

Gesture control (Gyroscope) based transmitter unit and voice module based received station with Arduino UNO and Arduino Nano and other sensors.

**A thesis submitted to the
Department of Mechanical Engineering**



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DECLARATION

Course Title: Project and Thesis

This is to certify that the work presented in the thesis is an outcome of the Investigation carried out by the authors under the supervision of lecturer Pronoy Chowdhury, Department of Mechanical Engineering Sonargaon University, Dhaka. It is Declared that thesis has been submitted only for the award of graduation It was not been submitted elsewhere for the award of any degree or diploma.

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“Author”

ABSTRACT

The hand gestures can be used to represent various signs with the help of the flex sensors. The gesture representation includes the movements such as angle bends and direction changes. The flex sensors which are fitter over fingers acquire their Dynamics. The voltage signals corresponding to the bend of flex sensors will then be processed by microcontroller . The processed signal will be sent to voice module and produce the appropriate voice words with the help of the speaker. In this society the number of disabled patients are increasing and there is no one to take care of them a patients required a caretaker to continuously monitor which is not always possible due to social or financial circumstances so to minimize caretakers requirement and increase the comfort level of the patients here we have proposed and automatic bed position control system for disable patients. The bed positioning is also controlled by different hand gestures.

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Old citizens or disabled persons become dependent on other members of the family and hospitals nurse station gesture control can be a useful assistant for them. Recent development in the field of robotics, automation, embedded system, artificial intelligence etc. The hand gesture controlled by nurse station. By this development the recent are controlled voice module from hospitality. The proposed model makes the hand gesture control a lot easier to assemble and simple in the use in addition the cost of manufacturing also gets reduced.

1.2 Objective

A helping device for disabled patients.

1. To get the nurses services properly for dumb patients.
2. By using this system, we can hospital service point.

1.3 Methodology

1. Creating an idea to design that it can be easily controlled by the hand gesture Control.
2. The controlling technique of this device is performed by microcontroller.

CHAPTER 2 SYSTEM ARCHITECTURE

2.1 Circuit Diagram

Block diagram of the auto power supply control system from different sources using ARDUINO NANO with all the essential components given below. The block diagram of power bank power supply control system from different sources using microcontroller.

