SMART WEATHER REPORTING SYSTEM

A Project Report Submitted For the Partial fulfillment of the requirements for the award of

Bachelor of computer Application

IT &CS

SUBMITTED BY:-

NAVNEETU KUMARI (BC/17/016)

UTTAM KUMAR (BC/17/007)

AKASH KUMAR (BC/17/017)

SESSION 2017-20

Under guidance

Of

Ashish Sinha

Submitted to Department of Computer Science and information Technology(BCA)

Bachelor of Computer Application

Year of Submission

INTRODUCTION

SMART WEATHER REPORTING SYSTEM Iot (internet of things) based weather reporting system is such type of system that forecast the report about all climatic conditions such as temperature ,humidity and rain etc. through the internet resources. Normally we know the weather condition through TV resources which present ,the weather report whose offered by the space research centers,but it is overall weather report of every country. Some time we want to know the humidity level or temperature level of any specific place then we must use a separate weather reporting system .so many system are available in market but ,they are so much costly as well as they are not so much costly as they are not so much accurate and efficient. Iot weather reporting system is more accurate ,more efficient and as well as less costly.

The internet of Things (IoT) is viewedas an innovation and financial wave in the worldwide data industry after the Internet. The IoT is a wise system which associates all things to the Internet with the end goal of trading data and conveying through the data detecting gadgets as per concurred conventions. It accomplishes the objective of keen recognizing, finding, following, observing, and overseeing things . It is an augmentation and extension of Internet-based system, which grows the correspondence from human and human to human and things or things and things. In the IoT worldview, many articles encompassing us will be associated into systems in some shape . It is a current correspondence paradigm that envisions a near future, in which the objects of regular day to day existence will be outfitted with microcontrollers, handsets for computerized correspondence, and reasonable convention stacks that will make them ready to speak with each other and with the clients, turning into a vital piece of the Internet. The IoT idea,consequently, goes for making the Internet much more immersive and unavoidable.Moreover, by empowering simple get to and association with a wide assortment of gadgets, for example, for example, home apparatuses, reconnaissance cameras, checking sensors, actuators, showcases, vehicles, et cetera, the IoT will encourage the advancement of various applications that make utilization of the possibly gigantic sum and assortment of information created by such questions give new

administrations to subjects, organizations, and open organizations. Present innovations in technology mainly focus on controlling and monitoring of different activities. These are increasingly emerging to reach the human needs. Most of this technology is focused on efficient monitoring and controlling different activities. An efficient environmental monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed level of parameters (e.g., noise, CO and radiation levels). When the objects like environment equipped with sensor devices, microcontroller and various software applications becomes a self-protecting and selfmonitoring environment and it is also called as smart environment. In such environment when some event occurs the alarm or LED alerts automatically. The effects due to the environmental changes on animals, plants and human beings can be monitored and controlled by smart environmental monitoring system. By using embedded intelligence into the environment makes the environment interactive with other objectives, this is one of the application that smart environment targets. Human needs demands different types of monitoring systems these are depends on the type of data gathered by the sensor devices.Event Detection based and Spatial Process Estimation are the two categories to which applications are classified. Initially the sensor devices are deployed in environment to detect the parameters (e.g., Temperature, Humidity and CO etc.)while the data acquisition, computation and controlling action (e.g., the variations in the temperature and CO levels with respect to the specified levels). Sensor devices are placed at different locations to collect the data to predict the behaviour of a particular area

of interest. The main aim of the this paper is to design and implement an efficient monitoring system through which the required parameters are monitored remotely using internet and the data gathered from the sensors are stored in the cloud and to project the estimated trend on the web browser. A solution for monitoring the temperature, humidity and CO levels i.e., any parameter value crossing its threshold value ranges, for example CO levels in air in a particular area exceeding the normal levels etc., in the environment using wireless embedded computing system is proposed in this paper. The solution also provides an intelligent remote monitoring for a particular area of interest. In this paper we also present a trending results of collected or sensed data with respect to the normal or specified ranges of particular parameters.

OBJECTIVES :-

The Objectives of this project is to Design a cost effective,flexible and portable mini weather reporting system that will be used to measure and monitor temperature ,humidity and rain.

Importance of project :- Weather play important role in our farming system.In greenhouse or internal farming system,weather monitoring is important.For better production and maintenance,it is important to monitor.This project is developed for forcasting Weather parameters like humidity,temperature ,rain.

CERTIFICATE OF ORIGINALITY

This is to certify that the project report entitled_____

Submitted to **Jharkhand Rai University** in the partial fulfilment of the requirement for the award

of the degree of **BACHELOR OF COMPUTER APPLICATIONS (BCA)** , is an authentic and original work carried out by Mr/Ms_____

with enrollment no._____under my guidance.

The matter embodied in this project is genuine work done by the student and has not been submitted whether to this University or to any other University/Institute for the fulfilment of the requirements of any course of study.

Navneetu

…… ……

Signature of the Student: Signature of the Guide:

Date: ……. Date : ……..

Name and Adress of the Student : Name ,Designation and Address

…….. Of Guide: ……

…….. ……..

Enrollment No: BC\171016 ……

ABSTRACT

The system proposed in this paper is an advanced solution for monitoring the weather conditions at particular place and make the information visible anywhere in the world. The technology behind this is Internet of Things (IoT), which is an advanced and efficient solution for connecting the things to the internet and to connect the entire world of things in a network. Here things might be whatever like electronic gadgets, sensors and automotive electronic equipment. The system deals with monitoring and controlling the environmental conditions like temperature, relative humidity and CO level with sensors and sends the information to the web page and then plot the sensor data as graphical statistics. The data updated from the implemented system can be accessible in the internet from anywhere in the world.

