Visvesvaraya Technological University

Belgaum, Karnataka-590 018

A Project Report on

"Implementation of Child Rescue From Borewell Using Zigbee For Long Range Applications"

Project Report submitted in partial fulfillment of the requirement for the award of the degree of

Bachelor of Engineering

In

Electrical & Electronics Engineering

Submitted by

Rahul Tiwari	**1CR17EE054**
Bindushree S	**1CR17EE013**
Chandana N	**1CR17EE015**
Gagana S.V	**1CR17EE020**

Under the Guidance of

D.Kodandapani

Assistant Professor, Department of Electrical & Electronics Engineering

CMR Institute of Technology

CMR INSTITUTE OF TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

AECS Layout, Bengaluru-560 037

Certificate

Certified that the project work entitled **"Implementation Of Child Rescue From Borewell Using Zigbee For Long Range Applications"** carried out by **Mr. Rahul Tiwari,1CR17EE054; Ms. Bindushree S, 1CR17EE013; Ms. Chandana N, 1CR17EE015;** Ms. Gagana S.V,1CR17EE020 are bonafied students of CMR Institute of Technology, Bengaluru, in partial fulfillment for the award of Bachelor of Engineering in Electrical & Electronics Engineering of the Visvesvaraya Technological University, Belgaum, during the year 2020-2021. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the Report deposited in the departmental library.The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Signature of the Guide	*Signature of the HOD*	*Signature of the Principal*
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Mr. D.Kodandapani, Assistant Professor EEE Department CMRIT, Bengaluru	Dr. K. Chitra Professor & HOD EEE Department CMRIT, Bengaluru	Dr. Sanjay Jain Principal, CMRIT, Bengaluru

External Viva

Name of the Examiners Signature & Date

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DECLARATION

We, [**Mr. Rahul Tiwari (1CR17EE054), Ms. Bindushree S (1CR17EE013), Ms. Chandana N (1CR17EE015), Ms. Gagana S.V (1CR17EE020)],** hereby declare that the report entitled **"Implementation Of Child Rescue From Borewell Using Zigbee For Long Range Applications"** has been carried out by us under the guidance of **D. Kodandapani,** Assistant Professor, Department of Electrical & Electronics Engineering, CMR Institute of Technology, Bengaluru, in partial fulfillment of the requirement for the degree of **BACHELOR OF ENGINEERING in ELECTRICAL & ELECTRONICS ENGINEERING**, of Visveswaraya Technological University, Belagaum during the academic year 2020-21. The work done in this report is original and it has not been submitted for any other degree in any university.

Place: Bengaluru
Date:13/05/2021

Bindushree S (1CR17EE013)

Chandana N (1CR17EE015)

Gagana S.V (1CR17EE020)

Rahul Tiwari(1CR17EE054)

Abstract

The water level is decreasing day by day so more people put ever increasing demands on limited supplies. To come up with the needs, bore wells are constructed, but these are usually left uncovered. Children often fall in bore well which is uncovered and gets trapped. Since the rescuing process is risky as well as difficult, it causes the child life in danger. A small delay in the rescue can cost the child life. To lift the child out the narrow confines of the bore wells is also not very easy. Robot for bore well rescue offers a solution to these kinds of situations. The robot is controlled by visual basic which is incorporated in a PC which acts as a prime component of our prototype. The robot consists of motors for movement, net arrangement as a supporting platform and a RF camera for image capturing. From the obtained information regarding the surroundings the robot reaches the child and places the net hand on the child thereby provides a safe platform. By making sure that the child is in safe position the robot lifts up and rescues the child.

Acknowledgement

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of people, who are responsible for the completion of the project and who made it possible, because success is outcome of hard work and perseverance, but stead fast of all is encouraging guidance. So with gratitude we acknowledge all those whose guidance and encouragement served us to motivate towards the success of the project work.

We take great pleasure in expressing our sincere thanks to ***Dr. Sanjay Jain****,* ***Principal, CMR Institute of Technology, Bengaluru*** *for providing an excellent academic environment in the college and for his continuous motivation towards a dynamic career. We would like to profoundly thank* ***Dr. B Narasimha Murthy****, Vice-principal of CMR Institute of Technology and the whole* ***Management*** *for providing such a healthy environment for the successful completion of the project work.*

We would like to convey our sincere gratitude to ***Dr. K Chitra****,* ***Head of Electrical and Electronics Engineering Department, CMR Institute of Technology, Bengaluru*** *for her invaluable guidance and encouragement and for providing good facilities to carry out this project work.*

We would like to express our deep sense of gratitude to ***D. Kodandapani, Assistant Professor, Electrical and Electronics Engineering, CMR Institute of Technology, Bengaluru*** *for his/her exemplary guidance, valuable suggestions, expert advice and encouragement to pursue this project work.*

We are thankful to all the faculties and laboratory staffs of ***Electrical and Electronics Engineering Department, CMR Institute of Technology, Bengaluru*** *for helping us in all possible manners during the entire period.*

Finally, we acknowledge the people who mean a lot to us, our parents, for their inspiration, unconditional love, support, and faith for carrying out this work to the finishing line. We want to give special thanks to all our friends who went through hard times together, cheered us on, helped us a lot, and celebrated each accomplishment.