ARDUINO NANO

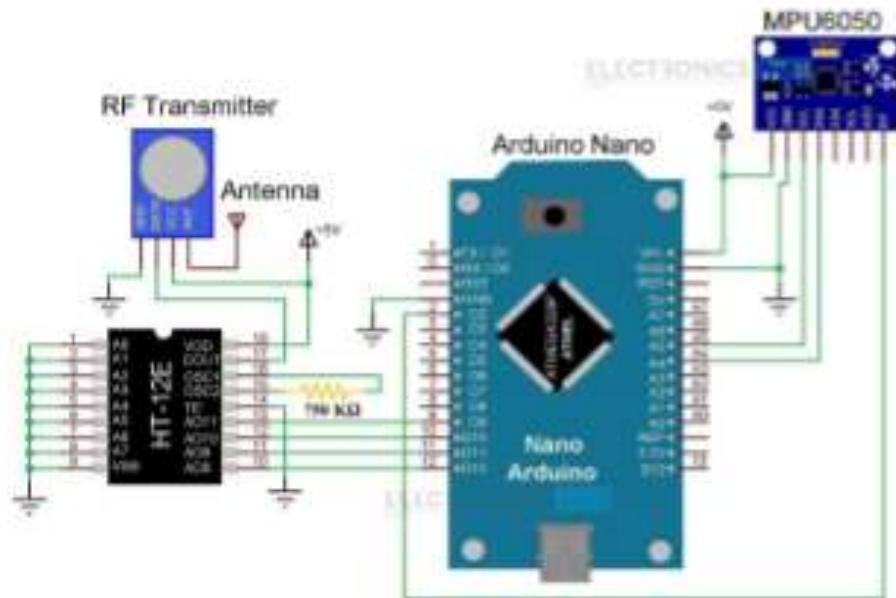


Fig 2.1(a): ARDUINO NANO

Receiver station

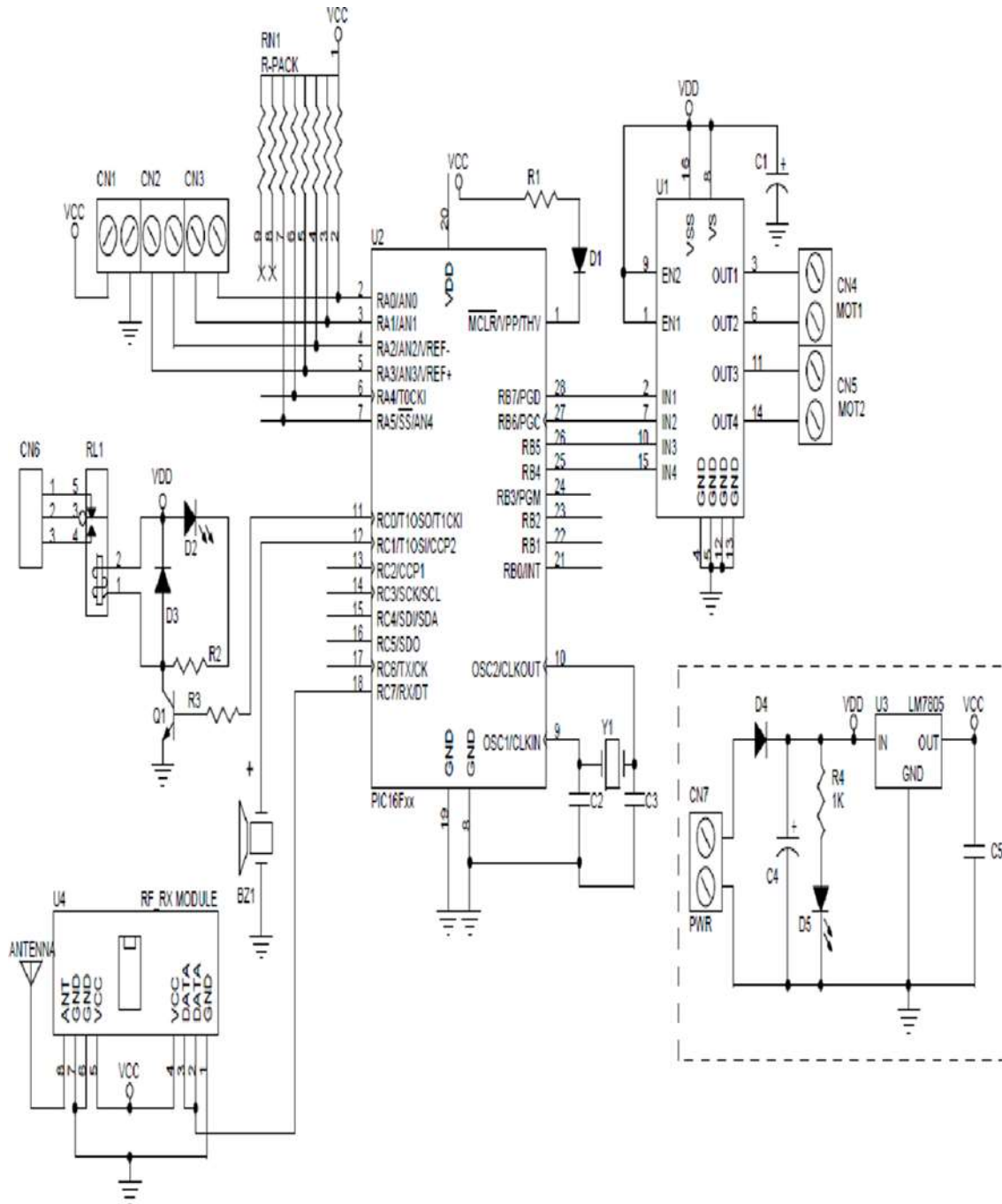


Fig 2.1(b): Receiver station

2.2 WORKING PRINCIPLE

The system working is easily understood by the following steps.

1. Microcontroller sends gesture data to transmitter controller as analog inputs.
2. Analog inputs are converted and processed based on digital data is out to ht12e for encoding
3. Then it is being transmitted wirelessly using RF module.

2.3 APLICATION

Hand gesture module is prepared by a sensing device known as MEMS gyroscope that capable of measuring the tilt in 3-Di.e. x, y and z. A relatively low cost gyroscope can be used for this. The accelerometer sensors sense the accelerating force and thus gives proportional analog voltage for 3-D thus the data is processed by the MCU unit and provides controls to the nurse station.