Aknowledgement

It gives me immense pleasure to express my deepest sense of gratitude and sincere thanks to my highly respected and esteemed guide prof. Ashish Sinha , CS& IT(BCA), Jharkhand Rai University, for his/her valuable guidance, encouragement and help for completing this work. His/her useful suggestions for this whole work and co-operative behavior are sincerely acknowledged. I would like to express my sincere thanks to Name, Dean (Academics), JRU, Ranchi for giving me this opportunity to undertake this project. I also wish to express my gratitude to Coordinator (Computer Science & Information Technology), JRU, Ranchi for her kind hearted support. I am also grateful to my faculty members for their constant support and guidance. I also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped me to face the challenges ahead. At the end I would like to express my sincere thanks to all my friends and others who helped me directly or indirectly during this project work.

Student name : Enrollment no. :

Place : Date :

CONTENTS

BACKGROUND OF PROJECT

Most of the research papers and studies in this field do not give priorities to data storage and data acquisition based microcontroller sensor outputs. In this paper, the resultant data obtained by the systemThat is, the information can be demonstrated and seen in two techniques, direct and indirect. The term direct means that weather condition can be shown over (16×2) LCD display directly without creating database ground area. Whereas, indirect technique means that weather condition are recorded and stored in a pc as long as the sensors are measuring climate conditions [2,3]. The main challenge of this work is showing and confirming up that the microcontrollers with their energetic sensors can be linked with data acquisition system in order to create a database depending on weather station attributes. The proposed idea allows forecasting opportunities based on the realized data by microcontroller sensors rather than monitoring the system directly. As a cost reduction, the proposed system uses one sensor identified as DHT sensor to provide both temperature and humidity readings that employed to build the heretical structure of climate database . Weather prediction issues completely depend on the last day weather situation in order to specify how much the weather might be changed in the future accordingly. The papers that present the idea of renewable solar systems and hybrid power plants have discussed several factors that affect considerably on weather condition appreciations such as the color of sun radiation due to the environmental reactions and the reflections that can be stored and charted synchronously with monitoring weather station system at the same time.

Hereby, the proposed conditions and factors effect majorly on the daily weather forecasting by human being. This paper presents a simple way to monitor / store the data locally that is, the user can equip the system in a specific location and starts recording and monitoring data with respect to (day / night) automatic system.

PURPOSE

Imagine a Situation where scientist/nature analysts want to monitor changes in a particular environment say volcano or a rainforest.And these people are from different places in the world .In this case,SMS based weather monitoring has its own limitations.Since it sends SMS to few numbers. And time for sending SMS increases as the number of mobile numbers increases.In order to send this data to everyone,a person who recieves this SMS can upload/add data to some place where everyone can see it.And what else apart from the internet connects everyone in this world?However a person doing manually is time consuming and tedious job.And then there arises a need of an automated solution for this.

So in such scenarios,IOT – Internet of Things ,we can upload these weather parameters data to the cloud using internet connectivity over a wifi module through wireless communication. Thus this project is also categorized under Wireless communication projects.

Two things are necessary to view this weather reporting over the internet. One is the Internet and another is a device to access a URL/Website.This device can be laptop or desktop or a tablet or even a smartphone.

Note that internet connectivity is require at both places.One where is project is placed and another from where user monitors this data.

SCOPE

IOT Weather reporting system has an application to farmer as well .The weather forecasting plays a very important role in field of agriculture.

IOT weather monitoring projects really helpful for monitoring weather at a places like a volcano,rain forests.it is quite Difficult for a human being to stay for a longer time at such places.

IOT is creating an environment of convergence in the society.This technology environment brings a paradigm shift in our professional and personal life.As a connected environment,IOT adds customer value and loyalty.

Today ,IOT is being implemented everywhere which is of human concern like smart city,smart environment,security,smart business process,smart agriculture,home automation and healthcare.

It is quite interesting and challenging to develop and implement web applications using open sourcing hardware and software.

APPLICABILITY

Climatic change and environmental monitoring have received much attention recently.Man wants to stay updated about the latest weather conditions of any place like a college campus or any other particular building .Since the world is changing so fast so there be the weather stations.The weather station is based on IOT.It is equipped with environmental sensors used for measurements at any particular place and report them in real time on cloud.To accomplish this we need Arduino Uno and different environment sensors like DTH11,Soil moisture sensor and rain drop sensor.The sensors constantly sense the weather parameters and keeps on transmitting it to the online web server over wifi connection.The weather parameters are uploaded on the cloud and then provides the live reporting of weather information.

CHAPTER-2 SURVEY OF TECHNOLOGIES

Internet of Things based weather reporting system present innovations in technology mainly focus on controlling and monitoring of different activities. These are increasingly emerging to reach the human needs.Most of the technology is focused on efficient monitoring and controlling different activities. An efficient environmental monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed levels of parameters(e.g ,noise,CO, and radiation levels). When the objects like an environment equipped with sensor devices, microcontroller and various software applications becomes a self-protecting and self-monitoring environment and it is also called as smart environment.In such environment when some events occurs the alarm or Led alert automatically.The effects due to the environmental changes on animals,plants and human beings can be monitored and controlled by smart environmental monitoring system.By using embedded intelligence in Environment makes the Environment interactive with their objectives,this is one of the application that smart environment targets. Human needs demands different types of monitoring systems these are depends on the type of data gathered by the sensor devices.

