

IOT Based Real Time Measurement of Temperature for Inverter Using Low Cost Node Microcontroller

M. Dinesh¹ and Dr. K. B. Bhaskar²

Assistant Professor, Department of EEE¹

Associate Professor², Department of EEE²

Adhi College of Engineering and Technology, Walajabad, Kanchipuram, India

mdinesh.dinu89@gmail.com

Abstract: *Temperature monitoring in the industrialized and domestic applications is important and many complications can occur due to absence of improper temperature monitoring method. In this project we will monitor the temperature of the inverter while it is charging and in discharging mode. Normally with the help of low cost nodemcu model ESP8266 model it is very low cost microcontroller is used to measure the real time temperature in outdoor and indoor unit.. Sensor DHT11 is used for the measuring the temperature and humidity in real time system this project we will monitor and regulate temperature of our room by the help DHT11 temperature and humidity sensor along with node microcontroller. In many industries where heaters and coolers are used so in order to measure the temperature man resources is utilized is the major drawback. . In this project we are using the Internet of Things concept like a cloud platform the sensor data will be commonly stored in the cloud so that anywhere and anytime the data can be accessed via the internet. This project model will continuously measure and monitor the temperature and humidity level of the room or any device which is operated. This model will continuously senses the current temperature and humidity data and send to the microcontroller for processing and the processed digital data is send in a wireless medium to the cloud server which is the Think speak protocol where it is the medium all the data are stored and accessed at any time. In Think speak the data can be viewed in graphical representation and display format is also viewed. This project can be implemented in various industrial sectors such as automotive industries, air conditioning, power plant and other industries that need the data to be saved and analyzed.*

Keywords: IOT, ESP8266, IOT, I²C, AURDINO

I. INTRODUCTION

The scheme suggests a well-organized application for IoT (Internet of Things) used for monitoring and directing the room temperature via World Wide Web. Home automation scheme uses the handy devices as a user edge. They can connect with home automation system through an Internet protocol, by means of low power communication devices like Zigbee, Wi-Fi etc. Existing project aims at controlling room temperature via android app using Wi-Fi as communication protocol and node MCU as server system. NodeMCU is an open source IoT platform where the user will directly use the system through a android interface device with the web server where the room temperature is remotely controlled through over a cloud based method. The worker will be interfaced with hand-off equipment circuits that control the gadget for controlling the temperature. It offers chance to interface physical world with PC based frameworks. IoT improves effectiveness, precision, monetary advantages alongside diminished labor. IoT structures help for the collaboration between "things". A climate station is an innovation that gathers information identified with the climate and condition utilizing distinctive gadgets sensors. It contains different sensors and contraptions that cooperate yet in explicit manners to communicate appropriate and exact information of the climate boundaries. It is very precarious to employments of WEB worker based climate station to non-specialized people groups, so we are giving web worker based UI just as Android application. We are notable today most versatile units running on Android OS, and numerous people groups are not able to utilize the android telephone. In this way, our application is valuable for such reason. This gadget is about IoT based Live Weather information Monitoring Using NodeMCU

ESP8266. From the cloud this data can be gotten to through different front end UIs, for example, Web or versatile applications, contingent on reasonableness and necessities. Web lies at the core of this change assuming its function in effective, solid and quick correspondence of information from gadgets to the cloud and from the cloud to the end clients. In this new worldview, the idea of the ordinary end framework or host in the Internet is adjusted and has include gadgets or things consequently the name Internet of Things. The "things" are fit for detecting and communicating information, for example, temperature, pressure, stickiness, clamor, contamination, object discovery, tolerant vitals and so forth. Natural observing is a significant IoT application which includes checking the general Environment and revealing this information for powerful momentary estimates, for example, distantly controlling the warming or cooling Devices and long haul information investigations and measures. The framework contains a focal ESP8266 board which interfaces at the contribution With temperature and stickiness observing sensor DHT11 and which sends the detected information through Internet to a far off distributed storage open IoT API Thing Speak. Through Thing Speak, MATLAB analytics are carried out on data and trigger is generated. System. The after effects of the venture show the constant observing of temperature and humidity levels from any area on the planet and its factual examination.