CHAPTER 3 HARDWARE ANALYSIS

3.1 Arduino UNO

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.



Fig 3.1: Arduino uno

3.2 Arduino NANO

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Demeaned but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

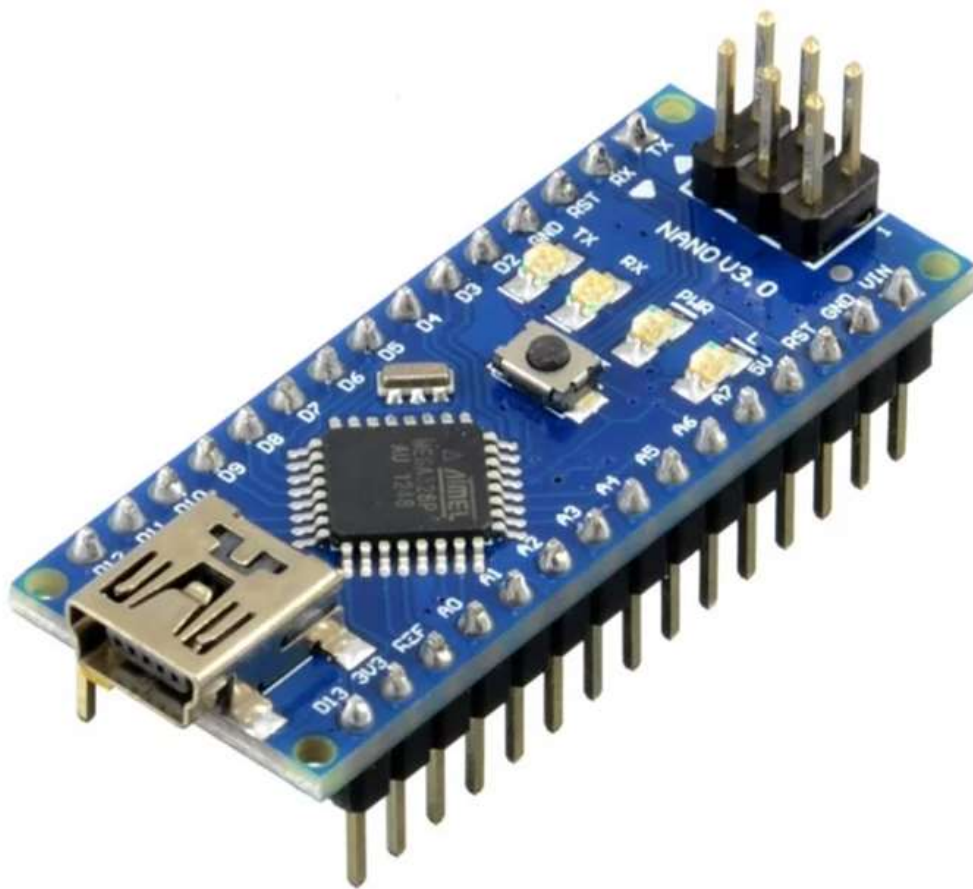


Fig 3.2: Arduino nano

3.3 Voice Record Module

Voice Record Module is based on ISD1820, which is a multiple-message record/playback device. It offers true single-chip voice recording, non-volatile storage, and playback capability around 10 seconds. This module is easy to use which you could directly control by push button on board or by Microcontroller such as Arduino, STM32, Chip Kit etc. From these, you can easily control record, playback and repeat and so on.