Initially the sensor devices are deployed in environment to detect parameters (e.g.,Temperature,Humidity,Rain etc.) while the data acquisition ,computation and controlling action.Sensor device are placed at different locations to collect the data to predict the behaviour of a particular area of interest.

Real Time Temperature and &Humidity Monitoring Using Arduino: A monitoring system generally refers to automated system that simultaneously and continuously records one or more physical parameters such as temperature,humidity rain,soil moisture etc. at one or more predefined places.Continuous monitoring of any sensitive environment helps to meet security and regulatory compliance needs.Temperature and humidity are key issues to be taken care of in manufacturing plants and particularly that of electronic assemblies.Lack of control of any of them will not only affect the component and equipment but also the process and the operators' comfort,all ultimately leading to loss in production.Temperature and relative humidity affects the airbrone survival of viruses,bacteria and fungi.Thus environmental control in hospitals is important because of infectious disease transmission from the aerosol or airbrone infection.Temperature and humidity play important role in the lifecycle of the plants.

CHAPTER-3 REQUIREMENTS AND ANALYSIS

3.1 PROBLEM DEFINATION :

The Internet of Things is actually apretty simple concept ,it means taking all things in the world and conneting them to internet.

The Internet of Things (IoT) describes the network of physical objects—“things”—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools. With more than 7 billion connected IoT devices today, experts are expecting this number to grow to 10 billion by 2020 and 22 billion by 2025.

Based on IOT we are decide to design smart weather reporting which is very useful for us.Smart weather reprting is a technique using this you can know real time weather reports at your areas.

3.2 Requirement Specification

The requirements and specification of smart weather reporting is design for making effective environment.This system deal with monitoring and controlling the environment conditions.Day to Day reports of weather which is helpful for farmers and it help in real life conditions.In smart weather reporting system we use sensors,electronic gadget and automotive electronic equippments that helps in gives weather reports. Most important things about this project is it gives accurate weather report and easy to handle.

3.3 Planning & Scheduling

- The project schedule is the time base or sequenced description of all the project activities.

- Depending upon the project objectives and various types of risks ,on this basis different techniques used.

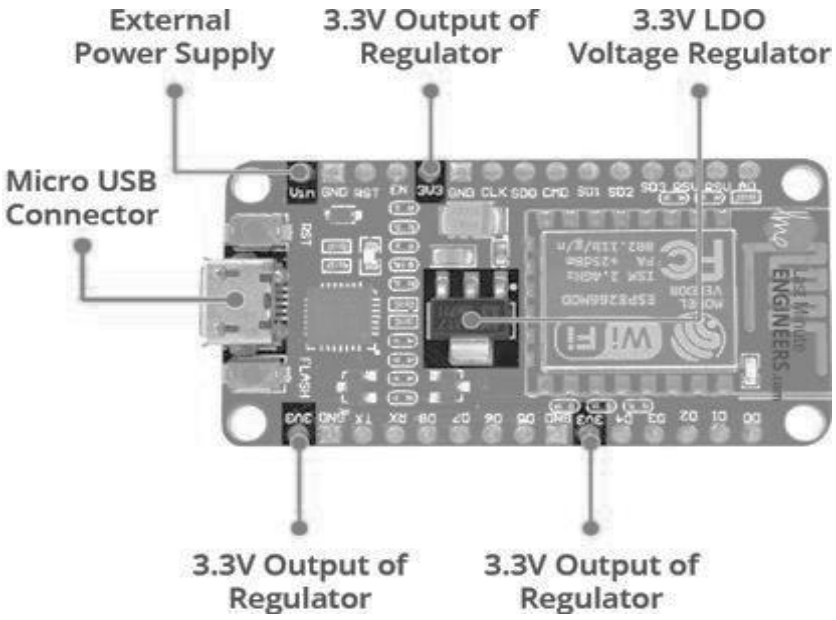
Software and Hardware Requirements

1. Nodemcu ESP8266 12E Board
2. BMP 180 Pressure Sensor
3. DHT11 Humidity Temperature Sensor
4. Rain Sensor FC37
5. 4.7K Resistor -2
6. Breadboard
7. Connecting Jumper Wires
8. LCD Display

SOURCE CODE/PROGRAMS

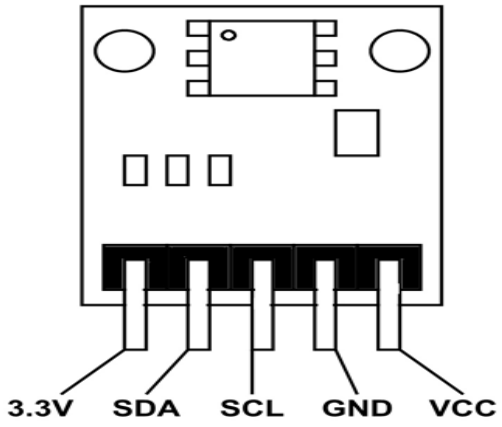
1. BMP180 Library
2. DHT11 ESP Library

1. Nodemcu ESP826612E Board



The implemented system consists of a microcontroller (ESP8266) as a main processing unit for the entire system and all the sensor and devices can be connected with the microcontroller. The sensors can be operated by the microcontroller to retrieve the data from them and it processes the analysis with the sensor data and updates it to the internet through Wi-Fi module connected with it. Here we used ESP8266 Wi-Fi module which is having TCP/IP protocol stack integrated on chip. So that it can provide any microcontroller to get connected with Wi-Fi network. ESP8266 is a preprogrammed SOC and any microcontroller has to communicate with it through UART interface.. It works with a supply voltage of 3.3v. The module is configured with AT commands and the microcontroller should be programmed to send the AT commands in a required sequence to configure the module in client mode. The module can be used in both client and server modes.

