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Identification Method of Main Structural Vibration Modal Based on Information Filtering

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ABSTRACT: This article presents a novel concept of a deaf and dumb nerve system based communication using a Pic controller, Bluetooth audio module, audio control, and vibration motor. The concept enables people with limited or no hearing to communicate and it is also applicable to highly deaf individuals, as it is a non-invasive system. The Pic controller is used to provide the necessary interface between the Bluetooth audio module and the audio control. The Bluetooth audio module transmits the sound signal to the audio control which can then be used to generate the vibration motor. The vibration motor then provides a tactile sensation to the user which helps them to understand the sound. The concept has several advantages over existing systems, it is cost effective, highly efficient, and non-invasive. The Pic controller is used to provide the interface between the Bluetooth audio module and the audio control, which reduces the cost of the system. The Bluetooth audio module is used to transmit the sound signal to the audio control, which is then used to generate the vibration motor. This process is highly efficient as it eliminates the need for an additional audio control. Furthermore, the concept is non-invasive as it does not require any physical contact with the user, which makes it ideal for highly deaf individuals. The concept has several applications. It can be used in educational and medical settings to enable communication between individuals who are deaf or have limited hearing. Additionally, it can be used to create a tactile language for communicating in sign language. It can also be used in industrial settings to provide a warning system for workers who are deaf or have limited hearing.

I. INTRODUCTION

Deaf and dumb nerve system based communication using a PIC controller, Bluetooth audio module, audio control, and vibration motor is an innovative technology that enables communication between differently abled people and their caregivers. This technology utilizes a combination of sensors and microcontrollers to facilitate communication between deaf and hard-of-hearing (DHH) individuals and their caregivers. The communication is achieved through the use of two-way text messaging, vibration, and audio signals. The PIC controller is a small, low-cost, single-board microcontroller that is used to control various components of the system. It is responsible for receiving and interpreting user input, such as text messages, vibration, and audio signals. The controller is programmed to detect the user's input, process it, and then transmit the output to the relevant device.

This process is automated and allows the user to communicate with their caregiver without the need to manually input messages. The Bluetooth audio module is used to transmit audio signals from the user to their caregiver. This module is connected to the PIC controller and is programmed to detect the audio signals from the user. Once the signal is received, it is then transmitted to the caregiver's device. This allows the user to communicate verbally with their caregiver. The audio control is used to regulate the audio volume of the user's device.

This allows the user to adjust the volume to their preference.

The vibration motor is used to detect the user's input, such as pressing a button or touching a sensor. Once the user's input is detected, the vibration motor then sends a signal to the relevant device, such as the audio module. This technology enables individuals with hearing impairments to communicate with their caregivers more effectively. It allows them to communicate using text messages, vibration, and audio signals. Furthermore, it also allows the user to adjust the audio volume to their preference. This technology is simple to use and can be easily adapted to meet the needs of different users.



II. LITERATURE SURVEY

Proposed a real time Albanian Sign Language Recognition captured from signers both hands. Kinect device is used to construct depth map. To classify signers hand a k means clustering algorithm is used to partition pixels into two groups. After extracting the hands contour pixels centroid distance is calculated and Fourier descriptors is obtained which is used for hand shape representation. Every input gestures compared with training data set by calculating Fourier coefficients and Euclidean distance then the lowest Euclidean distance is considered as a match. Proposed system gives an accuracy of 91%.

Works on two sensors that is Microsoft's Kinect with a Leap Motion Controller. In this paper Real time hand gesture letters are recognized using supervised learning method and natural user interface libraries with the Kinect SDK Version 2 and LMC. Thus, letters with overlapping fingers or letters with multiple frames need more processing to be accurate.

Presents work on image processing techniques such as frame extraction, erosion, dilation, edge detection, blur elimination, noise limitation wavelet transform and image fusion techniques. Fourier descriptors are used for feature extraction and extracted features with hindi text are stored in the database and compared with given input testing video of the signer.

Proposed a vision based system for recognition of Portuguese Sign Language. In this paper real time implementation can be done and support vector machine method is used for comparison. In this system vowels recognized with accuracy 99.4% and consonants recognized with 99.6% accuracy.

Proposed a hand gesture recognition system using wireless data gloves fitted with flex sensors. Hearing impaired people can wear these hand gloves and perform hand gestures then the system can convert these gestures into speech so normal person understand their expression hence the communication can be possible between deaf and normal person.

III. EXISTING SYSTEM

We will be having the component like flex sensor, ADC converter ADC0804, microcontroller such as PIC, Arduino and speaker. Here the flex sensor used for detecting the hand motion. Flex sensor is also called as bending sensor, based upon the bending of sensor their resistance of the sensor get varied. Then their voltage also varied, according to the voltage value the command will be provided. So this flex sensor is exactly act as a variable resistor.