II. LITERATURE SURVEY

There are possible to make the user-friendly live weather monitoring system using IoT technology. IoT is an Internet of things which capable of transferring data over a network without requiring human interaction [1]. With the development of a cloud-based system, the cloud platform can give better weather availability of data anywhere and anytime. The weather needs easy ways and new techniques for surveillance and management. Monitoring the weather parameter is required to assess the live condition of the weather to takes the right life action according to fetched data from the device. [2] It is an embedded system which consists of web-enabled smart such as processors, sensors and communication hardware, to fetch, transmit and work on available data they obtained from their weather. The IoT devices sent this processed data to the network gateway, and from there, it will be available to within network. But by designing such a system which also available on public Internet also is make more advantage to human life. [3] Previously many of IoT based weather monitoring system design used third parties IoT platform such as Thing Speak. But we have designed our cloud-based server because of that anyone can easily access our web-based service or through android app [4].

III. EXISTING SYSTEM

In this venture, Arduino is utilized for predominant entire the technique with a GPS Receiver and GSM module. GPS Receiver is utilized for police examination directions of the vehicle, GSM module is utilized for causing the ready SMS with the directions and furthermore the connection to Google Map. Estimating framework especially ADXL335 is utilized for police examination mishap or fulminant alteration in any hub. Furthermore, associate in nursing no obligatory 16x2 LCD is also utilized for showing standing messages or arranges. We have utilized GPS Module SIM28ML and GSM Module SIM900A. At the point when we region unit arranged with our equipment when programming, we will introduce it in our vehicle and force it up. Presently at whatever point there's Associate in nursing mishap, the car gets tilt and estimating framework changes his pivot esteems. In the event that any alteration occurs, at that point Arduino peruses organizes by separating \$GPGGA String from GPS module information (GPS working clarified above) and send SMS to the predefined range to the police or vehicle or companion with the circumstance directions of mishap place. The message conjointly contains a Google Map connect to the mishap area, all together that area are regularly basically followed. We tend to once us after we get the message then we exclusively should tap the connection and that we can check to the Google map thus we will see the exact area of the vehicle. Speed of vehicle, in tangles (1.852 KPH), is furthermore sent inside the SMS and showed on the LCD board. Check the absolute Demo Video underneath the Project. The technique of existing framework is appeared as on head of. Be that as it may, conjointly this procedure has a few drawbacks due to GSM like Problems sweet-looked in execution of GSM: bountiful Authentication methods are applied in security of GSM anyway they are doing have sure

imperfections. The client character classification is profaned by transmission the client personalities (IMSI) in unprotected sort through the middle vehicle networks between the GSM registers. In the GSM confirmation section, 2 associated boundaries, RAND and SRES, territory unit communicated broadcasting live interface inside the unmistakable. Subsequently any listener broadcasting live interface will play out an eminent plaintext assault on the RAND – SRES attempt to get the validation key.