Lastly, to the ***Almighty****, for showering His Blessings and to many more, whom we didn't mention here.*

CONTENTS

INTRODUCTION

1.1 Brief background to the Research

India is an agriculture based country, ranchers or farmers basically rely generally upon groundwater for their basic water framework requirements. Now for the growing populace, lesser land based assets and the advancement of urbanization of the very progressively significant requirement of the bore wells are usually tunnelled for the groundwater pondering requirement. Subsequent to the basic requirement yielding of the water, the bore wells would have generally left revealed. So that, most by far of kids coincidentally moves toward the well and falls into it, which is the main purpose for these distress disasters by and by. The bore wells are some of the time left open with no legitimate covering. The rescue activities as a rule are less secure even to the rescue colleagues. A little postponement in this entire procedure may diminish the odds of sparing the kid. In the event that the zone close to the bore opening contains shakes beneath certain profundity, odds of sparing the kid turns out to be exceptionally less. Whatever might be the situation the pace of accomplishment relies upon part of elements like time taken for transportation of apparatus to the circumstance, HR and chiefly the reaction time of different government associations. At present there is no legitimate strategy for managing this issue. At the point when the wells are burrowed, it isn't appropriately shut. the little kids accidentally will in general fall into the bore wells. safeguarding the kid is an another tumultuous errand. safeguarding the youngster with less time frame contrasted with all the basics of other existing strategies is a definitive point of this paper. Presently a-days, we regularly listen in regards to the kid tumbling or getting stuck under the bore wells and this is being an issue over the both urban, sub-urban and the small towns. The repeat from asserting such news is extending bit by bit. Most by far of the youngsters accidentally moves toward the wells and falls into it. In the wake of teaching everyone with respect to these bore well mishaps, there showed up on be no advancement in the quantity of weepy accidents

1.2 OBJECTIVE OF RSEARCH WORK

The objective of our B.E. final year project work entitled "Implementation of a Child Rescue System from Borewell using Zigbee for Long Range Applications" are as follows:

1. Manually monitoring the child with the help of camera and controlling unit of system.

2. Communicating with the system by sending appropriate commands to it and activate the suitable motors.

3. Once the system has reached proximity of child, it is stopped immediately and is given the commands by the controlling device to perform the closing of the systemic arms.

4. Controlling a system to takeoff the child inside the bore well, which is controlled by the person from outside.

LITERATURE REVIEW

In the current strategy the basic controlling of an armed robot to definitely rescue the kid from the small bore gap is majorly constrained by the depending individual from outside and also there is no general customizable arm width robot for each bore well size. Bygone framework, a major opening is burrowed nearly close to the bore well where the child is stuck until the major profundity where the kid is caught for quite a while. Indeed, even a little time postponement in these cases, assets may decrease to a very low value the opportunity to spare the kid alive. The effected region close to the bore opening may contaminate once in a while contain shakes somewhere inside becomes riskier, for those situation the opportunity to spare the kid alive is very low and highly unsafe. Due to very less oxygen and almost no light source that may cause the significant trouble and also may scare the child during the activity of rescue of the youngster. Till date there is no such good and extraordinary hardware for saving the youngster caught inside the bore opening. There is no good and reliable system to rescue the youngster. The advanced military individuals are called if this procedure doesn't work to rescue the system. It includes a very great deal of time and near vitality and also costly assets which are not efficient or effectively accessible from all over the place. The basic component of the drag well is very small for any child in troublesome and also splendid goes as diminished inside it, the important safeguarding task in that situation is extremely troublesome for the rescuers. The general computerized system which will join an outfit to the kid using expanded arms for saving the kid is major concern to developtheseday

DESIGN PROCESS

COMPONENTS REQUIRED:

- Zigbee receiving and transmitting unit
- Arduino uno
- Dc motor
- Dht11(Temperature and humidity sensor)
- LCD display
- MQ2(smoke sensor)
- Avr Microcontroller-IC ATmega 328(32 bit)
- Power supply(220V AC)
- Motor driver(L29 3D)
- Software used: arduino ide
- Programming language: c language

Zigbee

The explosion in wireless technology has seen the emergence of many standards, especially in the industrial, scientific and medical (ISM) radio band. There have been a multitude of proprietary protocols for control applications, which bottlenecked interfacing. Need for a widely accepted standard for communication between sensors in low data rate wireless networks was felt. As an answer to this dilemma, many companies forged an alliance to create a standard which would be accepted worldwide. It was this Zigbee Alliance that created **Zigbee**. Bluetooth and Wi-Fi should not be confused with Zibgee. Both Bluetooth and Wi-Fi have been developed for communication of large amount of data with complex structure like the media files, software etc. Zigbee on the other hand has been developed looking into the needs of communication of data with simple structure like the data from the sensors.