Flex sensor is analogue in nature. This input is directly given to Arduino. Because an Arduino has inbuilt analogue to digital converter. This will convert the analogue sensor input into digital input to Arduino. But in the case of raspberry pi we have to use ADC IC externally. Example ADC0804

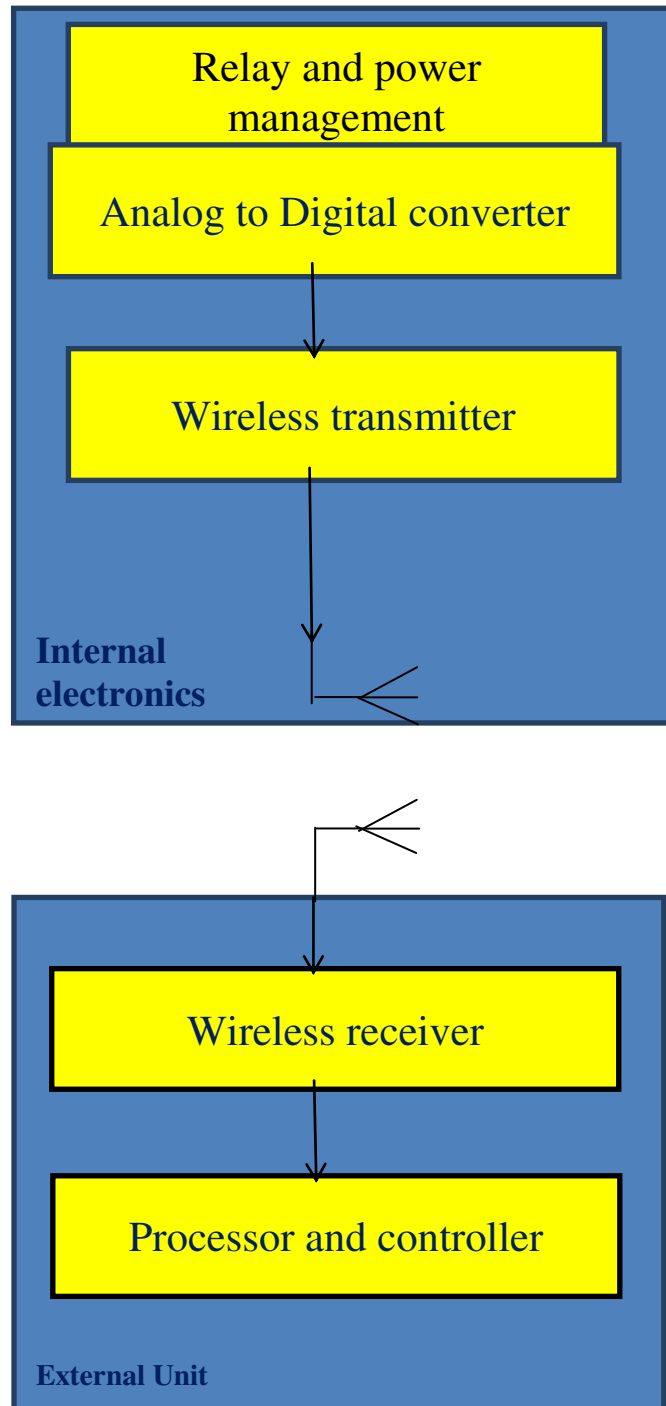


Fig.1: An overview of the system

IV. PROPOSED SYSTEM

The purpose of this report is to develop a Deaf and Dumb Nerve System Based Communication system using PIC Controller, Bluetooth Audio Module, Audio Control, Vibration Motor and other necessary components. The system is designed to facilitate communication between deaf and dumb people in a safe and efficient manner. The system will enable the users to communicate with each other by using vibration motor which will be triggered by a PIC controller. The controller will be connected to a Bluetooth audio module, which will send and receive audio signals. The audio

signals will be processed by an audio control unit, which will then be converted into signals that can be used to control the vibration motor. The vibration motor will then be used to create vibrations that will be received by the user and interpreted as a message

Use of audio amplifiers is increasing day by day. This project deals with the transmission of the audio signal wirelessly from mobile phone to the Bluetooth board through Bluetooth transmission and amplification of the received signal is done using power audio amplifier Bluetooth module can connect to devices such as Hi-Fi equipment, mobile phones and MP3 players. Audio sources such as mobilephones work as the transmitter unit, and Bluetooth module, audio amplifier and speakers form the receiver.

The receiver unit can be positioned anywhere (within Bluetooth range), so it can be moved around without using any cables. Amplifier in the receiver unit is used to boost the audio signal. The boosted audio signal is processed through the Microcontroller and the information will be passed to the deaf and dumb through the variations of vibration signal. All the process is controlled using Microcontroller.

The Pic controller is used to process the information received from a Bluetooth audio module. This module can detect audio signals which are then processed by the Pic controller. The Pic controller then generates a signal which is sent to the vibration motor.

