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MOTION BASED MESSAGE CONVEYOR FOR PARALYTIC PATIENTS

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ABSTRACT

The main aim of the project is to implement a low cost reliable system which will help to establish communication between paralytic or disabled patients and a nurse. A patient can easily send messages to the nurse by just tilting an accelerometer connected to a body part capable of movement. This angle of tilt is sent to a controller which then initiates communication between the patient and nurse and also decides which message is to be transmitted based on the tilt angle. Message can be displayed on the display as well as the message is converted in audio using speech module.Along with the buzzer the system also includes the GSM module which will help to alert the doctor or concerned person by sending SMS in case of emergency.Our project provides a reliable, effective and simple yet important solution to various issues faced by nurses in traditionally communicating with disabled patients.

Keywords: Patient Communication, Accelerometer, Arduino Uno, Speech Module, GSM module.

I. INTRODUCTION

Among the large number of advancements done in the medical sector, very few actually focus on helping patients with disabilities to communicate. Although monitoring systems make it easier for doctors to collect and observe a patient's vitals, there aren't many options for actual verbal communication for disabled patients. Here we propose a simple yet effective way to solve this age old problem. The main purpose is to replace the conventional approach of patient-nurse communication with modern technologies that provide a much faster and reliable way. In the current scenario, the patient has to be dependent on a family member or mostly a nurse both of which have to attend the patient constantly. Our objective is to make such patients independent to communicate with the nurse by the simple task of tilting a device located on his finger or any other part of the body that is capable of movement. This will not only help the patient but also ease out the nurse's job. As a single nurse is responsible for a number of patients, the time required for each nurse to visit every patient to meet his needs will be saved. After the patient sends the message the nurse can remotely monitor their requests and provide assistance without any further delay. A buzzer is placed and it will alert the nurse in case of an emergency. To make the system more dynamic all these ideas together thus focus on building a smart system to make patients self-sufficient, and assist the nurses, doctors and family members at the same time.

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II.SYSTEM WORKING

Accelerometer is connected to Arduino Uno controller which will acts as an input. The heart of our system is accelerometer .This can be two axis or three axis static accelerometer connected to analog input of controller. It is interface with controller to sense the acceleration. The controller is the second stage of system. The controller processes the data from the accelerometer and if the conditions are satisfied it selects the message which is set and it is further given to LCD. The instruction will be displayed onLCD. At the same time that instruction will be given to speech module and speaker. So that patient will be able to hear whether the given instruction is correct or not .We can insert the SD Card/ memory card in that we can store the instructions or messages which is to be given by the patient. At the same time buzzer will turn on and it gives alert to the doctors and nurse or relatives of patient. GSM is used to give emergency alert to the registered number as we can exchange the information from remote place.

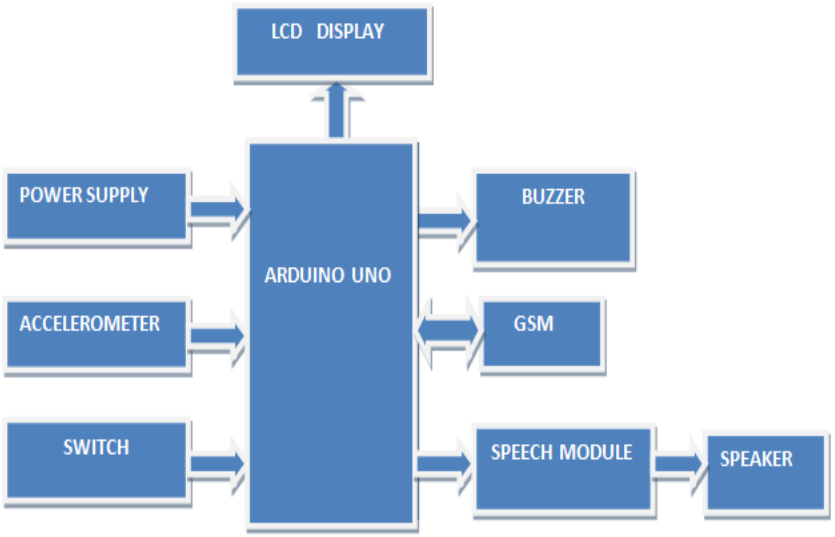

Fig.1 Block Diagram of the system

III. HARDWARE DESCRIPTION

1. Arduino Uno: The Arduino Uno is open source microcontroller board based on the ATmega328 chip. The board has 14 digital input/output pins, 6 analog input pins, Onboard 16 MHz ceramic resonator, Port for USB connection, onboard DC power jack, An ICSP header and a microcontroller reset button. It contains everything needed to support the microcontroller. Using the board is also very easy, simply connect it to a computer with a USB cable or power it with DC adapter or battery to get started.

2. Accelerometer: The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±3 *g*. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration.

3. GSM Module: GSM is used for wireless communication. Here SIM800 GSM module is used which is a full quad-band GSM/GPRS module which works on frequency GSM 850MHz. It is designed with power saving technique so that the power consumption is as low as 0.7mA in sleep mode. In application, the controlling device controls the GSM module by AT commands via its serial interface.