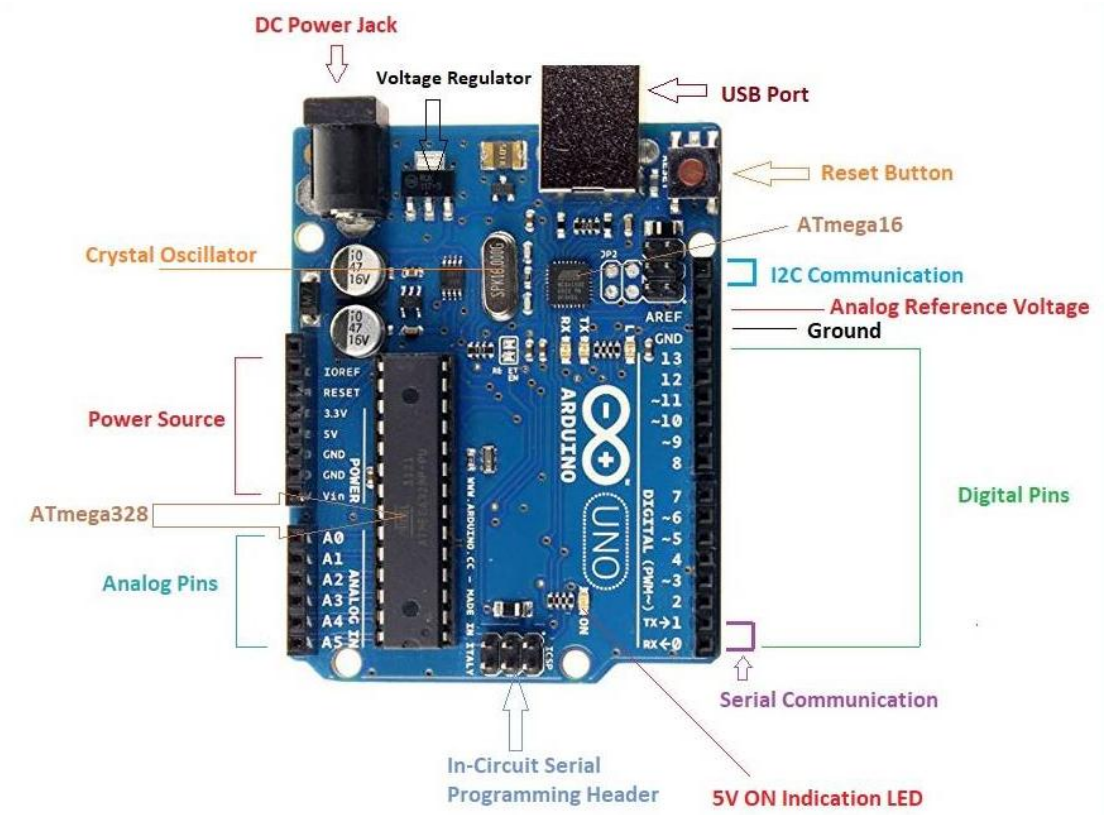
Zigbee is a low power spin off of WiFi. It is a specification for small, low power radios based on IEEE 802.15.4 – 2003 Wireless Personal Area Networks standard. The specification was accepted and ratified by the Zigbee alliance in December 2004. Zigbee Alliance is a group of more than 300 companies including industry majors like Philips, Mitsubishi Electric, Epson, Atmel, Texas Instruments etc. which are committed towards developing and promoting this standard. The alliance is responsible for publishing and maintaining the ZIgbee specification and has updated it time and again after making it public for the first time in 2005. Most of the recent devices conform to the Zigbee 2007 specifications has two feature sets– Zigbee and Zigbee Pro. The manufacturers which are members of the Alliance provide software, hardware and reference designs to anyone who wants to build applications using Zigbee.

Many years ago, when Bluetooth technology was introduced, it was thought that Bluetooth would make WiFi redundant. But the two coexist quite well today, so do many other Wireless standards like WirelessHART and ISA100.11a. Then why would we need another WPAN standard like Zigbee? The answer is, the application focus of Zigbee Alliance - low cost and low power for energy efficient and cost effective intelligent devices. Moreover, Zigbee and Bluetooth have different application focus. Despite of all their similarities, and despite the fact that both are based on the IEEE 802.15 standards, the two are different in technology as well as scope. Bluetooth is made with mobile phones as its centre of universe enabling media transfer at rates in excess of 1 Mbps while Zigbee is built with emphasis on low data rate control system sensors featuring slower data of just 250 kbps.

Arduino Uno

- It is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVR microcontroller Atmega328.

  First Arduino project was started in Interaction Design Institute Ivrea in 2003 by David Cuartielles and Massimo Banzi with the intention of providing a cheap and flexible way to students and professional for controlling a number of devices in the real world.
- The current version of Arduino Uno comes with USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output.
- It allows the designers to control and sense the external electronic devices in the real world.

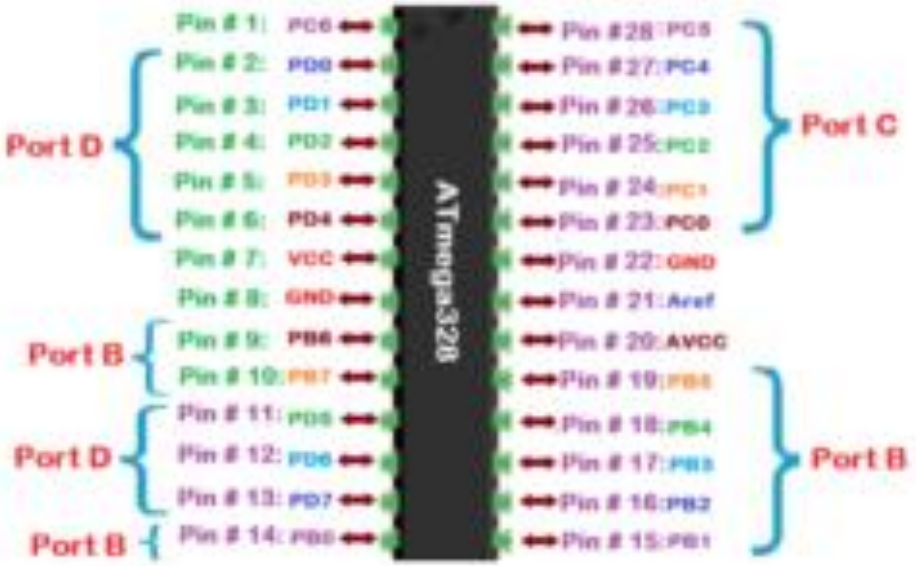


Arduino UNO

- This board comes with all the features required to run the controller and can be directly connected to the computer through USB cable that is used to transfer the code to the controller using IDE (Integrated Development Environment) software, mainly developed to program Arduino. IDE is equally compatible with Windows, MAC or Linux Systems, however, Windows is preferable to use. Programming languages like C and C++ are used in IDE.
- Apart from USB, battery or AC to DC adopter can also be used to power the board.
- Arduino Uno boards are quite similar to other boards in Arduino family in terms of use and functionality, however, Uno boards don't come with FTDI USB to Serial driver chip.
- There are many versions of Uno boards available, however, Arduino
- Nano V3 and Arduino Uno are the most official versions that come with Atmega328 8-bit AVR Atmel microcontroller where RAM memory is 32KB.
- When nature and functionality of the task go complex, Mirco SD card can be added in the boards to make them store more information.