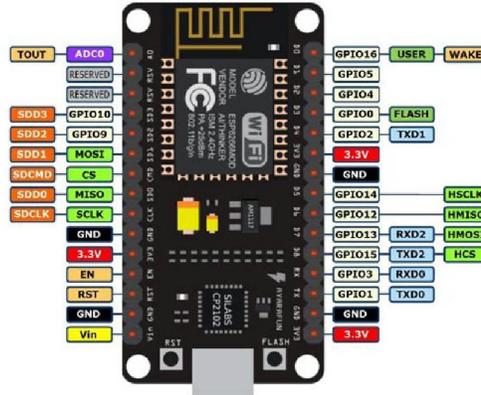


Figure 1: ESP8266 WIFI Module

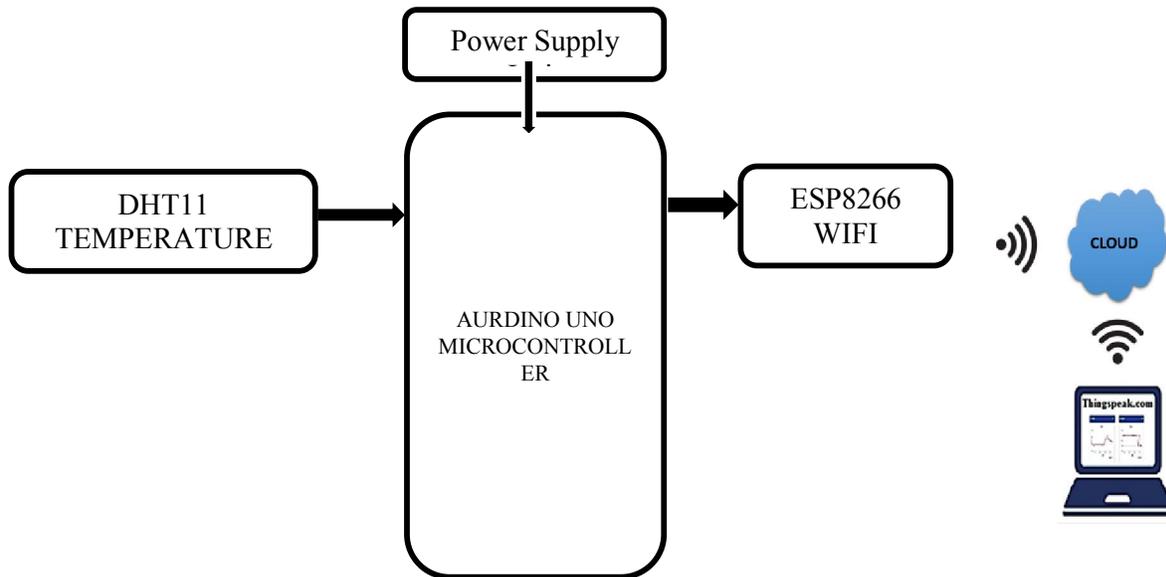


Figure 2: Existing System Model

IV. PROPOSED SYSTEM

Despite of the innovation created to the mobiles, vehicles etc. we have a tendency to see less developments to the roads. There are many works that may be done on the roads which is able to facilitate in inventing new technologies and reconstructing the driving expertise once it involves road safety. The masterminds during this sector try onerous to boost driving expertise by innovating numerous ideas prefer to use roads to store alternative energy from the sun directly and transfer that energy into electricity for homes. During this new system, sensors are wont to forestall loss of electricity by the spare usage of street lights at midnight. At nights street lights are switched 'ON' though there are zero vehicles on road. So, so as to beat this, sensors are used for street lights and once a vehicle passes through the sensors,

the road light-weight are switched ‘ON’ and once the vehicle passes through that street light-weight, the future street light-weight are switched ‘ON’ mechanically and every one the preceding light-weights are switched ‘OFF’ because the vehicle has gone through that light. This is often continued throughout the road thereby saving the energy. Unbearable sensors are wont to discover the traffic which supplies an indication to Raspberry PI three regarding the traffic and this may be able to clear the traffic. Camera module put in on road is employed to discover the vehicles that don't seem to be following the traffic rules. The wastage of electricity from street lights may be decreased by victimization the motion sensors and light-weight sensors because of that the loss of electricity may be prevented and causation a info to the government to take action.

