



Development of IOT Based Weather Monitoring & Reporting System

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Abstract---IOT based weather monitoring and reporting system is an advanced solution for weather monitoring that uses IOT to make its real time data easily accessible over a very wide range. This deals with monitoring weather and climate changes like temperature, humidity, wind speed, moisture and even carbon monoxide levels in the air; using multiple sensors. These sensors transmit data to a web page, where it is plotted as graphical statistics.. The system proposed is a hardware that monitor the weather and keep note of it. IOT based weather monitoring and reporting system report's the monitored data offline and online as well. The data is stored online over the cloud. Our Project Gives Smart way to Monitor the Weather and report it over Internet. This hardware can be used at places that needs continuous weather reports else they are affected by weather such as Farming, Ships, Dams, Volcano and so on.

Keywords- Weather analysis, Temperature Moderation, Moisture Control, Humidity Control, ESP32.

I.INTRODUCTION

In this paper, we propose an internet-based smart weather reporting system. Our proposed technology enables for the transmission of weather parameters via the internet. It enables users to check the weather status immediately online without the requirement for a weather forecasting agency. The system monitors the weather and provides live weather statistics by using temperature, humidity, and a rain sensor. The system constantly monitors temperature with a temperature sensor, humidity with a humidity sensor, and rain with a rain sensor. The system constantly sends this data to the microcontroller, which interprets it and sends it to the internet web server over a Wi-Fi connection. This data is updated in real time and can be accessed on the online server system..

II. LITERATURE SURVEY

Praveen Kumar et.al [1] Through weather monitoring system we can collect the information about humidity and temperature and according to current and previous data we can produce the results in graphical manner in the system. After reviewing many articles, there are presently no papers that mention monitoring the combination of temperature, lighting and humidity in one integrated system and have actuators to modify these settings. In addition to this, there is one research paper that has discussed monitoring these three environmental conditions; however, there has been no mention about having actuators to modify. So our main idea was to coin a system that can sense the main components that formulates the weather and can be able to forecast the weather without human error.

Arsheen Shaikh et.al [2] By keeping the weather station in the environment for monitoring enables self protection (i.e., smart environment) to the environment. To implement this need to use the sensor devices in the environment for collecting the data and analysis. By using sensor devices in the environment, we can bring the environment into real life. Then the collected data and analysis result will be available to the user through the Wi-Fi. The smart way to monitor environment an efficient, It also sent the sensor parameter to the cloud. This data will be helpful for future analysis and it can be easily shared to other also. This model can be expanded to monitor the developing cities and industrial zones for pollution monitoring. To protect public health from pollution, this model provides an efficient and low cost solution for continuous monitoring of environment.

AF Pauzi et.al [3] The Sensor station and Weather station will be communicated by hotspot Wi-Fi and it is limited in areas covered but still better in communication via wireless. The value that been recorded from google sheet and Table 1, 2 and 3 it seen that the weather at particular place has different condition from the exact condition with the accuracy of weather reporting system and forecast system data has been compared.

Nitant Sabharwal et.al [4] A low cost automatic wireless weather monitoring station equipment with software application for monitoring, logging and web hosting facilities. It is capable of calculating temperature, pressure, humidity, wind speed, wind direction and a mathematical model for calculating dew point temperature and short time local alerts.

Nisha Ghalot et.al [5]After the research in the agriculture field researches found the yield of agriculture goes on decreasing day by day. Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the extra man power efforts, some of the researches tried for betterment of farmers and provides the systems that use technologies which are helpful for increasing the agriculture yield. Some of such researches carried out in field of agriculture are summarized

III. Proposed System

The block diagram of the proposed system is shown in Fig.1:

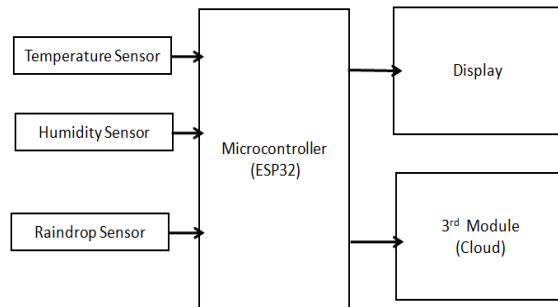


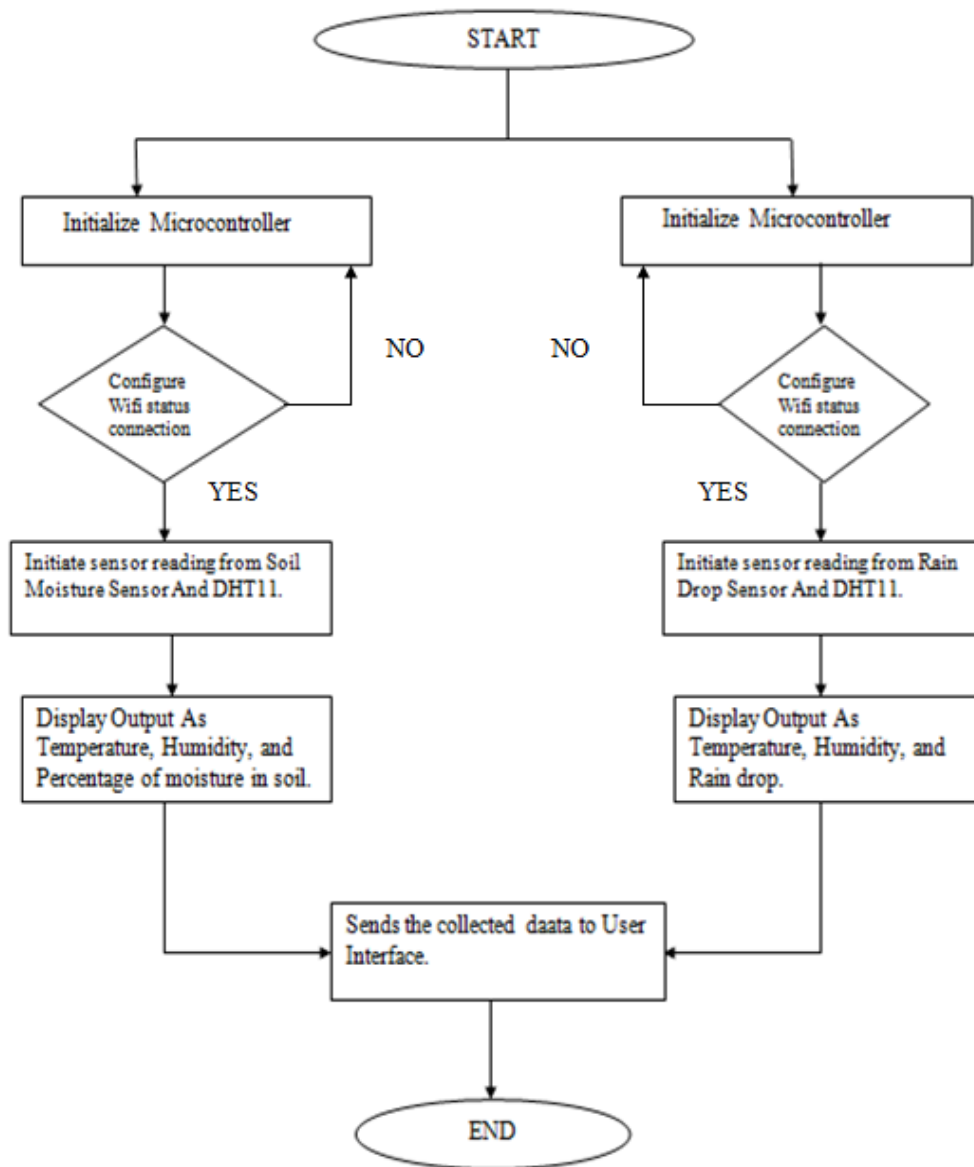
Fig. 1 Block Diagram of whether Monitoring and Reporting system using IOT

We designed a system for checking the environmental condition using IOT Cloud they have connected ESP32 . The objective of this project to check the environmental conditions like Temperature, Rain, Humidity from anywhere around the world using IOT Cloud.

Hardware Used:

- **Temperature and Humidity Sensor[DHT11]:** The DH11 is a basic, ultra low cost digital temperature and humidity sensor .It uses a capacitive humidity and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed)
- **Rain Sensor:** A rain sensor is one kind of switching device which is used to detect the rainfall. It works like a switch. Whenever there is rain, the switch will be normally closed
- **Soil Sensor :** Soil moisture sensors measure the water content in the soil and can be used amount of stored water in the soil horizon.
- **LED Display:** A Liquid Crystal Display commonly abbreviated as LCD is basically a display unit built using Liquid Crystal technology. When we build real life/real world electronics based projects, we need a medium/device to display output values.
- **ESP32:** ESP32 is the SOC (System on Chip) microcontroller which has gained massive popularity recently. Whether the popularity of ESP32 grew because of the growth of IOT ESP32 has integrated WiFi and Bluetooth stacks, which have proven to be a game-changer. No need to connect a separate module (like a GSM module or an LTE module).