The vibration motor is connected to the audio control. The audio control is responsible for controlling the vibration motor in order to produce the desired vibration. The vibration motor can be programmed to produce different levels of vibrations which can be used to communicate.

The Bluetooth audio module is also connected to the audio control. This module allows the user to send audio signals to the audio control. The audio control then processes the audio signals and sends them to the vibration motor.

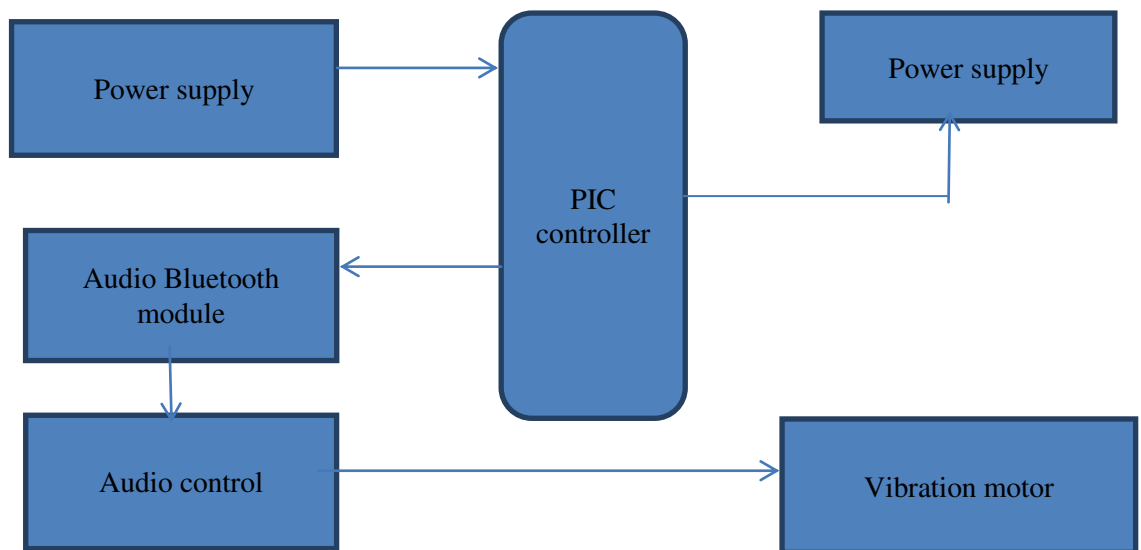


Fig.2: Block diagram of system

V. METHODOLOGY AND WORKING

Power supply

A power supply (sometimes known as a power supply unit or PSU) is a device or system that supplies electrical or other types of energy to an output load or group of loads. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others. A power supply unit is required to provide the appropriate voltage supply (5v to the Bluetooth board and 12v to the another parts).

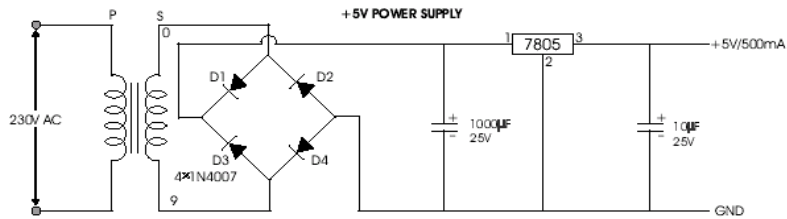


Fig.3: Circuit diagram of Power supply

PIC Controller

PIC is a family of modified Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Peripheral Interface Controller" now it is "PIC" only. PICs are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability. PIC controller is used to generate the frequency to the amplification board.

Liquid Crystal Display (LCD)

LCD is a type of display used in digital watches and many portable computers. LCD displays utilize to sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. LCD technology has advanced very rapidly since its initial inception over a decade ago for use in lap top computers. Technical achievements has resulted in brighter display, higher resolutions, reduce response times and cheaper manufacturing process. The liquid crystals can be manipulated through an applied electric voltage so that light is allowed to pass or is blocked. By carefully controlling where and what wavelength (color) of light is allowed to pass, the LCD monitor is able to display images. A backlight provides LCD monitor's brightness.