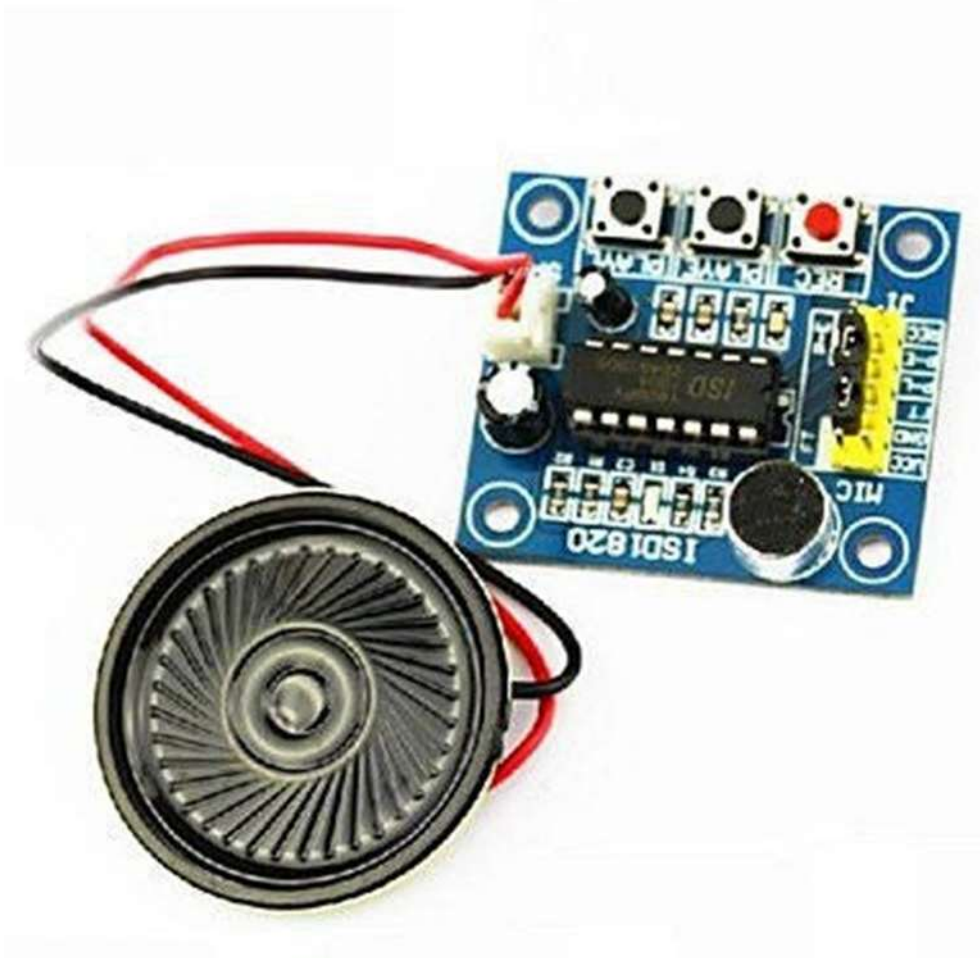


Fig 3.3: Voice Record Module

3.4 GYROSCOPE

A device consisting of a wheel or disc mounted so that it can spin rapidly about an axis which is itself free to alter in direction. The orientation of the axis is not affected by tilting of the mounting, so gyroscopes can be used to provide stability or maintain a reference direction in navigation systems, automatic pilots, and stabilizers.