2 . BMP 180 Pressure Sensor



BMP180 is one of sensor of BMP XXX series. They are all designed to measure Barometric Pressure or Atmospheric pressure. BMP180 is a high precision sensor designed for consumer applications. Barometric Pressure is nothing but weight of air applied on everything. The air has weight and wherever there is air its pressure is felt. BMP180 sensor senses that pressure and provides that information in digital output. Also the temperature affects the pressure and so we need temperature compensated pressure reading. To compensate, the BM180 also has good temperature sensor.

BMP180 Pin Configuration

BMP180 is available in two modules. One is Five pin module and other is Four pin module. With Five pin module we have additional +3.3V pin which is absent in four pin module. Other than that the functioning is same.

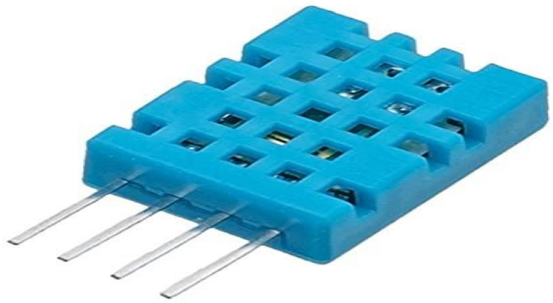
Pin name	Description
VCC	Connected to +5V

GND	Connected to ground
SDA	Serial Data Pin(12C interface)
SCL	Serial Clock Pin(12C interface)
3.3V	If +5V is not Present . Can power module by connecting +3.3V to this pin

BMP180 MODULE Features

- Can measure temperature and altitude.
- Pressure range: 300 to 1100hPa
- High relative accuracy of ±0.12hPa
- Can work on low voltages
- 3.4Mhz I2C interface
- Low power consumption (3uA)
- Pressure conversion time: 5msec
- Potable size

3 DHT11 Humidity Temperature Sensor



Humidity is the measure of water vapour present in the air. The level of humidity in air affects various physical, chemical and biological processes. In industrial applications, humidity can affect the business cost of the products, health and safety of the employees. So, in semiconductor industries and control system industries measurement of humidity is very important. Humidity measurement determines the amount of moisture present in the gas that can be a mixture of water vapour, nitrogen, argon or pure gas etc… Humidity sensors are of two types based on their measurement units. They are a relative humidity sensor and Absolute humidity sensor. DHT11 is a digital temperature and humidity sensor. DHT11 is a low-cost digital sensor for sensing temperature and humidity. This sensor can be easily interfaced with any micro-controller such as Arduino, Raspberry Pi etc… to measure humidity and temperature instantaneously.

DHT11 humidity and temperature sensor is available as a sensor and as a module. The difference between this sensor and module is the pull-up resistor and a power-on LED. DHT11 is a relative humidity sensor. To measure the surrounding air this sensor uses a thermist or and a capacitive humidity sensor.

Working Principle of DHT11 Humidity Sensor

DHT11 sensor consists of a capacitive humidity sensing element and a thermistor for sensing temperature. The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form.

For measuring temperature this sensor uses a Negative Temperature coefficient thermistor, which causes a decrease in its resistance value with increase in temperature. To get larger resistance value even for the smallest change in temperature, this sensor is usually made up of semiconductor ceramics or polymers.

The temperature range of DHT11 is from 0 to 50 degree Celsius with a 2-degree accuracy. Humidity range of this sensor is from 20 to 80% with 5% accuracy. The sampling rate of this sensor is 1Hz .i.e. it gives one reading for every second. DHT11 is small in size with operating voltage from 3 to 5 volts. The maximum current used while measuring is 2.5mA.

APPLICATION

This sensor is used in various applications such as measuring humidity and temperature values in heating, ventilation and air conditioning systems. Weather stations also use these sensors to predict weather conditions. The humidity sensor is used as a preventive measure in homes where people are affected by humidity. Offices, cars, museums, greenhouses and industries use this sensor for measuring humidity values and as a safety measure**.**

4 . Rain Sensor FC37

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer.

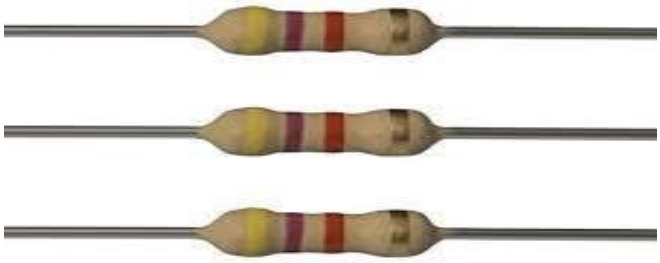
The analog output is used in detection of drops in the amount of rainfall.

Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level.

SPECIFICATIONS

- Adopts high quality of RF-04 double sided material.
- Area: 5cm x 4cm nickel plate on side,
- Anti-oxidation, anti-conductivity, with long use time;
- Comparator output signal clean waveform is good, driving ability, over 15mA;
- Potentiometer adjust the sensitivity;
- Working voltage 5V;
- Output format: Digital switching output (0 and 1) and analog voltage output AO;
- With bolt holes for easy installation;
- Small board PCB size: 3.2cm x 1.4cm;
- Uses a wide voltage LM393 comparator

5 . **4.7K Resistor**



The 4.7k resistor acts as a pull-down resistor, so the output voltage stays low despite the leakage current.