4. Speech Module: The board is controlled through simple serial commands. Board is very flexible, compact and low cost embedded audio solution for any applications. It plays high quality audio of 44.1 KHz.It can interface with any microcontroller or PC Serial port and can accepts any micro SD memory card from 128MB to 32GB. These memory cards are available at very low cost due to wide use in mobile phones.

5 LCD: LCD (Liquid Crystal Display) screen is an electronic display model and find a wide range of applications. A 16X2 LCD display is very basic device and is very commonly used in various applications and circuits. A 16X2 LCD means it can display 16 characters per row and there are 2 suchrows.

IV. RESULT& DISCUSSION

The system is fully automated, reliable, and convenient. The simulation of the system is done in the Arduino software. Our project shows the successful transmission of three different messages. One of the most effective function of the system is the message given by the patient is able to hear through speakers. As well as the message is remotely sent to doctor of concerned person through SMS. When accelerometer is titled to right side then themessage displayed is “PAIN”, when the accelerometer is tilted to left side then the message displayed is “HUNGRY” and when the accelerometer is tilted in upward direction the message displayed is “EMERGENCY”. At the same time these messages are sent to registered number via GSM.

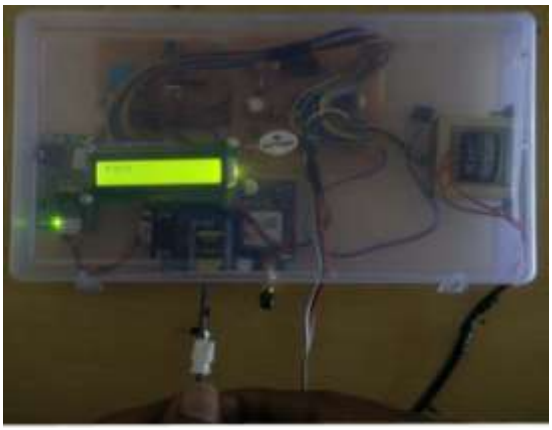

Fig.2 Message when tilted in right direction

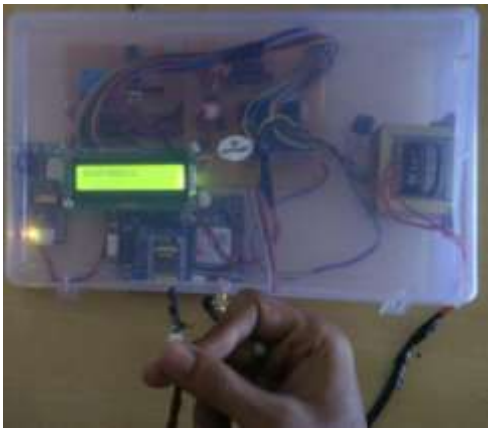

Fig.3 Message when tilted in left direction

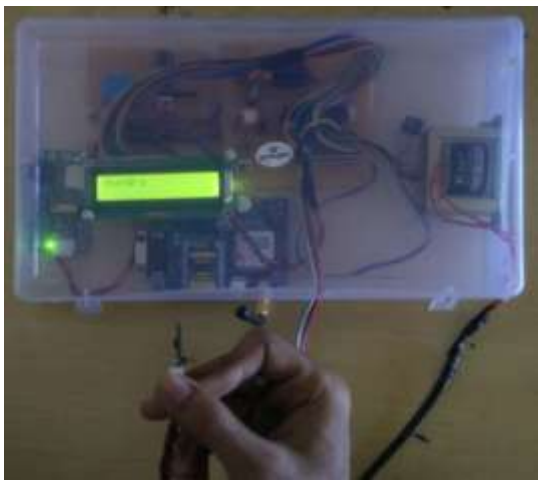

Fig.4 Message when tilted in upward direction

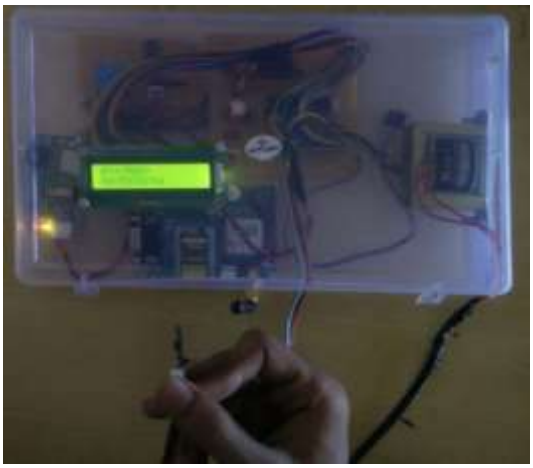

Fig.5 Message sent via GSM

V. CONCLUSION

By implementing this system a simple device for paralyzed or disabled person achieved without use of complex form of inputs. Communication through this system is very fast and effective. Excellent approach implemented between patient–nurse communication.

VI. FUTURE ASPECTS

We can also use the Android Application, by which the real time patient's health status updates will be given to the doctor. Then the doctor will give immediate solutions to the nurse or on the status of the patient's health. We can use the Wi-Fi system for communication. By using Wi-Fi system we can expand the communication distance. We can transmit and receive message through the long distance.

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