Design of Speaking System for Physically Impaired People

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Abstract-*Science and Technology have made human life addictive to comfort but still there exists an underprivileged group of people who are fighting for finding an innovative way that can make the process of communication easier for them. According to the World Health Organisation, about 285 million people in the world are blind, 300 million are deaf and 1 million are dumb. Sign language is most accept and meaningful way of communication for deaf and dumb people of the society. This is a best device for these people to overcome their disability. The main objectives of this project to achieve communications of mute people like a normal person. Human hand has remained a popular choice to convey information in any situations where other forms like speech cannot be used. Hand gestures which can represent ideas using unique shapes and finger orientation have a scope for interaction. We have use touch sensor for getting the data from people using sign language and Microcontroller for controlling all operation and voice chip for voice storage. LCD display and speaker are used as output to convey message.*

Keywords: Hand gloves, Touch sensor, Zigbee, ATMEGA328 Controller, GSM, and Speaker.

1. INTRODUCTION.

To improve a language handshaking for dumb peoples using sensor based on embedded system. The sensors are used as a transducer and it is converted to voice signal using voice processor. The Communication between dumb peoples are due to physical actions. A normal New ideas have to propose solution for this problem while using sensor and zigbee. Among various ideas, but we selected a project. That will help a group of people who that will help a group of people who are unable to listen and speak like. This project is not only just a scientific approach, but also introduce prototype that can applied in reality. It is really so hard. For normal people to understand what deaf and mute people what to say. Normal people do not understand what they are saying. For their deafness, they are almost ignored in our society. But we believe they can contribute to our society. We try to solve this problem for deaf and mute peoples. Our project is to convert finger movement into displaying letters and to store this conversion letters in a Microcontroller based system that convert movement of the fingers to alphabets and words are displaying on the LCD..This product will be compact and portable. We have also attached rechargeable battery as an energy source. A Figure as the USA way toconvertmovements of the fingers to alphabet.

2.BACK GROUND

In the fifth century BC Aristotle was the first to feel necessity of sign language. The Recorded history of sign language in western societies started in the 17th century. Like other language   different region of the world has different sign language American Sign Language's name is ASL.   The British sign language's name is BSL.
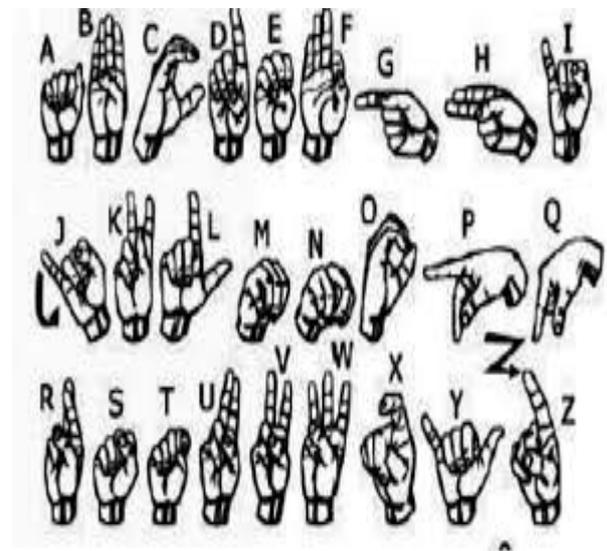

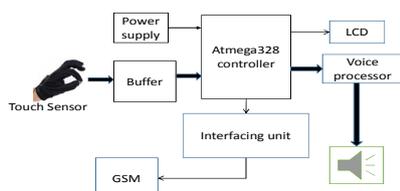
Fig.1 Indian Sign Language

3. BLOCK DIAGRAM

Fig.2 Block Diagram

In this project consists of two section transmitter and receiver .In transmitter section consists of touch sensor, zigbee, controller. The power supply circuit is used to convert the 230 v ac supply into 5v dc supply with the help of transformer, rectifier, capacitor and voltage regulator. AT mega 328 microcontroller which acts as a processor for the arduino board. Nearly it consists of 28 pins. From these 28 pins, the inputs can be controlled by transmitting and receiving the inputs to the external device. The corresponding signal is given to controller. Controller receives the signal from buffer and analyse the data, to send the signal to zigbee transmitter. Zigbee transmit the signal to receiver section through wirelessly.

4. TRANSMITTER SECTION

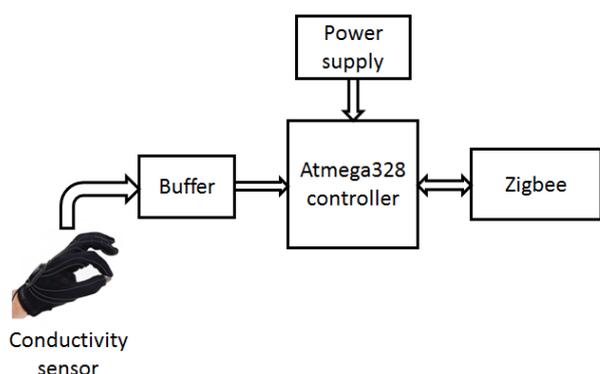The main components are touch sensor, buffer, AT mega 328, zigbee.