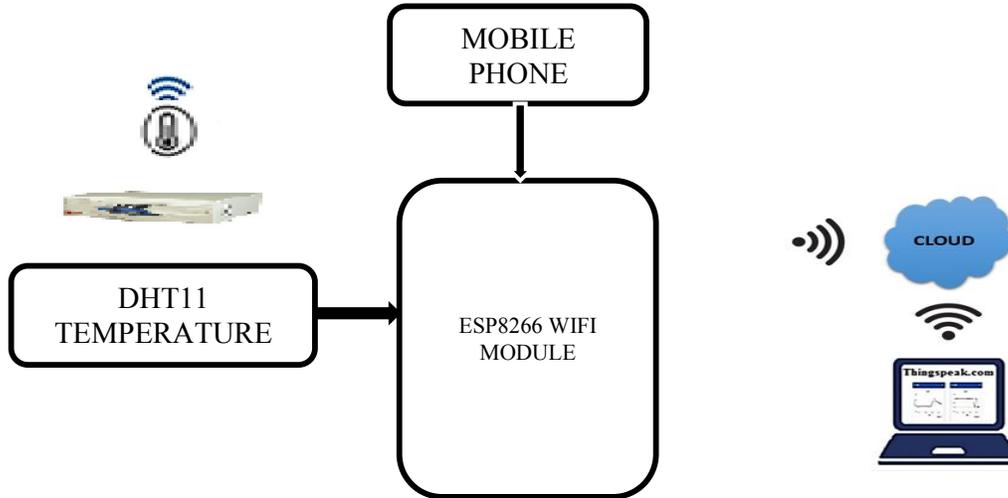


Figure 3: Block Diagram of a Proposed System

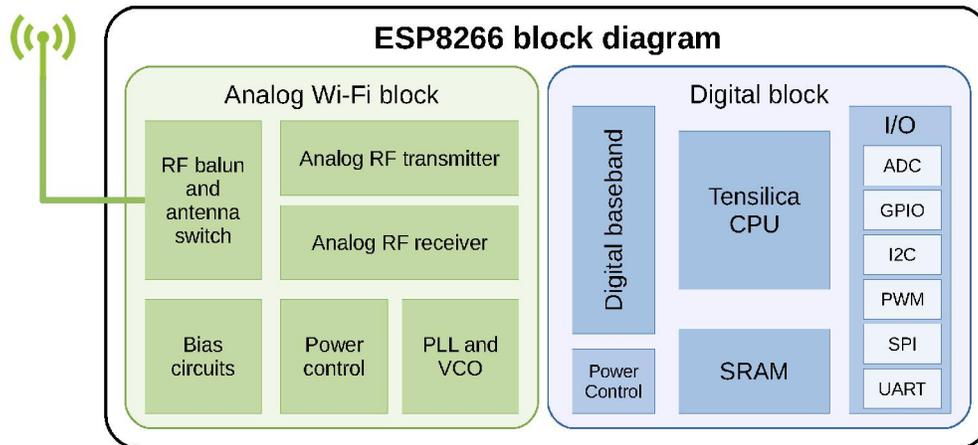


Figure 4: Block Diagram of an ESP8266 microcontroller

V. DHT SENSOR DEVICE

This sensor takes care of the low expense DHT temperature and stickiness sensors. These sensors are extremely essential and moderate, yet are extraordinary for specialists who need to do some fundamental information logging. The DHT sensors are made of two sections, a capacitive stickiness sensor and a thermistor. There is additionally an extremely essential chip inside that does some simple to advanced change and lets out a computerized signal with the temperature and moistness. The computerized signal is genuinely simple to peruse utilizing any microcontroller.

- Low cost
- 3 to 5V power and I/O
- 2.5mA max current use during conversion (while requesting data)
- Good for 0-100% humidity readings with 2-5% accuracy
- Good for -40 to 80°C temperature readings $\pm 0.5^\circ\text{C}$ accuracy
- No more than 0.5 Hz sampling rate (once every 2 seconds)
- Body size 15.1mm x 25mm x 7.7mm
- 4 pins with 0.1" spacing

As you can see, the DHT22 is a little more accurate and good over a slightly larger range. Both use a single digital pin and are 'sluggish' in that you can't query them more than once every second or two.



Figure 5: *DHT11 Temperature Sensor*

VI. THINKS SPEAK

Thingspeak is an online open API IoT source data stage [04, 05, 06] that extensive in putting away the sensor information of differed 'IoT applications' and plot the detected information yield in graphical structure at the web level. Thingspeak speak with the assistance of web association which goes about as an 'information bundle 'transporter between the associated 'things' and the Thingspeak cloud recover, spare/store, break down, watch and work on the detected information from the associated sensor to the host microcontroller such as 'Arduino, TI CC3200 module, Raspberry-pi and so on. The Thingspeak assists with shaping a charm sensor based logging applications, area/place following application and 'social network' of articles/things with refreshed status and on the other hand we can have an authority over 'Home robotization' items that were associated with the public area organization (by means of Internet) from the area of presence and The most essential component of Thingspeak usefulness is the term 'Channel' that have field for information, field for area, field for status for changed detected information. When diverts are made in the 'Thingspeak' the information can be implemented_ furthermore, on the other hand one can measure and envision the data utilizing the MATLAB and react to the information with tweets and different types of alarms. Thingspeak additionally give an element to make a public based channel to dissect and gauge it through open. To Engage the 'Things/items' in detecting the individual information and sending over the Internet and one includes to go further simply associating information from a PC, objects to gather (sensors)And to do so the information need to network transferred that are as workers (that runs applications) and such sorts are considered as Cloud .The 'Cloud' uses the tasks of Graphical representation what's more, accessible as Virtual worker for the clients and the articles are spoken with the cloud through conceivable 'remote web associations' accessible to the clients and dominant part protests utilizes the sensors/actuator to tell with respect to our ecological simple information. The IoT Helps to bring all things together and grants us to speak with our very own things and significantly more inquisitively permits objects/things to collaborate with other 'things'..

