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WHETHER STATION USING WIRELESS INTERNET OF THINGS

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ABSTRACT- The system is an advanced solution for monitoring the weather conditions at a particular place and make the information visible anywhere in the world. The technology behind this is Internet of Things (IoT), which is an advanced solution for connecting the things to the internet and to connect the entire world of things in a network. The information refreshed from the carried out framework can be available in the web from anyplace on the planet. In farming zone it will be truly challenging to check and screen the climate boundary through wires and simple gadgets during a few climate risks. To beat this issue here the remote sensors are utilized to check and screen the climate boundaries. We will interface DHT11 Humidity & Temperature Sensor, FC37 Rain Sensor , atmospheric pressure sensor and visibility sensor with Node MCU ESP8266-12E Wi-Fi Module. The system proposed for monitoring weather conditions in a particular place like temperature, humidity, sensors detect changes in environment and send it to the users for making statistical analysis, data collected by this is uploaded in web, so this can be useful to everyone in the world. In the present project, an attempt is made to develop and explain the use of Internet of Things (IoT) in Monitoring the weather.

Index Terms- IoT(Internet of Things), ESP8266 Wi-Fi module, NodeMCU, Arduino

I. INTRODUCTION

The web of Things (IoT) is viewed as a development and monetary wave in the overall information industry after the Internet. The IoT is an astute framework which relates everything to the Internet with the ultimate objective of exchanging information and passing on through the information identifying devices according to agreed shows. It achieves the target of sharp perceiving, finding, following, noticing, and directing things . It is an increase and expansion of Internet-based framework, which develops the correspondence from human and human to human and things or things and things. In the IoT perspective, many articles incorporating us will be related into frameworks in some shape . It is a current correspondence worldview that imagines a not so distant future, where the objects of ordinary everyday presence will be furnished with microcontrollers, handsets for automated correspondence, and sensible show stacks that will prepare them to talk with one another and with the customers, transforming into an indispensable piece of the Internet. The IoT idea, consequently, goes for making the Internet considerably more vivid and unavoidable. Moreover, by engaging basic get to and relationship with a wide grouping of contraptions, for instance, for instance, home devices, surveillance cameras, actually looking at sensors, actuators, exhibits, vehicles, and so forth, the IoT will support

the progression of different applications that make use of the potentially monstrous aggregate and combination of data made by such inquiries give new organizations to subjects, associations, and open associations.
Present advancements in development generally revolve around controlling and checking of different activities. These are dynamically emerging to show up at the human necessities. The majority of this development is revolved around viable noticing and controlling different activities. A capable normal noticing structure is expected to screen and assess the conditions assuming that there ought to be an event of outperforming the suggested level of limits (e.g., commotion, CO and radiation levels). Right when the articles like environment outfitted with sensor devices, microcontroller and different programming applications transforms into a self-getting and self-checking environment and it is moreover called as smart environment. In such environment when some event happens the alert or LED cautions normally. The effects in light of the biological changes on animals, plants and individuals can be noticed and compelled by splendid regular really taking a look at system. By using embedded information into the environment makes the environment clever with various objectives, this is one of the applications that splendid environment targets. Human necessities demands different kinds of checking structures these are depends upon the sort of data amassed by the sensor gadgets. Made to order Detection based and Spatial Process Estimation are the two orders to which applications are requested. At first the sensor contraptions are passed on in environment to perceive the limits (e.g., Temperature, Humidity , Rain and perceivability etc.)while the data getting, estimation and controlling movement (e.g., the assortments in the temperature and Rain and perceivability with respect to the foreordained levels).

Sensor gadgets are put at various areas to gather the information to foresee the conduct of a specific area of interest. The primary point of this paper is to plan and execute a proficient observing framework through which the necessary boundaries are checked remotely utilizing web and the information assembled from the sensors are put away in the cloud and to extend the assessed pattern on the internet browser. An answer for checking the temperature, stickiness and rain visibility and atmospheric pressure levels i.e., any boundary esteem passing its boundary esteem ranges, for instance in air in a specific region surpassing the ordinary levels and so on, in the climate utilizing remote installed figuring framework is proposed in this paper. The arrangement additionally gives an insightful remote checking to a specific area of interest. In this paper we likewise present a moving after effect of gathered or detected information regarding the ordinary or indicated scopes of specific boundaries. The

implanted framework is a joining of sensor gadgets, remote correspondence which empowers the client to remotely get to the different boundaries and store the information in cloud.

II. EXISTING SYSTEM

The existing weather monitoring systems generally use weather stations that use multiple instruments such as thermometers, barometers, wind vanes, rain gauge etc. to measure weather and climate changes. Most of these instruments use simple analog technology which is later physically recorded and stored in a data base. This information is later sent to news reporting stations and radio stations where the weather report is given.