Fig 3. Transmitter Section

5. RECEIVER SECTION

The main components are AT mega 328, LCD display, mobile, Zigbee, GSM, speaker.
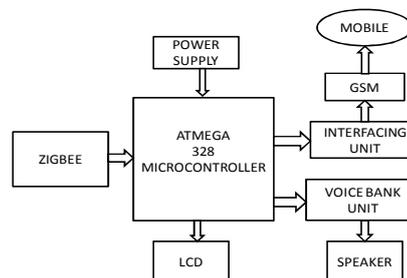
Fig 4. Receiver Section

6. HARDWARE DESCRIPTION
TOUCH SENSOR

A touch sensor is a type of equipment that captures and records physical touch or embraces on a device and/or object. It enables a device or object to detect touch, typically by human user or operator. A touch sensor detects touch or near proximity without relying on physical contact. Touch sensors are making their way into many applications like mobile phones, remote controls, and control panels, etc.

Fig.5 Touch sensor with glove

Present day touch sensors can replace mechanical buttons and switches. Touch sensors with simple rotational sliders, touch pads and rotary wheels offer significant advantages for more intuitive user interfaces. Touch sensors are more convenient and more reliable to use without moving parts. The use of touch sensors provides great freedom to the system designer and help in reducing the overall cost of the system. The overall look of the system can be more appealing and contemporary. The working of a touch sensor is similar to that of a simple switch. When there is contact with the surface of the touch sensor, the circuit is closed inside the sensor and there is a flow of current.

When the contact is released, the circuit is opened and no current flows.

ATMEGA 328

ATMEGA 328 microcontroller, which acts as a processor for the ardiuno board. Nearly it consists of 28 pins. From these 28 pins, the inputs can be controlled by transmitting and receiving the inputs to the external device. It also consists of pulse width modulation (PWM). These PWM are used to transmit the entire signal in a pulse modulation. Input power supply such as Vcc and Gnd are used. These IC mainly consists of analog and digital inputs. These analog and digital inputs are used for the process of certain applications. Ardiuno atmega-328 microcontroller board consist of 6 analog inputs pins. These analog inputs can be named from A0 to A5.
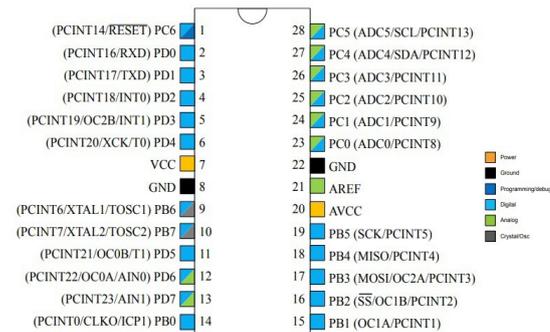

Fig.6 Pin Diagram

From these 6 analog inputs pins, we can do the process by using analog inputs. Analog inputs can be used in the operating range of 0 to 5V. Analog signal is considered as the continuous time signal, from which these analog signal can be used for certain applications. These are also called as non discrete time signal. Inputs such as voltage, current etc.., are considered to be either analog signal or digital signal only by analysing the time signal properties. Various applications of ardiuno microcontroller can use only an analog input instead of digital inputs. For these applications, analog input ports or pins can be used. These digital inputs can be either on state or in off state. Ardiuno atmega328 microcontroller also consists of 12 digital input pins. It can be stated as D0 to D11.Pins PB6 and PB7, which acts as a crystal to generate a clock signal. By using these crystals, we can generate the clock signals and by these clock

signals, we can use this clock signals for input sources. PC6 pin are the one where it can be used for the reset option. Resetting the program can be done by using this PC6 pin.

ZIGBEE

ZigBee is an IEE802.15.4based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that require short-range low-rate wireless data transfer. Its low power consumption limits transmission distances to 10–100 meters line-of-sight, depending on power output and environmental characteristics. ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZigBee basically uses digital radios to allow devices to communicate with one another. ZigBee devices are classified into three kinds, they are ZigBee coordinator, ZigBee router, ZigBee end device. The main applications of zigbee is Personal and healthcare, Commercial and residential control, consumer electronics.