VII. INTERNET OF THINGS

The develop of blending PCs, sensors, and organizations to watch and the board gadgets has existed for a long time. These grasp ubiquitous property, Widespread Adoption of IP-based Networking, Computing sociology, contracting, Advances in data Connectivity Models: IOT executions utilize totally unique specialized interchanges models, each with its own qualities. Four basic correspondences models depicted by the net plan Board include: Device-to-Device, Device-to-Cloud, Device-to-Gateway, and Back-End Data-Sharing. These models feature the malleability inside the manners by which IOT gadgets will interface and gracefully cost to the client.

VIII. AUDRINO PROGRAM CODING

```
#include <DHT.h>
#include <ESP8266WiFi.h>
String apiKey = "XXXXXXXXXX"; // Enter your Write API key here
const char *ssid = "HONOR 5C"; // Enter your WiFi Name
const char *pass = "XXXXXXXX"; // Enter your WiFi Password
const char* server = "api.thingspeak.com";
#define DHTPIN 4 // GPIO Pin where the dht11 is connected
DHT dht(DHTPIN, DHT11);
WiFiClient client;
void setup()
{
  Serial.begin(115200);
  delay(10);
  dht.begin();
  Serial.println("Connecting to ");
  Serial.println(ssid);
  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(550);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
}
void loop()
{
  float h = dht.readHumidity();
  float t = dht.readTemperature();
  if (isnan(h) || isnan(t))
  {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }
  if (client.connect(server,80))
  {
    String postStr = apiKey;
    postStr += "&field1=";
```

```

postStr += String(t);
postStr += "&field2=";
postStr += String(h);
postStr += "\r\n\r\n";
client.print("POST /update HTTP/1.1\n");
client.print("Host: api.thingspeak.com\n");
client.print("Connection: close\n");
client.print("X-THINGSPEAKAPIKEY: "+apiKey+"\n");
client.print("Content-Type: application/x-www-form-urlencoded\n");
client.print("Content-Length: ");
client.print(postStr.length());
client.print("\n\n");
client.print(postStr);
Serial.print("Temperature: ");
Serial.print(t);
Serial.print(" degrees Celcius, Humidity: ");
Serial.print(h);
Serial.println("% Send to Thingspeak.");
}
client.stop();
Serial.println("Waiting...");
delay(10000);
}

```

IX. OUTPUT RESULT

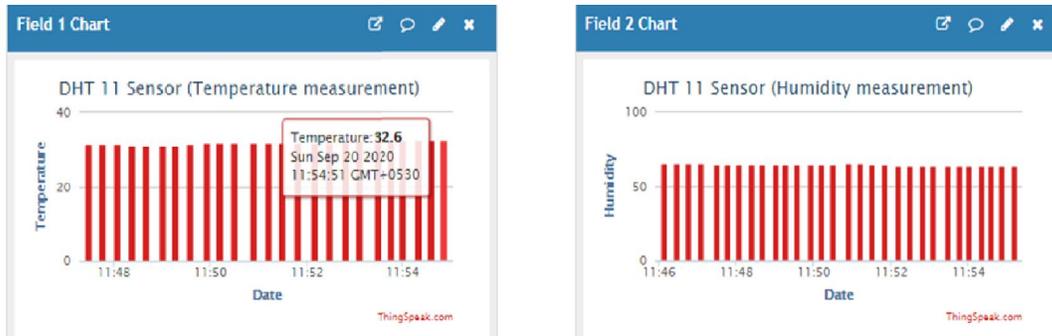


Figure 6: Graphical representation of the temperature reading of the Inverter



Figure 7: Graphical representation of the Humidity reading of the Inverter

X. HARDWARE DIAGRAM



Figure 8: Measuring the temperature of the Inverter by ESP8266 microcontroller and DHT Sensor

XI. CONCLUSION

To make this thought, authentic need to take help of electronic sensor gadgets which are expected to put in the earth. By utilizing this sensor, we can stream continuous information over the web worker utilizing ESP8266. We additionally required one committed public IP to accessible this worker over the open Internet. The incredible and minimal effort climate are checking ongoing framework introduced in this paper. The IOT is utilized for network availability and processing ability stretches out to protest sensors to produce and trade and expend information with negligible human mediation. There is no sign, Universal definition.

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