Features of Arduino Uno board

- Arduino Uno comes with USB interface i.e. USB port is added on the board to develop serial communication with the computer.
- Atmega328 microcontroller is placed on the board that comes with a number of features like timers, counters, interrupts, PWM, CPU, I/O pins and based on a 16MHz clock that helps in producing more frequency and number of instructions per cycle.



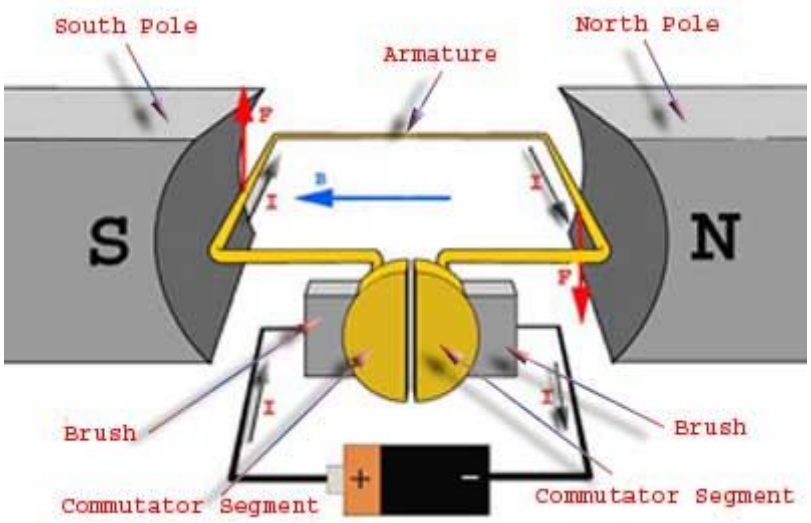
Atmega328 Microcontroller

- It is an open source platform where anyone can modify and optimize the board based on the number of instructions and task they want to achieve.
- This board comes with a built-in regulation feature which keeps the voltage under control when the device is connected to the external device.
- Reset pin is added in the board that reset the whole board and takes the running program in the initial stage. This pin is useful when board hangs up in the middle of the running program; pushing this pin will clear everything up in the program and starts the program right from the beginning.
- There are 14 I/O digital and 6 analog pins incorporated in the board that allows the external connection with any circuit with the board. These pins provide the flexibility and ease of use to the external devices that can be connected through these pins. There is no hard and fast interface required to connect the devices to the board. Simply plug the external device into the pins of the board that are laid out on the board in the form of the header.

- The 6 analog pins are marked as A0 to A5 and come with a resolution of 10bits. These pins measure from 0 to 5V, however, they can be configured to the high range using analogReference() function and AREF pin.
- 13KB of flash memory is used to store the number of instructions in the form of code.
- Only 5 V is required to turn the board on, which can be achieved directly using USB port or external adopter, however, it can support external power source up to 12 V which can be regulated and limit to 5 V or 3.3 V based on the requirement of the project.

DC motor

It relies on the fact that like magnet poles repel and unlike magnetic poles attract each other. A coil of wire with a current running through it generates an electromagnetic field aligned with the center of the coil. By switching the current on or off in a coil its magnetic field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°. A simple *DC motor* typically has a stationary set of magnets in the stator and an armature with a series of two or more windings of wire wrapped in insulated stack slots around iron pole pieces (called stack teeth) with the ends of the wires terminating on a commutator. The armature includes the mounting bearings that keep it in the center of the motor and the power shaft of the motor and the commutator connections. The winding in the armature continues to loop all the way around the armature and uses either single or parallel conductors (wires), and can circle several times around the stack teeth. The total amount of current sent to the coil, the coil's size and what it's wrapped around dictate the strength of the electromagnetic field created. The sequence of turning a particular coil on or off dictates what direction the effective electromagnetic fields are pointed. By turning on and off coils in sequence a rotating magnetic field can be created. These rotating magnetic fields interact with the magnetic fields of the magnets (permanent or electromagnets) in the stationary part of the motor (stator) to create a force on the armature which causes it to rotate. In some DC motor designs the stator fields use electromagnets to create their magnetic fields which allow greater control over the motor. At high power levels, DC motors are almost always cooled using forced air.