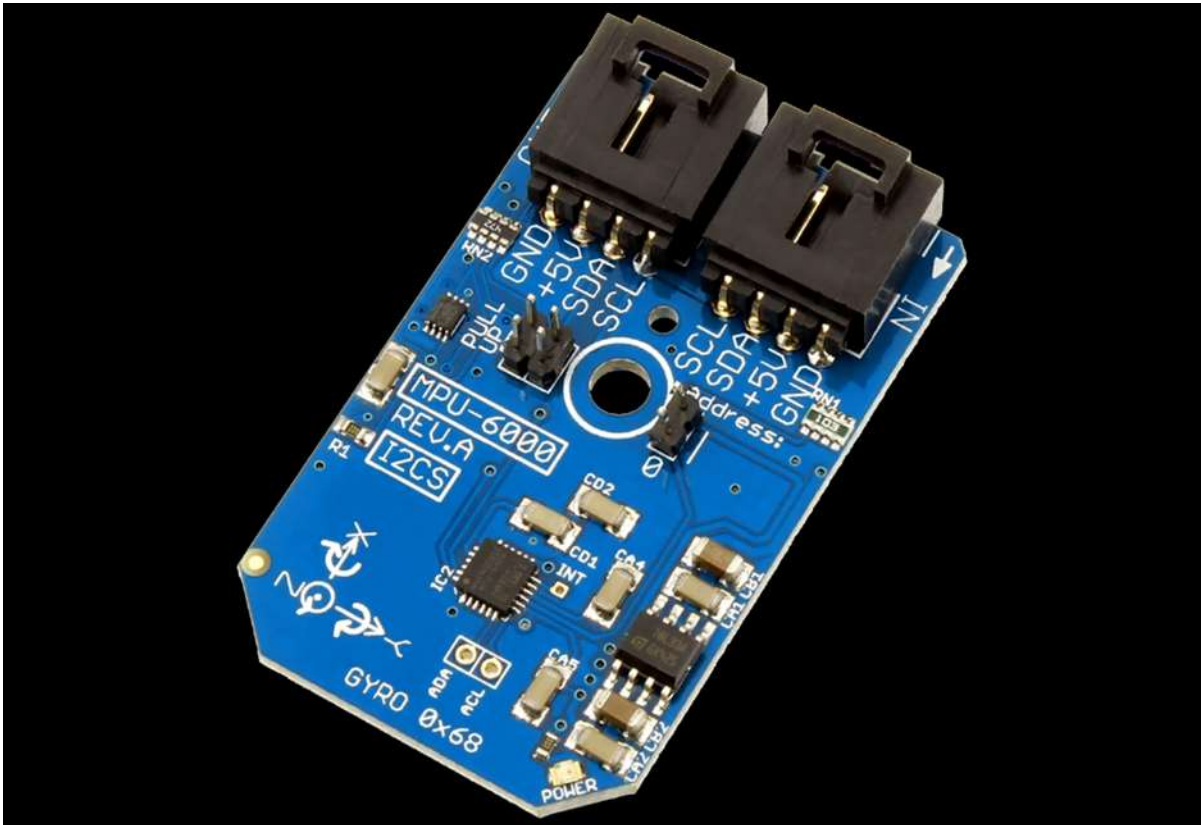


Fig 3.4: GYROSCOPE

3.5 RESISTOR 220 ohm

220 ohm $\frac{1}{4}$ watt Resistor

Resistors act to reduce current flow, and at the same time, act to lower voltage levels within circuits. In electronic circuits, resistors are used to limit current flow, to adjust signal levels, bias active elements, and terminate transmission lines among other uses.



Fig 3.5: RESISTOR 220 ohm

3.6 POWER SUPPLY

5V power supplies (or 5VDC power supplies) are one of the most common power supplies in use today. ... Linear regulated 5VDC power supplies regulate the output using a dissipative regulating circuit. They are extremely stable, have very low ripple, and have no switching frequencies to produce EMI.



Fig 3.6: POWER SUPPLY

3.7 CONNECTING WIRES

Connecting wires allows an electrical current to travel from one point on a circuit to another, because electricity needs a medium through which to move. In a basic circuit, the wire comes from one terminal of a power source, such as a battery.



Fig 3.7: CONNECTING WIRES

3.8 ENCODER DIGITAL LOGIC

HT12E is a 212 series encoder IC (Integrated Circuit) for remote control applications. It is commonly used for radio frequency (RF) applications. HT12E simply converts 12-bit parallel data in to serial output which can be transmitted through a RF transmitter.