Disconnect the LED from the output or replace it with a 1M Ohm resistor and then measure the output voltage of the transistor circuit with both buttons open .

FEATURES :-

Power Rating Resistance Tolerance T.C.R. Flameproof Multi-layer Coating Meets Flameproof Feature Meets Overload Test UL-94V-0 UL-1412

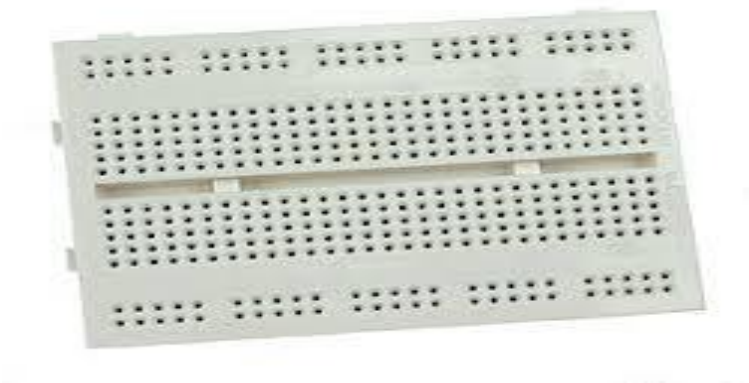
The RSF Series Metal Oxide Film Flame-Proof Resistors offer excellent performance in applications where stability and uniformity of characteristics are desired. They provide lower cost alternatives to Carbon Composition Resistors and General Purpose Metal Films. Metal Oxides also can replace many low power General Purpose wirewound applications, saving both money and time, with shorter delivery cycles. The normal style & the miniature style of RSF series are coated with layers of gray and pink colors flame-proof lacquer respectively.

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below.

STYLE Power Rating at 70°C Maximum Working Voltage Maximum Overload Voltage Proof Resistance Range Operating Temp. Range Temperature Coefficient 1,000V 750V .

STYLE Power Rating at 70°C Maximum Working Voltage Maximum Overload Voltage Proof Resistance Range Operating Temp. Range Temperature Coefficient 700V RSF5WS.

Breadboard

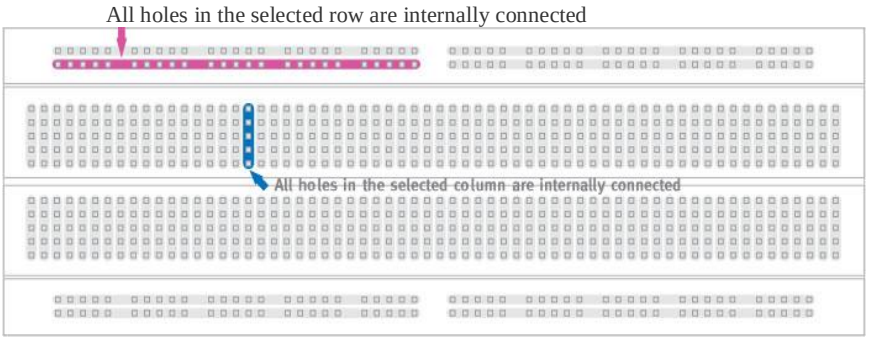


A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate. The breadboard has strips of metal underneath the board and connect the holes on the top of the board. The metal strips are laid out as shown below. Note that the top and bottom rows of holes are connected horizontally and split in the middle while the remaining holes are connected vertically.

Specification

Resistance(ohms)	4.7K
Power (watts)	1W
Composition	Metal Oxide Film
Temperature coefficient	RoHS Compliant

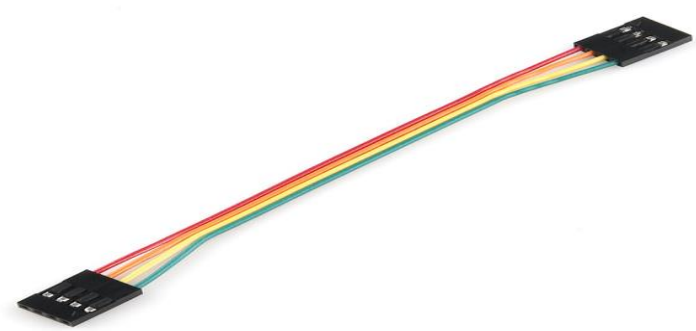
Note how all holes in the selected row are connected together, so the holes in the selected column. The set of connected holes can be called a node:



FEATURES

- 2 Distribution Strips, 200 tie-points
- 630 tie-points in IC/ circuit areas
- ABS plastic with color legend
- Dimension: 6.5*4.4*0.3 inch
- Hole/Pitch Style: Square wire holes (2.54mm)
- ABS heat Distortion Temperature: 84° C (183° F)
- Rating: 300/3 to 5Amps
- Insulation Resistance : 500MΩ / DC500V
- Withstanding Voltage : 1,000V AC / 1 minute
- Insertion Wire Size: 21 to 26 AWG wire

Jumper wire



Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. Fairly simple. In fact, it doesn't get much more basic than jumper wires.

Though jumper wires come in a variety of colors, the colors don't actually mean anything. This means that a red jumper wire is technically the same as a black one. But the colors can be used to your advantage in order to differentiate between types of connections, such as ground or power.