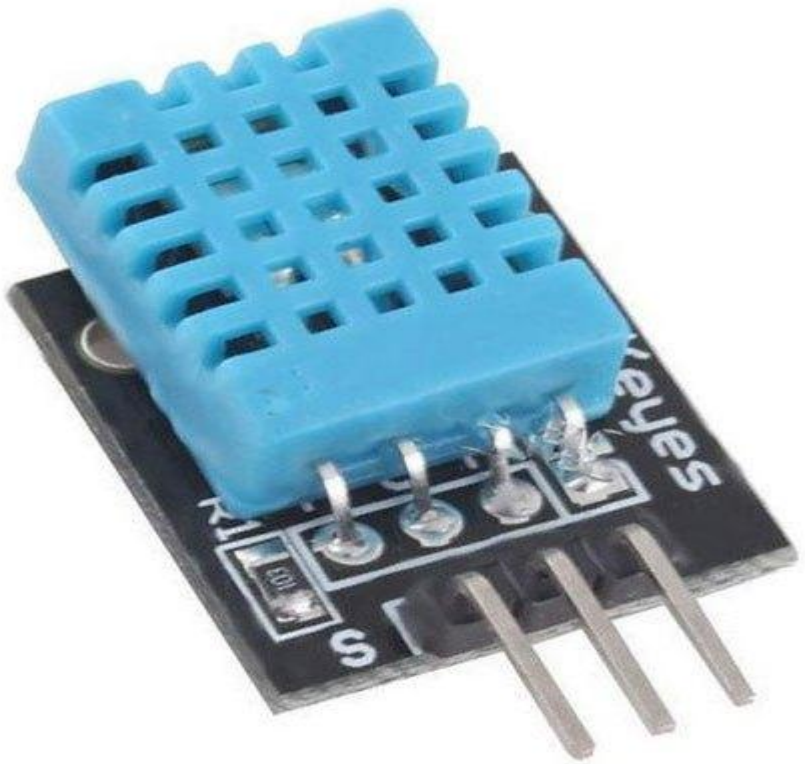


The commutator allows each armature coil to be activated in turn. The current in the coil is typically supplied via two brushes that make moving contact with the commutator. Now, some brushless DC motors have electronics that switch the DC current to each coil on and off and have no brushes to wear out or create sparks.
Different number of stator and armature fields as well as how they are connected provide different inherent speed/torque regulation characteristics. The speed of a DC motor can be controlled by changing the voltage applied to the armature. The introduction of variable resistance in the armature circuit or field circuit allowed speed control. Modern DC motors are often controlled by power electronics systems which adjust the voltage by "chopping" the DC current into on and off cycles which have an effective lower voltage.
Since the series-wound DC motor develops its highest torque at low speed, it is often used in traction applications such aselectric locomotives, and trams. The DC motor was the mainstay of electric traction drives on both electric and diesel-electric locomotives, street-cars/trams and diesel electric drilling rigs for many years. The introduction of DC motors and an electrical grid system to run machinery starting in the 1870s started a new second Industrial Revolution. DC motors can operate directly from rechargeable batteries, providing the motive power for the first electric vehicles and today's hybrid cars and electric carsas well as driving a host of cordless tools. Today DC motors are still found in applications as small as toys and disk drives, or in large sizes to operate steel rolling mills and paper machines.
If external power is applied to a DC motor it acts as a DC generator, a dynamo. This feature is used to slow down and recharge batteries on hybrid car and electric cars or to return electricity back to the electric grid used on a street car or electric powered train line when they slow down. This process is called regenerative braking on hybrid and electric cars. In diesel electric locomotives they also use their DC motors as generators to slow down but dissipate the energy in resistor stacks. Newer designs are adding large battery packs to recapture some of this energy.

DHT11 Sensor

This DFRobot DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it

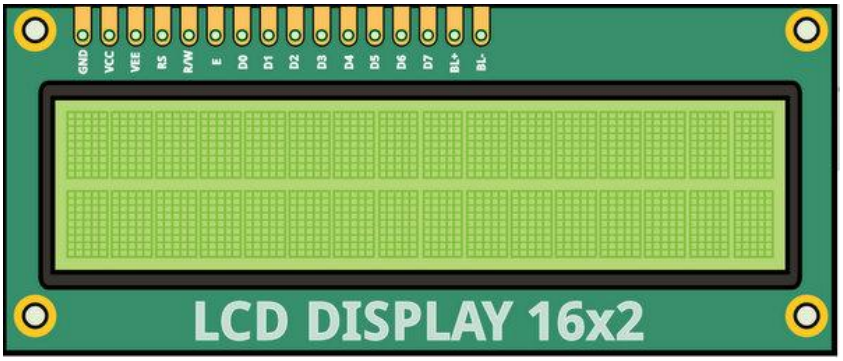
ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness.



Each DHT11 element is strictly calibrated in the laboratory that is extremely accurate on humidity calibration. The calibration coefficients are stored as programmers' in the OTP memory, which are used by the sensor's internal signal detecting process. The single-wire serial interface makes system integration quick and easy. Its small size, low power consumption and up-to-20 meter signal transmission making it the best choice for various applications, including those most demanding ones. The component is 4-pin single row pin package. It is convenient to connect and special packages can be provided according to users' request.

LCD Displays

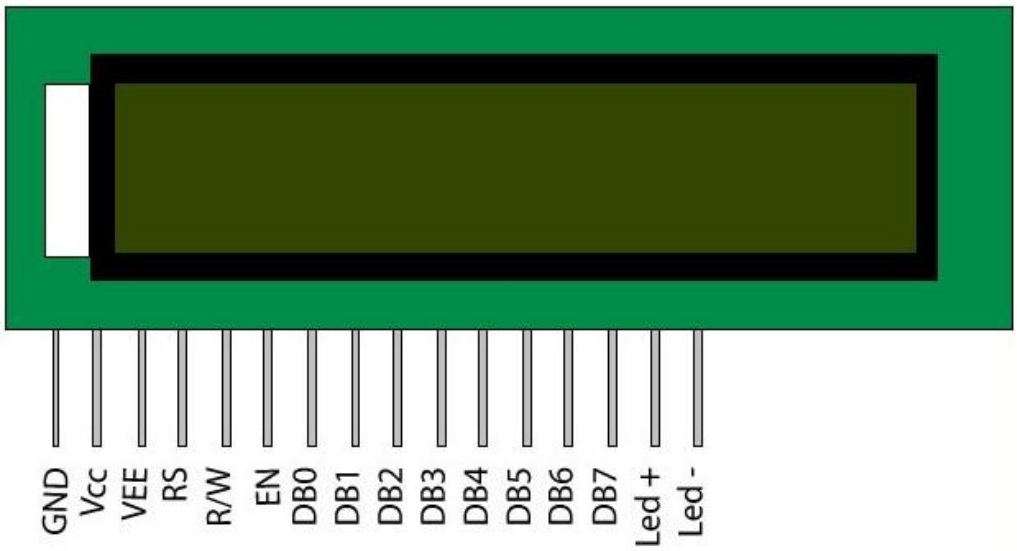
There are many display devices used by the hobbyists. LCD displays are one of the most sophisticated display devices used by them. Once you learn how to interface it, it will be the easiest and very reliable output device used by you! More, for micro controller based project, not every time any debugger can be used. So LCD displays can be used to test the outputs. Obviously, for last possibility, you need to know how to use this stuff pretty well.