Limitations of the existing System

1. Existing weather monitoring systems that are used in the field generally consist of unconventional and heavy machinery that consists of numerous moving parts that require constant maintenance and need to be manually monitored and changed frequently.
2. Power requirements are one of many major constraints as these instruments are generally sited far from main power supply. This adds to the cost of using such instruments.

3. The use of thermometers to measure external temperature; however accurate is still outdated and constantly needs to be manually checked for any change in temperature.
4. Data that is collected by the instruments needs to be manually transferred from the logger to a laptop or computer via a cable.
5. Existing systems consist of large and heavy instruments that occupy a lot of space hence making it difficult to install them in remote location and places which have limited space.
6. The instruments used in the existing systems are expensive and add up to the already high cost of installation and maintenance.
7. The current system always faces problems such as delay in warning people about bad weather and sudden changes in the forecast.

III. PROPOSED SYSTEM

The system proposed is an advanced solution for weather monitoring that uses IoT to make its real time data easily accessible over a very wide range. The system deals with monitoring weather and climate changes like 1.

1. Temperature by LM35 sensor,

2.humidity

3. Light intensity to measure the visibility,

4. Atmospheric pressure

5. Raindrop sensor for detecting rainfall or snow fall.

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IV. ARCHITECTURAL OF PROPOSED SYSTEM

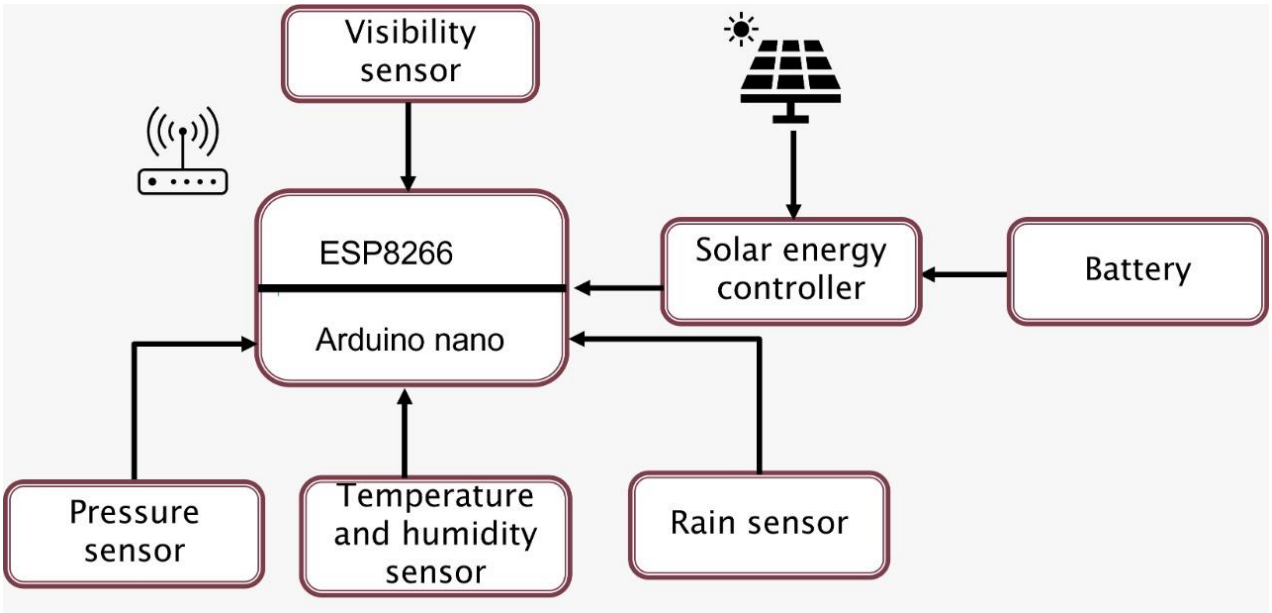

FIG. 1 ARCHITECTURAL

Here heart of our system is Arduino microcontroller, which is connected to different sensor like temperature, humidity, rain sensor, atmospheric pressure sensor and light sensor to check visibility. Once every parameter is get read then it send the information to cloud using Wifi module called esp8266 or nodemcu, here we are using Thinks speaks IoT cloud services. We are sending information in private mode so that that information is only visible to respective authorities. This information can be visible on mobile or laptop.

Workflow of system:

There are multiple nodes of the system we will install in different locations. All this sensor nodes are connected to one IoT cloud like Thinks Speaks. We are leveraging computing power of cloud service for representing information in graphical manner so that it become very easy to understand the information. Think speaks has in built MATLAB which help in doing calculation on data also MATLAB is very powerful tool for representation of data. It help in presenting data on graphical manner from which we can understand the trends and can also be able to predict about the environment condition based on available data. The work flow diagram is as shown in below fig.