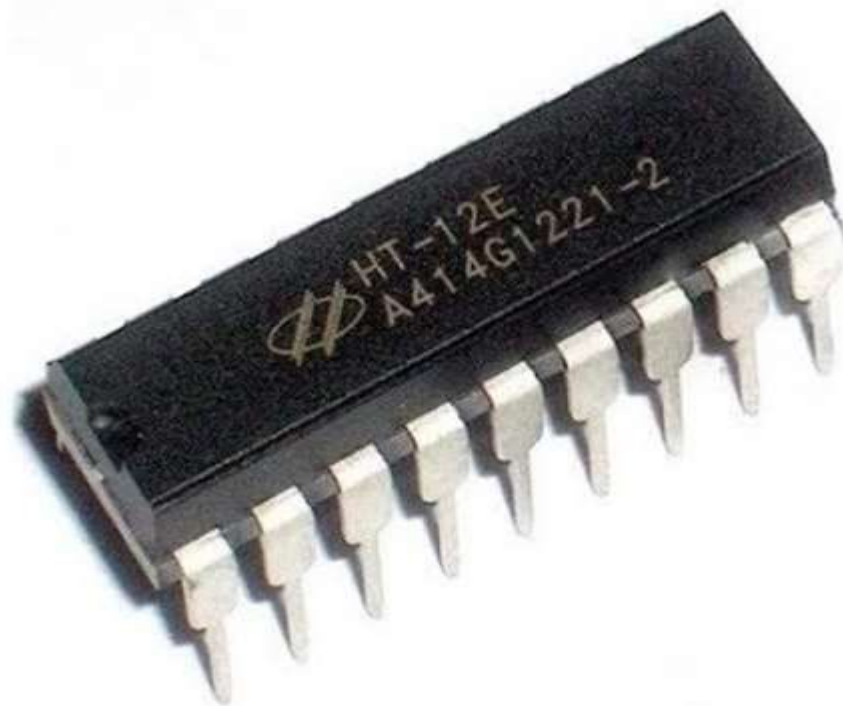


Fig 3.8: ENCODER DIGITAL LOGIC

3.9 DIP SWITCH 8 BIT

Eight switches offer 256 (2⁸) combinations, which is equivalent to one byte. The DIP switch package also has socket pins or mounting leads to provide an electrical path from the switch contacts to the circuit board.

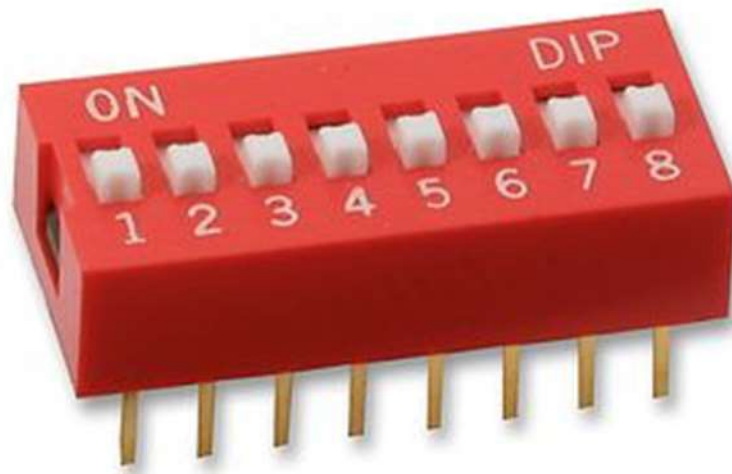


Fig 3.9: DIP SWITCH 8 BIT

3.10 POTENTIOMETER

The measuring instrument called a potentiometer is essentially a voltage divider used for measuring electric potential (voltage); the component is an implementation of the same principle, hence its name. Potentiometers are commonly used to control electrical devices such as volume controls on audio equipment.



Fig 3.10: POTENTIOMETER

3.11 HAND GESTURE GLOVES



Fig 3.11: HAND GESTURE GLOVES

3.12 POWER BANK

Power banks can be defined as portable batteries that use circuitry to control any power in and power out. They can charge up using a USB charger when power is available, and then used to charge battery powered items like mobile phones and a host of other devices that would normally use a USB charger.



Fig 3.12: POWER BANK

3.13 LED LIGHT SIGNAL

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.



Fig 3.13: LED LIGHT SIGNAL

3.14 POWER SWITCH

A power switch controls the flow of power to an electric device. The switch has an on and off position, usually represented by a 1 (on) and a 0 (off).



Fig 3.14: POWER SWITCH

3.14 FEMALE HEADER

0.1" (2.54 mm) Female Headers. These 0.1" (2.54 mm) female header strips are commonly used as low-cost connectors for custom-made cables or perforated prototyping PCBs. The standard spacing is the same as on most solderless breadboards and matches 0.1" male header strips.