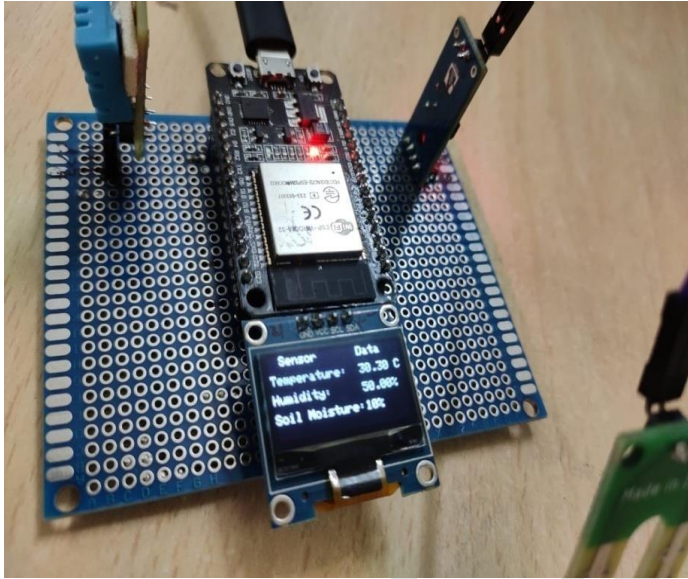
IV : FLOWCHART



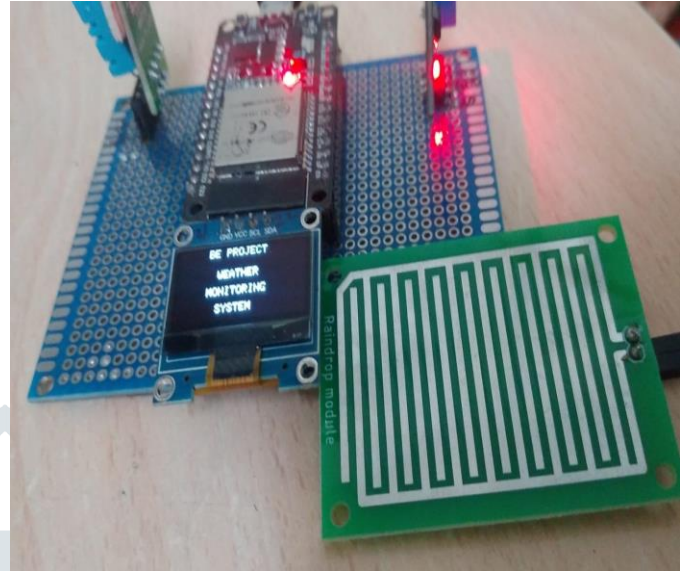
Module 1 & 2 Consists of Microcontroller And sensors Its Core of Overall Hardware. Module 1 consists of ESP32 , DHT11 ,Soil moisture sensor. Module 1 measure the following parameter such as Temperature, Humidity, Moisture level in soil. DHT11 sensed the data of temperature & humidity and gives the digital output via display as well as over the cloud. Soil Moisture sensor is used to measure moisture level in soil. ESP32 converts that analogical information into digital information and gives output via Display. And also Stores that information over Cloud.

Module 2 consists of ESP32 , DHT11 ,Rain drop sensor. Module 2 measure the following parameter such as Temperature, Humidity & presence of rain. DHT11 sensed the data of temperature & humidity and gives the digital output via display as well as over the cloud. Rain drop sensor sense the presence of rain in surrounding. ESP32 converts that analogical information into digital information and gives output via Display. And also Stores that information over Cloud.

V : RESULTS



Module:-1



Module:-2

Output Values Table 01:-

Output Results		
	Weather Parameter	Values
Module1	Temperature	30.30 C
	Humidity	59.00%
	Soil Moisture	10%
Module2	Temperature	33.80 C
	Humidity	44.00%
	Rain	No Rain

VII FUTURE SCOPE

As a global feature of this system, a few more sensors can be implemented and connected to the satellite. We can further add more sensors to measure various environmental elements including CO₂, pressure, and oxygen. This real-time system has a wide range of applications in aircraft, navigation, and the military. It can also be used in hospitals or medical institutes to conduct research and studies on the "Effect of Weather on Health and Disease."

VIII CONCLUSION

Keeping a weather station in the environment for monitoring allows the environment to protect itself (i.e., smart environment). To execute this, sensor devices in the environment must be used to collect and analyse data. We can bring the environment to life by employing sensor devices in the environment. The collected data and analysis results will then be made available to the user over Wi-Fi. This study describes a clever technique to monitor the environment using an efficient, low-cost embedded technology. It also transmitted sensor data to the cloud. This information will be useful for future study and may be simply shared with other users. This model may be expanded to track the development of cities and industrial zones.

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