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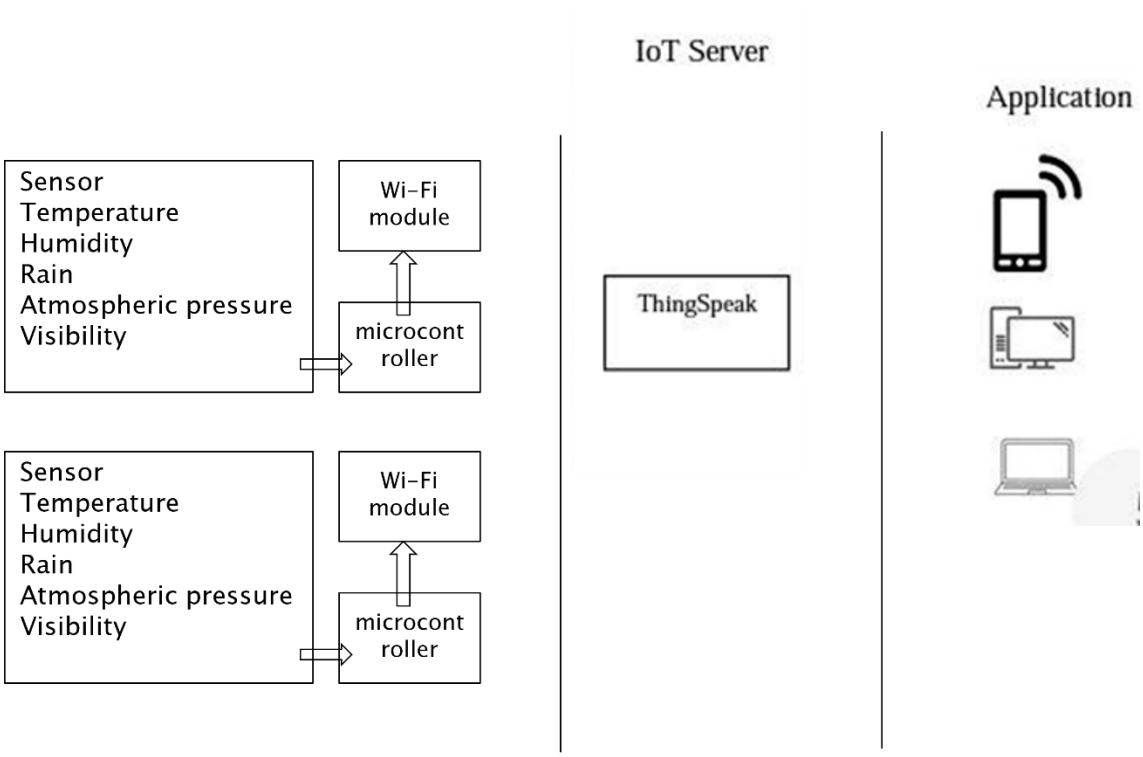

Fig.2- Work flow

V. SENSOR INFORMATION AND COMPONENT

DHT11 SENSOR:

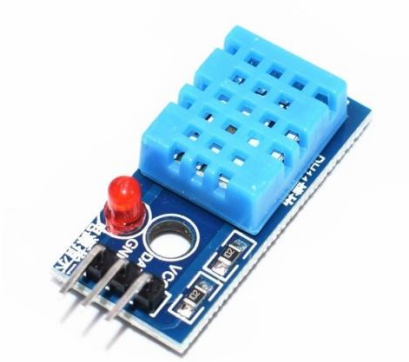

FIG.3 SENSOR

The DHT11 is a commonly used Temperature and humidity sensor**.** The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.

The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. So if you are looking to measure in this range then this sensor might be the right choice for you.

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BMP388 ATMOSPHERIC PRESSURE SENSOR MODULE:

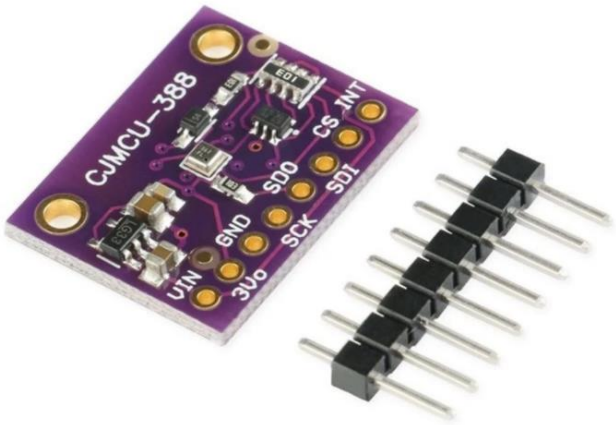

Fig.4 - BMP388 ATMOSPHERIC PRESSURE SENSOR

the BMP388 is a very small, precise, low power, low noise absolute barometric pressure sensor. It enables accurate altitude tracking and is perfectly suited for drone applications. By making accurate steering significantly easier, the BMP388 enhances the drone flying experience. It is compatible for use with other Bosch sensors such as the BMI088 for better performance, robustness and stability. The BMP388 sensor excites with an outstanding design flexibility. Additionally, it provides a single package solution that is easy to integrate into other existing and upcoming devices such as smart homes, industrial products and wearables.