GSM MODULE

A **GSM modem** is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities. A GSM modem exposes an interface that allows applications such as SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. It should also be noted that not all phones support the modem interface for sending and receiving SMS messages. The GSM modem is a specific type of device, which accepts a SIM card

operate on a subscriber's mobile number over a network, as a cellular phone.

Fig 7 GSM Module

LCD DISPLAY

Liquid Crystal Displays (LCDs) have materials, which combine the properties of both liquid and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. An LCD consists of two glass panels, with the liquid crystal material sand witched in between them. The inner surface of the glass plates are coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientation angle. When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned in a specific direction. The light rays passing through the LCD would be rotated by the polarizer, which would result in activating / highlighting the desired characters.

Fig 8 LCD Display

The LCDs are lightweight with only a few milli meters thickness. Since the LCD's consume power, they are compatible with low power electronic circuits, and can be powered for long durations. The LCD does don't generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. The LCD's have long life and a wide operating temperature range. The LCD's used exclusively in watches, calculators and measuring instruments are the simple seven-segment displays, having a limited amount of numeric data. These have resulted in the LCDs being extensively used in telecommunications and entertainment electronics. LCD display use of our project title message and information message. Our project connect to a microcontroller unit data line connected to a 'PORT 2' and control lines connected to a P3.5,P3.6,P3.7.

SPEAKER

A speaker is an electro acoustic transducer, which converts an electrical audio signal into a corresponding sound. The individual speakers are referred to as "drivers" and the entire unit is called a loudspeaker. Drivers made for reproducing high audio frequencies are called tweeters, those for middle frequencies are called mid-range drivers, and those for low frequencies are called woofers. Smaller loudspeakers are found in devices such as radios, televisions, computers and electronic musical instruments.

7. SOFTWARE DESCRIBTION

ARDUINO

The software tool that is used to program the microcontroller, is open-source-software and can be downloaded for free on www.arduino.cc.with this "arduino software" you can write little programs which the microcontroller should perform.
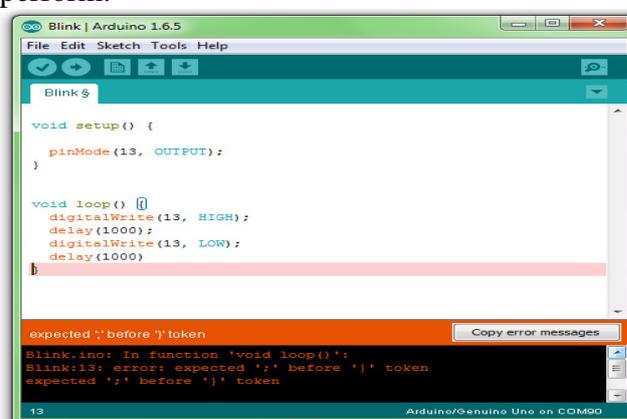

Fig 9 Arduino programming

8. RESULT

This paper explains the design of and working of a system which is helpful for dump and deaf people to commune with them as well as with the normal people. The dump people use their sign communication which is not easily intelligible by generic people and dump people cannot see and comprehend their gestures. This device converts the sign language into speech which is easily apprehended by dump and generic people. The sign language is translated into some text for deaf people as well which will get displayed on LCD. Also this sign language are converted into voice for blind people through speaker. The importance of speaking system is to reduce the communication barrier between the physically impaired people and normal people. The speaking system is used to recognize the hand gestures and it is converted into voice and display using speaker and LCD.

Fig 10 Hardware result

9. FUTURE ENHENCEMENT

There can be a lot of future enhancements related to this research work, which includes.

1. In homes offices and more, gesture remembrance can be greatly used to increase usability and reduce the resources necessary to create primary or secondary input systems with buttons.

2. Designing of a whole jacket which will be capable enough to read and vocalize the movements of animals and displaying the same on LCD for deaf people.

3. Virtual reality application eg.replacing the conventional input devices like joy sticks in videogames with the data glove.

4. Gesture remembrance along with facial remembrance, lip movement remembrance, and eyes tracking can be combined to create something called perpetual user interface to interact with computer systems which will improve creativity by leaps and bounds.

10. CONCLUSION

Sign language may be a helpful gizmo to ease the communication between the deaf or mute community and additionally the standard people. This project aims to lower the communication gap between the mute community and additionally the standard world. The projected methodology interprets language into speech. The system overcome the necessary time difficulties of dump people and improves their manner. Compared with existing system the projected arrangement is compact and is possible to carry to any places. The language interprets into some text kind displayed on the digital display screen to facilitate the deaf people likewise. In world applications, this system is helpful for physically impaired people. The foremost characteristic of this project is that the gesture recognizer may be a standalone system that, applied in common place of living. It in addition useful for speech impaired and paralysed patient means those do not speak properly and in addition used for intelligent home applications and industrial applications.

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