TYPES OF JUMPER WIRE

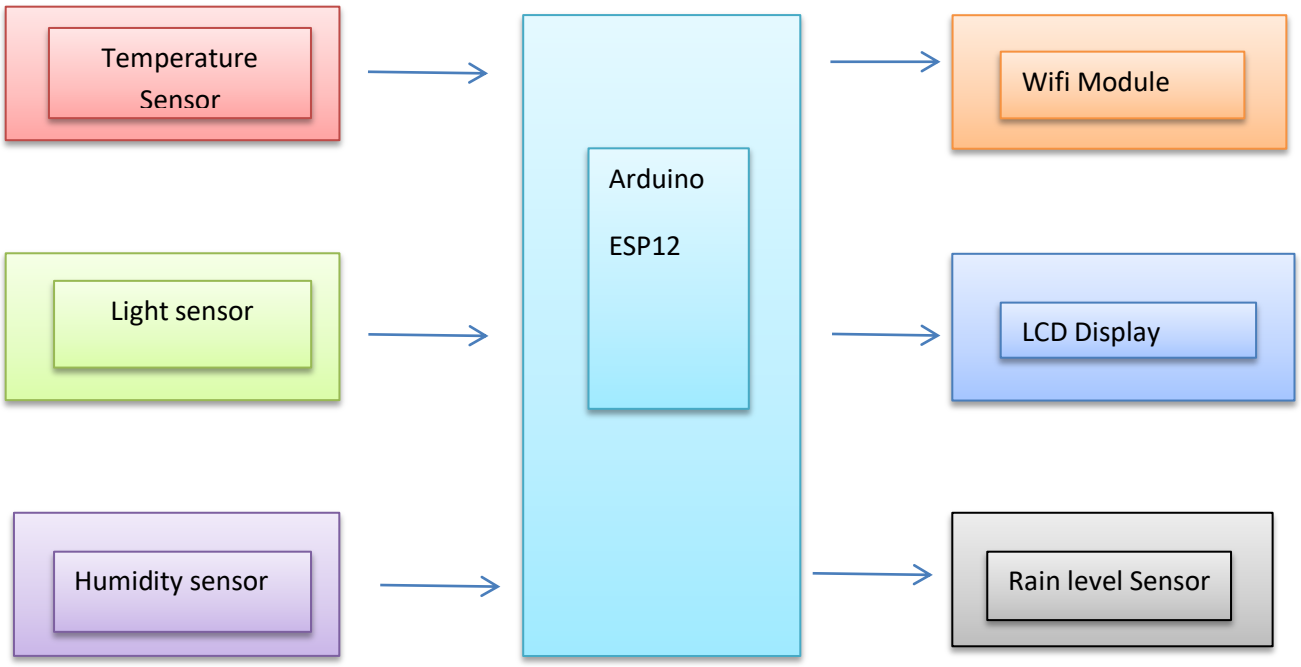
Jumper wires typically come in three versions: male-to-male, male-to-female and female-to-female. The difference between each is in the end point of the wire. Male ends have a pin protruding and can plug into things, while female ends do not and are used to plug things into. Male-to-male jumper wires are the most common and what you likely will use most often.

FEATURES

- Capable of voltage: 5-12v
- Dimensions: 0.00 in x 0.00 in x 0.00 in (0.0 cm x 0.0 cm x 0.0 cm)
- Weight: 1.38 oz (39 g)
- Easy to use
- Easy to interface

- Long life
- Best for Prototyping

Conceptual model

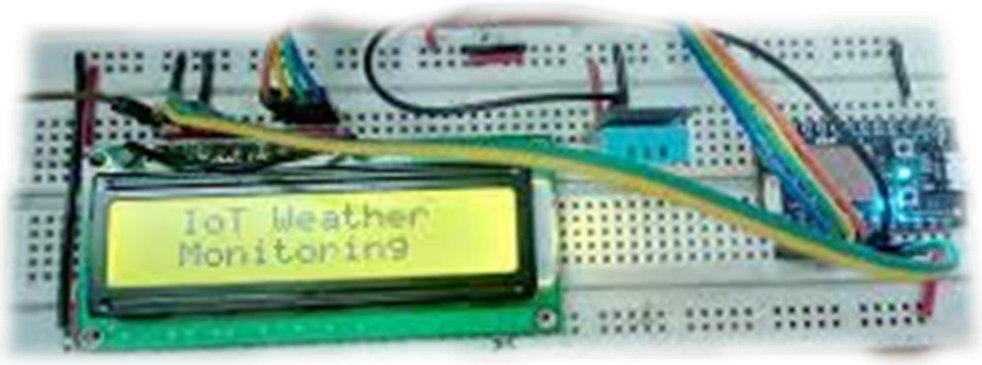


SYSTEM ARCHITECTURE

The Implemented system consists of a microcontroller(ESP8266) as a main processing unit for the entire system and all the sensor and devices can be connected with the microcontroller.The sensors can be operated by the microcontroller to retrieve the data from them and its processes the analysis with the sensor data and updates it to the internet through Wi-Fi module connected with it.The name of the hardwares which uses in weather monitoring is already mentioned above in block diagram.

CHAPTER-4 SYSTEM DESIGN

4.1 Basic Modules



Circuit Diagram and Connections

This is the circuit Diagram for making live Weather Monitoring Using NodeMCU. In this diagram we represent our model equipments physically connections to each other using jumperwires ,Led display,nodeMCU ,rain sensor etc.and this show how its works in live weather detection in your areas.it is simple to use and userfriendly.