Hitachi has set up a mile stone by its LCD controller IC. All the LCD displays use the same, or any one of the IC s based upon the architecture introduced by Hitachi.
Ok, one minute, all I'm talking about is the character LCD display and not Graphical LCD Display.

Most of the LCD Displays available in the market are 16X2 (That means, the LCD displays are capable of displaying 2 lines each having 16 Characters a), 20X4 LCD Displays (4 lines, 20 characters). It has 14 pins. It uses 8lines for parallel data plus 3 control signals, 2 connections to power, one more for contrast adjustment and two connections for LED back light. Let us have a look to typical pin configurations:

Pin Description:



Pin Number	Symbol	Function
1	Vss	Ground Terminal
2	Vcc	Positive Supply
3	Vdd	Contrast adjustment
4	RS	Register Select; 0→Instruction Register, 1→Data Register
5	R/W	Read/write Signal; 1→Read, 0→ Write
6	E	Enable; Falling edge
7	DB0	Bi-directional data bus, data transfer is performed once, thru DB0 to DB7, in the case of interface data length is 8-bits; and twice, through DB4 to DB7 in the case of interface data length is 4-bits. Upper four bits first then lower four bits.
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	LED-(K)	Back light LED cathode terminal
16	LED+(A)	Back Light LED anode terminal

Data/Signals/Execution of LCD

Now that was all about the signals and the hardware. Let us come to data, signals and execution.

LCD accepts two types of signals, one is data, and another is control. These signals are recognized by the LCD module from status of the RS pin. Now data can be read also from the LCD display, by pulling the R/W pin high. As soon as the E pin is pulsed, LCD display reads data at the falling edge of the pulse and executes it, same for the case of transmission.

LCD display takes a time of 39-43µS to place a character or execute a command. Except for clearing display and to seek cursor to home position it takes 1.53ms to 1.64ms. Any attempt to send any data before this interval may lead to failure to read data or execution of the current data in some devices. Some devices compensate the speed by storing the incoming data to some temporary registers.

LCD displays have two RAMs, naming DDRAM and CGRAM. DDRAM registers in which position which character in the ASCII chart would be displayed. Each byte of DDRAM represents each unique position on the LCD display. The LCD controller reads the information from the DDRAM and displays it on the LCD screen. CGRAM allows user to define their custom characters. For that purpose, address space for first 16 ASCII characters are reserved for users. After CGRAM has been setup to display characters, user can easily display their custom characters on the LCD screen.

MQ2 Sensor

MQ2 gas sensor is an electronic sensor used for sensing the concentration of gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon monoxide. MQ2 gas sensor is also known as chemiresistor. It contains a sensing material whose resistance changes when it comes in contact with the gas. This change in the value of resistance is used for the detection of gas.

MQ2 is a metal oxide semiconductor type gas sensor. Concentrations of gas in the gas is measured using a voltage divider network present in the sensor. This sensor works on 5V DC voltage. It can detect gases in the concentration of range 200 to 10000ppm.

Working Principle

This sensor contains a sensing element, mainly aluminium-oxide based ceramic, coated with Tin dioxide, enclosed in a stainless steel mesh. Sensing element has six connecting legs attached to it. Two leads are responsible for heating the sensing element, the other four are used for output signals.

Oxygen gets adsorbed on the surface of sensing material when it is heated in air at high temperature. Then donor electrons present in tin oxide are attracted towards this oxygen, thus preventing the current flow.

When reducing gases are present, these oxygen atoms react with the reducing gases thereby decreasing the surface density of the adsorbed oxygen. Now current can flow through the sensor, which generated analog voltage values.

These voltage values are measured to know the concentration of gas. Voltage values are higher when the concentration of gas is high.

Applications

These sensors are used to detect the presence of gases in the air such as methane, butane, LPG and smoke but they are unable to distinguish between gases. Thus, they cannot tell which gas it is.