Over the years many improvements have been made to LCD to help enhance resolution, image, sharpness and response times. One of the latest such advancement is applied to glass during acts as switch allowing control of light at the pixel level, greatly improving LCD's ability to display small-sized fonts and image clearly. Other advances have allowed LCD's to greatly reduce liquid crystal cell response times. Response time is basically the amount of time it takes for a pixel to "change colors", in reality response time is the amount of time it takes a liquid crystal cell to go from being active to inactive. LCD display is used to display the status of the controller (the system is in active mode or not)

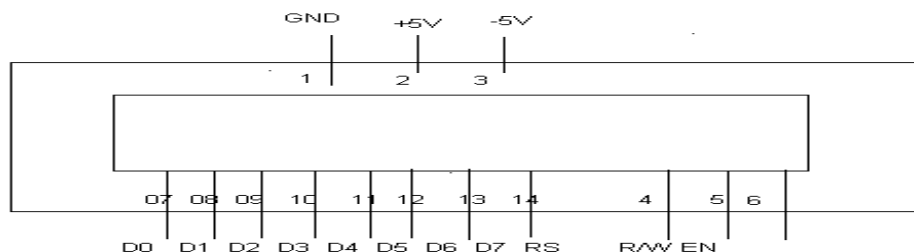


Fig.4: LCD Pin diagram

Vibration motor

The PIC controller is used to send and receive signals from the Bluetooth audio module. It is connected to the Bluetooth audio module using a serial port. The Bluetooth audio module is used to transmit and receive audio signals. It



is connected to the audio control unit using a 3.5mm audio jack. The audio control unit is used to convert the audio signals into signals that can be used to control the vibration motor. The vibration motor is connected to the PIC controller and is used to create vibrations that will be received by the user and interpreted as a message.

Amplifier

It is an electronic circuit that uses an external power supply to generate an output signal that is a larger replica of its input. An audio amplifier is used to increase the volume of a speaker voice so they can be heard more easily in larger areas. In an amplification section the audio becomes and that generated audio is transmitted to the vibration motor.

Relay

The relay is an electrical control device, which has the interaction between the input circuit and the output circuit. It plays a role of automatic adjustment, safety protection and conversion circuit in the circuit

System Design

The Deaf and Dumb Nerve System based Communication using PIC Controller, Audio Bluetooth Module, Audio Control and Vibration Motor is designed with the latest technology of the PIC Controller, Audio Bluetooth Module, Audio Control and Vibration Motor. The PIC Controller is used to facilitate the communication process between the users of the system. The Audio Bluetooth Module is used to allow the users to receive audio signals from the other user. The Audio Control is used to control the volume of the audio signal. The Vibration Motor is used to alert the users when a signal is received.

The system consists of two main components, the PIC Controller and the Audio Bluetooth Module. The PIC Controller is used to facilitate the communication process between the users. The Audio Bluetooth Module is used to allow the users to receive audio signals from the other user. The Audio Control is used to control the volume of the audio signal. The Vibration Motor is used to alert the users when a signal is received.

Operation and Applications:

The Deaf and Dumb Nerve System Based Communication system is designed to enable deaf and dumb people to communicate with each other in a safe and efficient manner. The system is operated by the user sending a signal from the PIC controller to the Bluetooth audio module. The audio module then sends the signal to the audio control unit, which then converts the signal into a signal that can be used to control the vibration motor. The vibration motor then
The system can be used in a variety of applications, such as enabling deaf and dumb people to communicate with each other in a safe and efficient manner. The system can also be used in educational settings, as it provides a unique way for deaf and dumb people to communicate with others.

VI. RESULT

We have designed a prototype model for the dumb people. The important key factor of this project is to facilitate these people from these risk factor and to make them more confident to manage their sites by themselves. The project will be beneficial to both dumb and as well as normal people in this electronic world. We are trying to make this project more and more convenient to mute people.

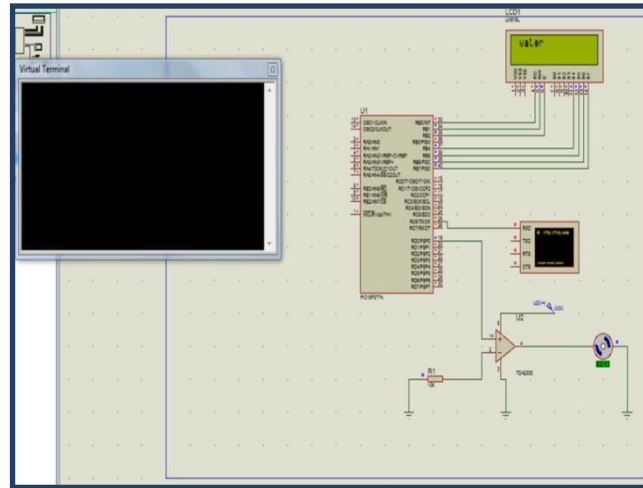


Fig.5: Stimulation Output

VI. CONCLUSION AND FUTURE SCOPE

In this paper we have designed a prototypemodel for the dumb people. The important key factor ofthis project is to facilitate these people from these riskfactor and to make them more confident to manage theirsites by themselves. The main advantages of this projectis to carry away this device very easily wherever the needcomes. It is of about less weight. Simple coding languageis used to make is less complicated. The project will bebeneficial to both dumb and as well as normal people inthis electronic world. We are trying to make this projectmore and more convenient to mute people.

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