CHAPTER -5 IMPLEMENTATION AND TESTING

5.1 Implementation Approaches

The main governor of the system denoted by Arduino UNO control each component separately . As mention before,the system is consisted of an LCD display that demostrates the data provided by the sensors directly .DHT11 sensor that measures(T) and (H) locally based on aurdino code.each elements in the system needed to be provided with 5V .The proposed model responsible for weather report.Firstly ,DHT sensor starts measuring the temperature(T) in degree celsius (◦C) , humidity (H) in percentage (%) and transfers the data directly and indirectly to the display and I/O monitor of the microcontroller respectively.

Arduino board is programmed via Universal Serial Bus,implemented using USB to serial adapter chips such as the FTDI FT232. Aurdino program is written by interfacing the board with a computer in orderto create a programming user interface area to startup controling tasks properly. Digital temperature sensor are used to reading from the system components.Aurdino microcontroller acts as a medium for the connectivity of the relay and temperature sensors with the computer system.The programming of Arduino UNO is done in Arduino IDE software with c++ as coding language.

5.2 Coding Details and Code Efficiency

The globally ruling technology acting as a single key to shrinking this whole universe to a tiny globally connected village ,whereas IOT comprises of just two words which precisely depicts its defination.

- For sensing the data
- Collecting the data
- Sending the data

USE BMP180 Library (download)

DHT11 ESP Library (download)

Main code for weather reporting

```
#include <ESP8266wifi.h>
#include <wificlient.h>
#include <ESP8266WebServer.h>
#include <SFE_BMP180.h>
#include <wire .h>

#include “index.h” // html webpage content with  javascripts
#include  “DHTesp.h” //DHT11  Library for ESP

#define LED 2  //on board LED
#define DHTpin  14  //DS  of NodeMCU is GPIO14

SFE_BMP180 pressure;

#define ALTITUDE 1655.0 //Altitude in meters


DHTesp  dht;

//SSID  and  password of your Wifi  router
cons  char* ssid = “nav1456”;
const  char* password =” navneetu1400”;

ESP8266WebServer server(80) ; // server on port 80

Void  handleRoot() {
String  s = MAIN_page; //read  HTML contents
Server .send (200,”text/html” ,s);// send web page
}

Float humidity ,temperature;

Void  handleADC() {
Char  status;
Double T,p,p0,a;
Double Tdeg,Tfar,phg,pmb;

Status  = prssure.startTemperature();
if (status != 0)
{
  //wait for the measurement to complete:
delay (status);
status = pressure.getTemperature(T);
if(status != 0)
{
//print out the measurement:
Serial.print(“temperature: “);
```

```
Serial.print(T,2);
Tdeg = T;
Serial.print(“ deg c, “);
Tfar = (9.0/5.0)*T+32.0,2);
Serial.println( “ deg F”);

Status = pressure.startpressure(3);
if(status ! =0)
{

//wait for the measurement  to complete:
 delay(status) ;
status = pressure.getPressure(P,t);
if(status != 0)
{
 //print  out the measurement:
Serial.print(“absolute pressure: “);
Serial.print(P,2);
 Pmb = P;
Serial.print(“ mb, “);
Phg = p*0.0295333727,2);
Serial.println(“ inHg”);

p0 = pressure.sealevel(P,ALTITUDE);
Serial .print(“relative  (sea-level) pressure: “);
Serial.print(p0,2);
Serial.print(“ mb , “);
Serial.print(p0*0.0295333727,2);
Serial.println(“ inHg”);

a =  pressure.altitude(p,p0);
Serial.print(“compute altitude: “);
Serial.print(a,0)
Serial.print(“ meters, “);
Serial.print(a*3.28048,0);
Serial.println(“ feet”);
}

else Serial.println(“error retrieving pressure measurement\n”);
}
else Serial.println(“error starting pressure measurement\n”);
}
else Serial.println(“error retrieving temperature measurement\n”);
}
else Serial.println(“error starting temperature measurement\n”);


int rain  = analogRead(A0);
```

```
//Create JSON data
Stringdata="{\"Rain\":\""+String(rain)+"\",\"Pressuremb\":\""+String(pmb)+"\",\"Pressurehg\":\""+
String(phg)+"\",\"Temperature\":\""+String(temperature) +"\",\"Humidity\":\""+ String(humidity)
+"\"}";

digitalWrite(LED, !digitalRead(LED));  //Toggle LED on data request ajax
server.send(200, "text/plane",data);  //send  ADC value,temperature and  humidity JSON to client
ajax request
delay(dht.getMinimumSamplingPeriod());

humidity = dht.getHumidity();
temperature = dht.getTemperature();

Serial.print("H:");
Serial.println(humidity);
Serial.print("T:");
Serial.println(temperature);  //dht.toFahrenheit(temperature));
Serial.print("R:");
Serial.println(rain);
}

Void setup()
{
Serial.begin(115200);
Serial.println();

// dht11 Sensor

Dht.setup(DHTpin,DHTesp : :DHT11);  //for DHT connect DHT sensor to GPIO 17
pinMode(LED,OUTPUT);

//BMP180  Sensor
if  (pressure.begin())
Serial.println(" BMP180 init success");
else
{
Serial.println("BMP180 init fail\n\n");
While(1);  //pause forever.
}
 WiFi.begin(ssid,password); //connect to  your WiFi router
Serial.println(" ");

//wait for connection
While (WiFi.status() !=  WL_CONNECTED) {
Delay(500);
Serial.print(" .");
}

//If  connection  successful show IP  address in serial monitor
```

```
Serial .println("");
Serial.print("Connected to ");
Serial.println(ssid);
Serial .print("IP address: ");
Serial.println(WiFi.localP());  // IP address assigned to your  ESP

server.on("/", handleRoot);  //which routine to handle at root location .This is display page

server.on("/readADC", handleADC); //This page is called by java Script  AJAX

server.begin() ; //start server
Serial.println("HTTP  server started");
}

Void  loop()
{
Server.handleClient() ;  //Handle client
}
```

First assemble the circuit as show above n the circuit diagram and upload the main into file to NodeMCU board.