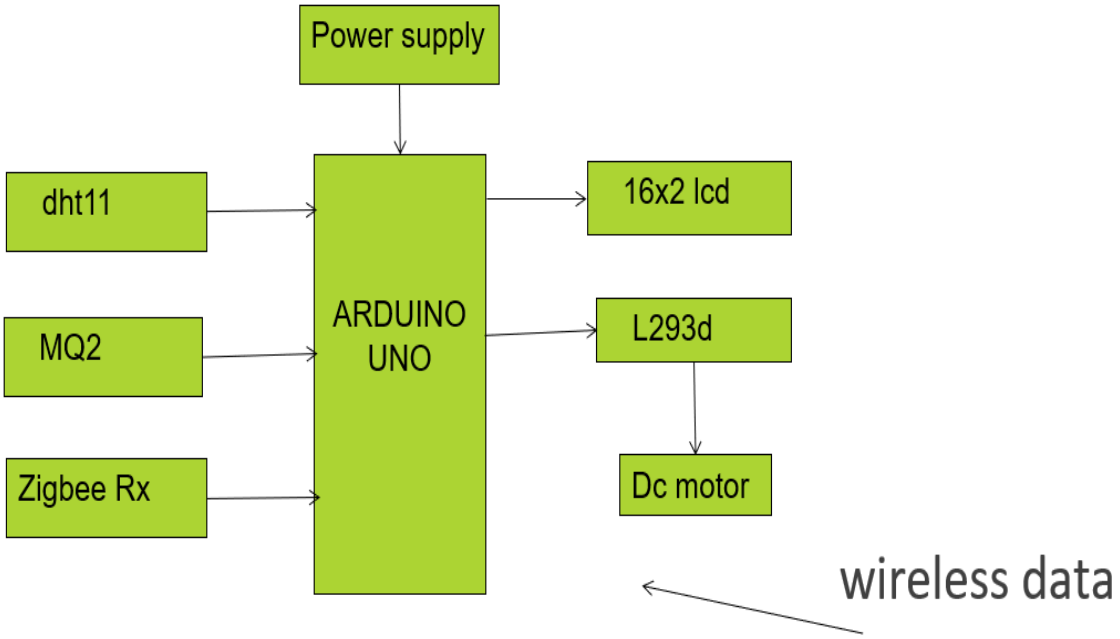
Module version of this sensor can be used without interfacing to any microcontroller and is useful when detecting only one particular gas. This can only detect the gas. But if ppm has to be calculated then the sensor should be used without module.
This sensor is also used for Air quality monitoring, Gas leak alarm and for maintaining environmental standards in hospitals. In industries, these are used to detect the leakage of harmful gases.

METHODOLOGY:

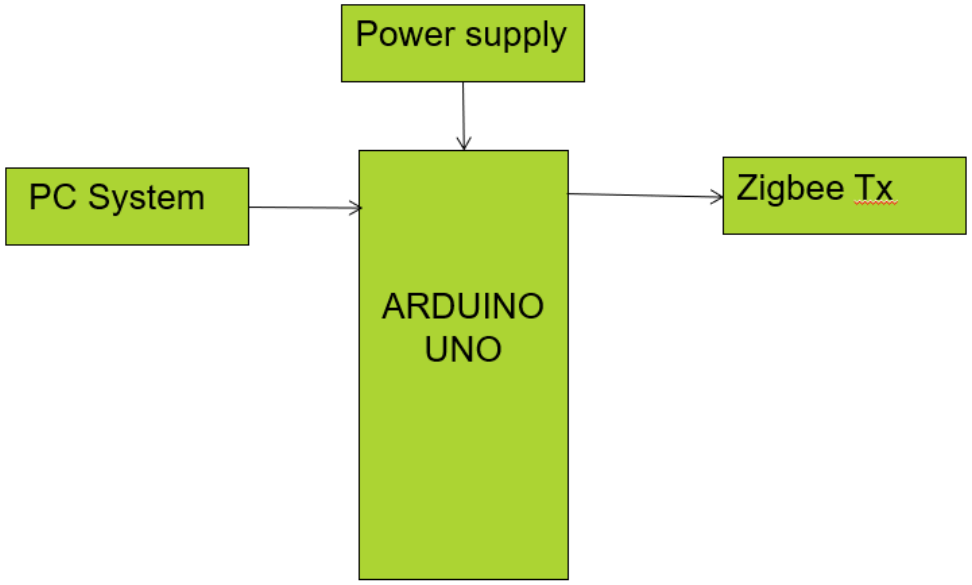
- We have a 220V ac supply which is used to power all the components present in the circuit .The 220V ac are only used for the motor driver IC
- We use Power supply to charge the motors.
- The robot contains 2 arrangements for its motion inside the bore well. OPEN movement, CLOSE movement.
- The robot is allowed entering the bore hole when there temperature and humidity sensor (DHT11) and a gas sensor(MQ2) .It is actually provided to know the child's surrounding.
- The output of the sensor will be Digital in nature , so we can monitor the normal or abnormal behavior of the temperature and gas inside the bore well Through LCD display.
- All the action of the robot is controlled by a DC motor , to start a motor we need a motor driver (L293D). It contains an enable pin which decides the working speed of the motor. The motor starts only when enable is high.
- We have a zigbee unit it is also a transceiver, is used to visualize the video on the PC which is captured by the RF camera.
- The carrier that used for modulation in the transmitter is of 2.4GHz frequency. It can cover a distance of 1Km.
- The microcontroller interfaces with Zigbee by serial communication.
- Thus we can limit the working frequency of the microcontroller to 11.0592MHz.

