a smaller die size for the integrated circuitry (IC). The ARM processor's smaller size, reduced complexity and lower power consumption makes them suitable for increasingly miniaturized devices. Nextly the main element of the system is the zigbee modem used both at the transmitter and the receiver end for complete wireless communication. Here zigbee is used over Bluetooth foe better range and less power consumption

Fig(5):Implemented Glove with Flex Sensors

The receiver hardware consists of a zigbee modem receiver and a Voice processor APR6008 to convert the required voltage generated into speech. It offers non-volatile storage of voice and/or data in advanced Multi-Level Flash memory. Up to 8 minutes of audio recording and playback can be accommodated. A maximum of 30K bits of digital data can be stored.

There is a LCD display used in this system which displays the gesture with its number so that the user understands as in how many gestures are fed in it with its name.For example if the first gesture represents a "hi" the LCD will display "hi" and the voice processor says the same.The use of this is just to simplify the system for the eae of the user.

5. RESULT

According to the implementation of the required system depending upon the usage of the components and the recent technology in the proper way a basic system is designed which records around 15 inputs depending upon the gestures made.

6. CONCLUSION

Based on the advancement of the technology t is importatnt to use it for the welfare of the people which would help everyone to live a life of convinence and hence this system contributes to some extent of use of technology which woud help the disabled people communicate with normal people who find it difficult to understand their hand gestures.

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