BH1750 digital ambient light sensor:

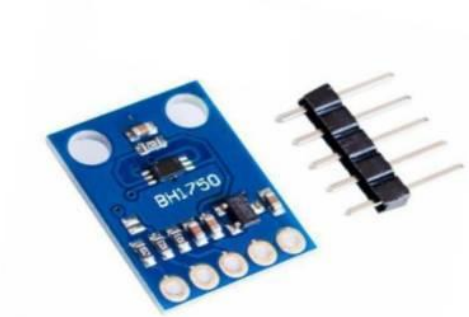

Fig.5 -BH1750 digital ambient light sensor

The BH1750 is a light intensity sensor that can be used to adjust the brightness of display in mobiles and LCD displays. It can also be used to turn the headlights of cars on/off based on the outdoor lighting. The sensor uses I2C communication protocol so that makes it super easy to use with microcontrollers. The SCL and SDA pins are for I2C. There is no calculation needed to measure the LUX value because the sensor directly gives the lux value. Actually, it measures the intensity according to the amount of light hitting on it. It operates on voltage range of 2.4V-3.6V and consumes really small current of 0.12mA. The results of the sensor does not depends upon the light source used and the influence of IR radiation is very less. There are very less chances of any error because the variation in measurement is as low as +/-20%.

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Rain drop Sensor Module

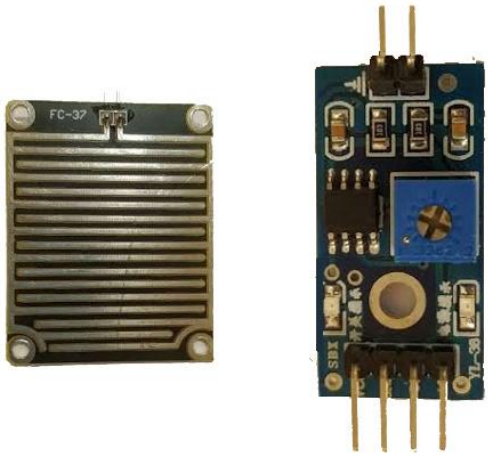

Fig.6- Rain drop Sensor Module

Raindrop Sensor is a tool used for sensing rain. It consists of two modules, a rain board that detects the rain and a control module, which compares the analog value, and converts it to a digital value. The raindrop sensors can be used in the automobile sector to control the windshield wipers automatically, in the agriculture sector to sense rain and it is also used in home automation systems.

NodeMCU:

Fig.7- NodeMCU

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP12 module.

1. Type: single board microcontroller
2. Operating system: XTOS
3. CPU: ESP8266

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4. Memory: 128 kbytes
5. Storage: 4Mbytes
6. Power: USB

Arduino nano:

This is the heart of our project it read sensor information and also connected to server via sensor node

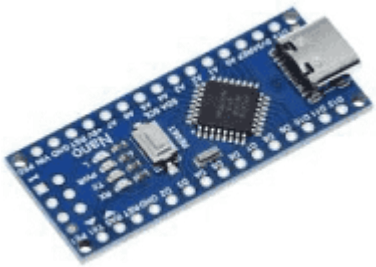

Fig.8 Arduino uno

The **Arduino Nano** is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor.

The Arduino Nano is equipped with 30 male I/O headers, in a DIP30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline. The board can be powered through a type-B mini-USB cable or from a 9 V battery.

VI. CONCLUSION

The objective of this research is to design and implement a weather station that can provide an accurate weather update and the updated information can be accessed remotely. For its easy design, this WS can be implemented in remote locations where weather data are not easy to get. Continuous weather data will be uploaded to a server from where anyone from around the world can access the data. This WS can also be helpful to meteorologists to find the property of any particular area for future research. As we can take data on spot our data accuracy will be far greater than the satellite data. As this WS design is simple and anyone can operate this so there is no need for a skilled man to operate this. This designed WS can be carried easily to anywhere at any time that will reduce manpower and less time consumption. In the future, a mobile app can be developed where users can easily log in and get the weather update.

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