BLOCK DIAGRAM:

RECEIVING END BLOCK DIAGRAM:



TRANSMITTING END BLOCK DIAGRAM:



CODE IMPLEMENTATION

RECEIVING END CODE:

```
#include <dht.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd(13,12,15,16,17,18);
dht DHT;
#define DHT11_PIN 9

int sensorValue1;
int sensorValue2;
int gas = 14;
//////////////////////////
int d1 = 7;
int d2 = 6;
int d3 = 5;
int d4 = 4;
//////////////////////////
void setup()
{
  Serial.begin(9600);
  lcd.begin(16, 2);
  lcd.clear();
  pinMode(d1, INPUT);
  pinMode(d2, INPUT);
  pinMode(d3, INPUT);
  pinMode(d4, INPUT);
  pinMode(2, OUTPUT);
  pinMode(3, OUTPUT);

}
```

```
void loop()
{

  ////////////////////////////////////
if(digitalRead(d1))
   {
     digitalWrite(2, HIGH);  //CLOSING
     digitalWrite(3, LOW);
     delay(5000);
     digitalWrite(2, LOW);
     digitalWrite(3, LOW);
   }
  if(digitalRead(d2))
    {
     digitalWrite(2, LOW);  //OPENING
     digitalWrite(3, HIGH);
     delay(5000);
     digitalWrite(2, LOW);
     digitalWrite(3, LOW);

    }

  if(digitalRead(d3))
      {
     digitalWrite(2, LOW);  //If value is 1 then LED turns ON
     digitalWrite(3, LOW);
     digitalWrite(4, LOW);
     digitalWrite(5, LOW);

      }
```

```
  //////////////////////////////////////

    int chk = DHT.read11(DHT11_PIN);
    int i = DHT.temperature;
    lcd.setCursor(0, 0);
    lcd.print("Tem= ");
    lcd.setCursor(5, 0);
    lcd.print(i);
    ////////////////////////////////////////////////////////

    int j = DHT.humidity;
    lcd.setCursor(8, 0);
    lcd.print("Hum= ");
    lcd.setCursor(13, 0);
    lcd.print(j);
    ////////////////////////////////////////////////////////

    sensorValue1 = analogRead(gas);       // read analog input pin 0
    lcd.setCursor(0, 1);
    lcd.print("Gas= ");
    lcd.setCursor(5, 1);
    lcd.print(sensorValue1);

    ////////////////////////////////////////////////////////////


  delay(1000);
}
```

TRANSMITTING END CODE:

```
int d1 = 8;
int d2 = 9;
int d3 = 10;
int d4 = 11;
char data = 0;              //Variable for storing received data
void setup()
{
  Serial.begin(9600);
  pinMode(d1,OUTPUT);
  pinMode(d2,OUTPUT);
  pinMode(d3,OUTPUT);
  pinMode(d4,OUTPUT);
  digitalWrite(d1,LOW);
  digitalWrite(d2,LOW);
  digitalWrite(d3,LOW);
  digitalWrite(d4,LOW);

}

void loop()
{
   if (Serial.available() > 0) // Send data only when you receive data:
  {
    data = Serial.read();
    Serial.print(data);
    Serial.print("\n");
    if (data == 'C')
    {
    digitalWrite(d1,HIGH);
    delay(1000);
    digitalWrite(d1,LOW);
    }
```

```
    if (data == 'O')
    {
    digitalWrite(d2,HIGH);
    delay(1000);
    digitalWrite(d2,LOW);
    }
    if (data == 'S')
    {
    digitalWrite(d3,HIGH);
    delay(1000);
    digitalWrite(d3,LOW);
    }

  }
}
```

FUTURE SCOPE

Concept of robotics is for minimizing the human effort. Here we designed a robot for rescue children fall in the bore well. Even though it is developed for a lifesaving need; we can modify it in doing various applications. Primarily, this robot can used to clear the motor that are accidently fall in to the bore well. When such type incident kept unnoticed then bore hole became a place of no use. It is realized by fixing a temporary magnet on bottom disc of the robot. Since the robot moves in to the bore well by means of a thread or belt no chances for breakdown of the system. The robot can replace the repaired motor with a functioning one by using the same magnet arrangement. Further the robot can use as a pipeline inspection robot. Since we are using a high resolution RF camera can the crack inside the bore well. In this we are hanging the whole system in a stand that suits for any kind of bore well. And also there is no wheel arrangement for the very same the reason. But if we are removing the thread arrangement and giving wheels then it is perfect for pipeline inspection. It is really a tough or nearly impossible job for identifying defects inside a pipeline. But by using such a system we can monitor not only cracks but also any obstructions in the liquid flowing path. If we are further modifying, it can repair the cracks and remove the obstruction. Depth can be measured by using sonars or other appropriate methods, so that we can determine the intensity of the bore hole. And thus the robot can be useful in measuring the depth of the bore well for cleaning methods and other useful proposes. Water level can also be measured. This project can be extended adding bomb diffusion, GPS to set location and digital compass to self-navigation.

CONCLUSION

Even now bore well accidents are reporting from Maharashtra, Tamil Nadu, and Andhra Pradesh. Conventional rescue operations following from years, that is digging a hole parallel to the bore well is continuing. It has no guarantee to the life of child, uneconomical, risky, time consuming and will takes large manpower. At this scenario bore well rescue robot is an economical and fool proof solution. It offers a safe method and that too with minimum time. Since the robot is entering the bore well through a thread there is no chance of falling down rapidly. The size of the robot is less than the diameter of bore hole, it makes the system more convenient for rescue i.e. there is no falling of soil that may occur when we are using a wheel arrangement that fit in to the walls of bore well. We are using a net arrangement instead of graspers that make the system unique from others. In this entire body of the child is locked where as in graspers wrist or head is locked, this may lead to other serious problem. In total, the system will be the best alternative to all other rescue method and provide safe, economical and time saving method. We are also giving temperature and gas sensor which is used to monitor the condition under the bore well. Further these details can be used for medical support before or after rescue. So this system is also concerned about the victim after the rescue. Robot is only a mechanical or electronic section and it will not act its own. The robot has no idea that it is taking a living thing. For avoiding problem due to that, the system is controlled by an operator. Since the decision making power is manually and hence machine error can be taken care of.

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