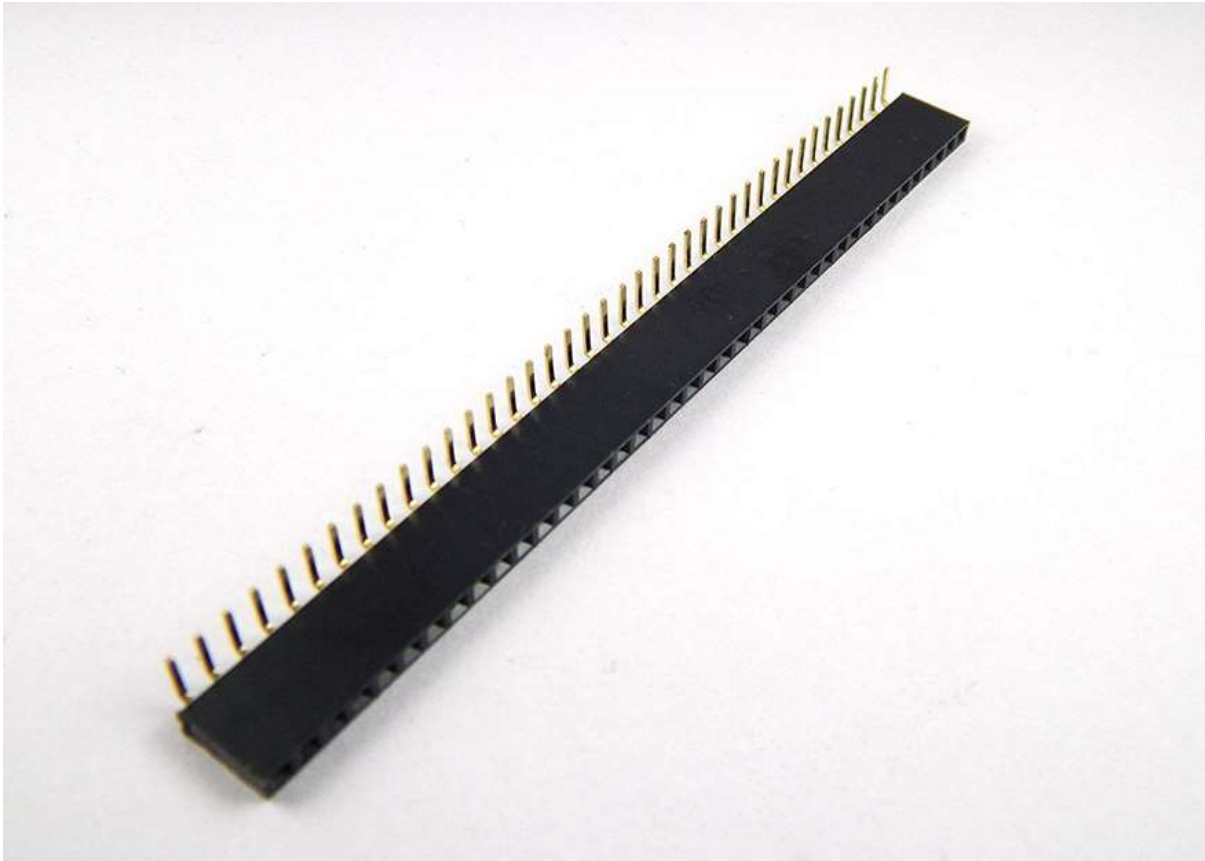


Fig 3.15 : FEMALE HEADER

CHAPTER4 Project Activities and final

4.1 PROJECT ACTIVITIES AND FINAL REAL PHOTO

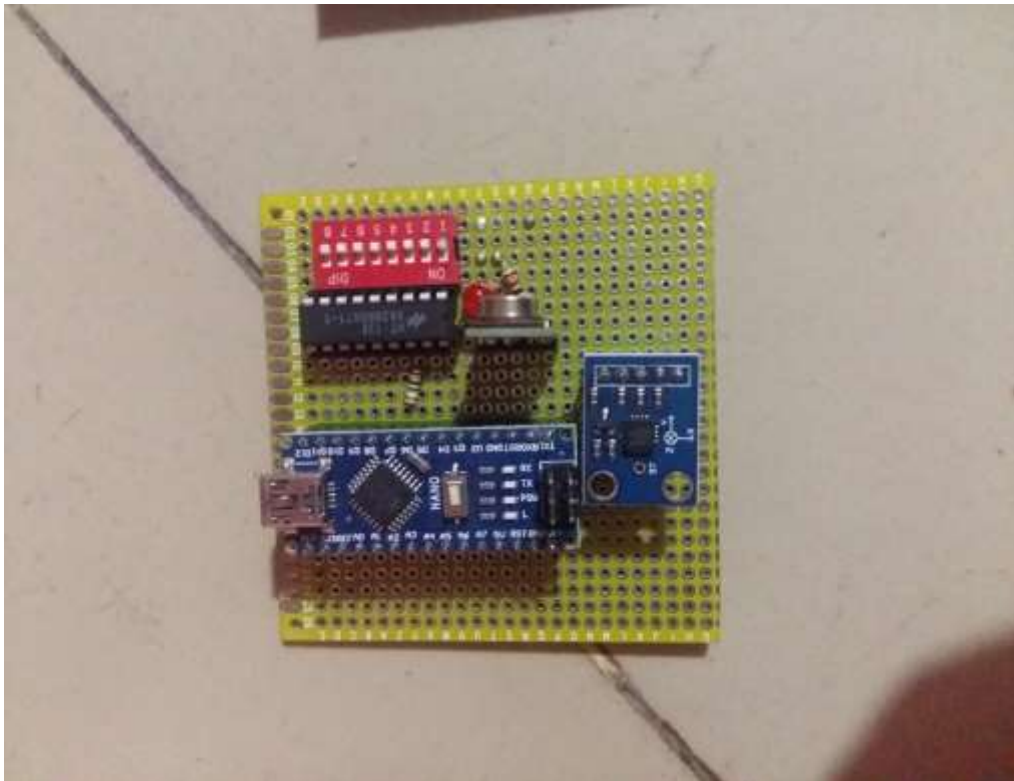
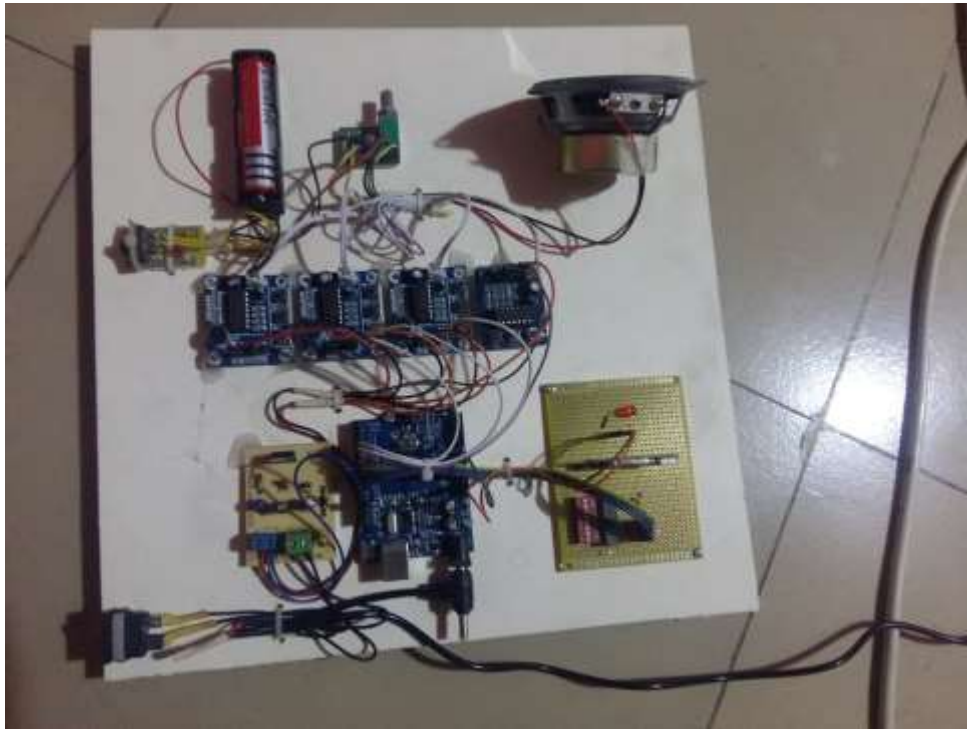


Fig: Real project

CHAPTER 5 DISCUSSION AND CONCLUSION

5.1: DISCUSSION

This project also used for disabled patients for hospitality and service others.

5.2: CONCLUSION

The expression of words have been made successfully by this work for the speech impaired people. This project also the patients itself to adjust the bed on their comfort. The wireless smart health monitoring system project is designed to give a better healthcare service. This system is really assisting them is not spending much time with each of the patients for monitoring.

5.3: FUTURE SCOPE

- 1.In the future it will be seen from the nurse station through on LED monitor.
- 2.Also the message on the mobile phone will tell you what the patient needs with GSM System.

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Open source electronic prototyping platform.

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1. Beginning Arduino mike mc roberts
2. Introduction to Arduino.... alan G smith
3. Electronic devices and circuit theory.....Robert boylestad