Once code is uploaded,get ESP8266 IP address from serial monitor.now copy the IP adderss and paste it in any web browser like google chrome and hit enter.

Modifications and Improvement

Weather conditions around the world change rapidly and continuously. Correct forecasts are essential in today's day life.From agriculture to industry ,from travelling to daily communicating,we are dependent on weather forecasts heavily.Entire world is suffering from the continuous climate change and its side effects,it is very important to predict the weather without any error .

The design model can divide in 4 –tier with the function of each individual modules developed for monitoring the different weather parameters. The tier 1 is the environment,Sensor devices in tier 2,Sesor data acquisition and decision making in tier 3 and warning notification in tier 4.Here,the tier 1 provides information about the parameters under the region which is to be monitored. Tier 2 deals with sensor devices with suitable characteristics,features and each of these sensor devices are operated and controlled based on their sensitivity as well as the range of sensing. System used IOT to make its real time data easily accessible over a very wide range.

Feature and advantages of the design model

1. Our proposed model 'Smart weather monitoring system ' unlike conventional weather monitoring instruments is very small and compact allowing it to be installedeasily on rooftops.
2. It is light and portable ,this advantage allows us to easily carry it to remote location for installation.due to its design it can be easily be carried .
3. The power requirements for our system (sensors and board) is much less compared to the existing instruments in.
4. The sensor used in our product are much cheaper compared to the ones that are used in existing weather monitoring systems .

CHAPTER 6 –RESULTS AND DISCUSSION

6.1 Test Reports

All the modules were designed and all the components were assembled. The testing of each module was carried out successfully. The

sensor readings were effectively retrieved in a stable environment and stored in files. The files were then imported to excel

automatically using macros and the data was cleansed and formatted for a neater representation. Graphical charts were then plotted

using the data which presented a nice analytical view of weather pattern based on sensor readings. Thus the testing phase was

completed. This study was performed in a controlled manner. Thus, there is a need to conduct further experiments in environments

more similar to real weather conditions.Given below in table

Test point	Module	Data
Tp0	Temperature	22.6
Tp1	Humidity	27%
Tp2	Heat intensity	23C
Tp3	power	+5v

6.2 User Documentation

User documentation refers to the documentation for a product or service provided to the end users. The user documentation is designed to assist end users to use the product or service. This is often referred to as user assistance. The user documentation is a part of the overall product detail guides.

Traditionally user documentation was provided as a user guide, instruction manual or online help.

User documentation is important because it provides a avenue for users to learn:

how to use smart weather reporting system.

features of model/project

tips and tricks of your model/project

how to resolve common problems with your weather reporting

Without user documentation, a user may not know how to do the above things.

The vision document applies to weather reporting way to predict weather based on old weather data feed information system. User will measure temperature ,humidity, rain ,windspeed using smart weather reporting model.It is very easy and efficient to use .it give exact weather report.

CHAPTER 7 – CONCLUSION

7.1 CONCLUSION

The paper demonstrates a simple and low cost system design to measure climate components in perfect competence.To implement this model to use the sensor devices in the environment for collecting the data and analysis.By using sensor devices in the environment ,we can bring environment into rreal life.Then collect data and analysis results will be available to the user through the Wi-Fi.The smart way to monitor environment an efficient , low cost embedded system is presented in this paper.This device in multiple nodes can be connected to the internet from various location of study.

The data given by this model is helpful for future analysis and it can be easily shared to other user also.This model can be expanded to monitor the developing cities and industrial zone for polllution developing cities and industrial zones for pollution monitoring. To protect the public health from pollution, this model provides an efficient and low cost solution for continuous monitoring of environment.

The temperature, humidity and CO value can be monitored with Internet of Things (IoT) concept experimentally tested for monitoring three parameters. It also sent the sensor parameters to the cloud (Google Spread Sheets).

7.2 Limitation of System

1 Existing weather monitoring systems that are used in the field generally consist of unconventional and heavy machinery that consist numerous moving parts that require constant maintenance and need to be manually monitored and change frequently

2.Power requirements are one of many major constraints as these instruments are generally sited far from main power supply.

3.The instruments used in the existing systems are expensive and add up to the already high cost of installation and maintenance.

4.The current system always faces problems such as delay in warning people about bad weather and sudden changes in the forecast.

7.3 FUTURE SCOPE

An alarm can be added to the circuit to notify the user in case of excess smoke conditions i.e. Smoke alarm. An SMS can be sent to clients notifying them with the temperature/humidity/smoke parameters.

In future we add a sensor for measure wind speeds and pollution controller which helps to keep clean environment.

In addition, it has been thought to transfer and demonstrate the realized sensors data wirelessly based on Bluetooth module or Wi-Fi chip over smart phone application.