

IOT BASED WEATHER MONITORING AND REPORTING SYSTEM

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ABSTRACT

Weather is the state of the atmosphere, to the degree that it is hot or cold, wet or dry, calm or stormy, clear or cloudy. Most weather phenomena occur in the troposphere, just below the stratosphere. Weather generally refers to day-to-day temperature and precipitation activity, whereas climate is the term for the average atmospheric conditions over longer periods of time. When used without qualification, weather, is understood to mean the weather of earth. Monitoring the weather conditions manually is difficult. This paper present our work to develop an automated system which monitors the weather condition. The weather condition is driven by air pressure (temperature and moisture) differences between one place and another. These pressure and temperature differences can occur due to the sun angle at any particular spot. Through this system we can automatically collect the information about humidity and temperature. The details are stored in a database and according to current and previous data we can produce the results in graphical manner in the system.

Keyword: *Climate control, Weather analysis, Temperature Moderation, Moisture Control, Humidity Control, Arduino, Esp 8266, Etc...*

1. INTRODUCTION

Advancement in science and technology has made it possible to predict the climatic condition for a particular location. A weather station is believed to be a scientific technique that permits measuring the parameters of meteorological conditions centered on the situations of the environment both on the land or on sea for a particular place with certain devices with the intention of comprehending forecasted weather states, and to analyse atmospheric properties. In this new era, weather monitoring is of immense importance and has found application in many fields of human endeavour varying from following the progress of farm ground weather conditions to industrial conditions monitoring. A self-regulating weather surveillance system is a device that is used for measuring and recording weather-related parameters by means of sensing devices devoid of human involvement. The parameters being measured can be to an isolated place by the use of a network connection. Weather monitoring assists in monitoring various factors that contributes to atmospheric conditions of a particular place such as temperature, humidity and light intensity. There is need to keep track of the weather situations so as to sustain bumper harvests of farm produce and to guarantee environmental safety in industries. Indigenous weather measurements are very critical to a large and varied range of vocations, from gardeners to fireman. It offers continuous monitoring of climatic conditions for various types of applications. Weather monitoring system can be classified as using wired communication or wireless communication. For the wireless communication, the network will be easily accessible and user friendly and there will not be need for the user to be physically present at the site to keep track of the climatic condition. Wireless communication is a wide-ranging term that combines every techniques and practices of connection and communication between two or more devices by a wireless signal through wireless communication mechanisms and apparatuses. The Communication is set and the information is disseminated through electromagnetic waves such as radio frequencies, infrared or satellite. The distances concerned may just be a few meters as in television remote control or long such as in radio communications. GSM technology is the most economical and the most handy technology now being used for wireless communication. The wireless weather monitoring system fundamentally needs a small number of elementary modules such as GSM module, display module, sensors and microcontroller module. Monitoring weather conditions is important not only as an environmental baseline, but to maintain quality working conditions, studies and recreational safety. When the principles of wireless monitoring are applied to weather, the result will be increase in accuracy. Remote monitoring of environmental parameters is important in various applications, agricultural and industrial processes. In earlier

periods, weather monitoring systems were commonly centered on mechanical or electromechanical devices which are disadvantaged by the downsides such as inflexibility, necessary human interference, associated parallax errors and robustness. The aim of this research work is to design and implement a simple and low cost weather monitoring system using LM35, LCD and ATmega328P microcontroller unit to monitor weather conditions of the desired location and transmit it to a cell phone at distant location through SMS. The following objectives were achieved: Analog data from LM35 was fetched and fed to one of the ADC channel of Microcontroller. Display the temperature, relative humidity and light intensity on LCD screen which is pre-processed and calculated by ATmega32. Send the measured temperature, relative humidity and light intensity to user with the help of GSM module (SIM 800) Via SMS. The proposed system will only measure temperature, relative humidity and light intensity respectively and is developed for small area.

1.1 Existing System

There are many methods which are helpful to calculate the weather parameters. Manual methods need to take the readings at the place of the station by human being. This method of traditional approach is accurate and depend on the person who takes the values. Before going for any method we must know the definitions and standard unit of the weather parameters. A manual inventory system is relies heavily on the action of the people which increases the possibilities of human error.

1.2 Objective

Weather station systems are huge, sensitive, and reliable systems. Hence, the key reason that makes such systems considerably wanted to be available is the planning issues. 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.

1.3 Contribution

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 changes temperature situation and hence proportionally changes humidity situation. Furthermore, wind speed is considered another factor that has huge influence on climate conditions such as air velocity, air density, air direction and air coldness. Hereby, the proposed conditions and factors effect majorly on the daily weather forecasting by human being.

2. LITERATURE SURVEY

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. Ancient weather forecasting methods usually relied on observed patterns of events, also termed pattern recognition. For example, it might be observed that if the sunset was particularly red, the following day often brought fair weather. This experience accumulated over the generations to produce weather lore. However, not all of these predictions prove reliable, and many of them have since been found not to stand up to rigorous statistical testing. The simplest method of forecasting the weather, persistence, relies upon today's conditions to forecast the conditions tomorrow. This can be a valid way of forecasting the weather when it is in a steady state, such as during the summer season in the tropics. This method of forecasting strongly depends upon the presence of a stagnant weather pattern. It can be useful in both short range forecasts and long range forecasts. Measurements of barometric pressure and the pressure tendency (the change of pressure over time) have been used in forecasting since the late 19th century.

3. PROPOSED SYSTEM

There are a lot of high end systems available these days for round the clock weather monitoring. But these systems are implemented on a very large scale, for monitoring real time weather for a whole city or state. Implementing such system for a small area is not feasible, since they are not designed for it and the overhead for maintaining such systems for a small area is very high. Our proposed system makes use of 3 sensors to measure the weather/environment factors such as temperature, humidity, light intensity, dew point and heat index. The values read from the sensors are processed by the Arduino micro-controller and stored in a text file which can be processed upon to derive analysis. The readings are also displayed on an on board LCD for quick viewing. All these readings can be analyzed to get the weather characteristics of a particular area and record the weather pattern. These recorded parameters are essential and vary from places to places. All these requirements are fed into the database and these values are essentials and recorded over time. Using these values as input we can plot a weather chart of a particular area over time. Based on the present weather factors and preset values the set actions are done. The set action can include turning on the heating system when the temperature is colder than the set value and turning on the cooling system when the temperature is hot or humid beyond the set values. The serial output from the Arduino micro-controller which are the values read from the sensors can also be stored in a database. The database can be used as a source for data if we want to display values through a website or a standalone application.

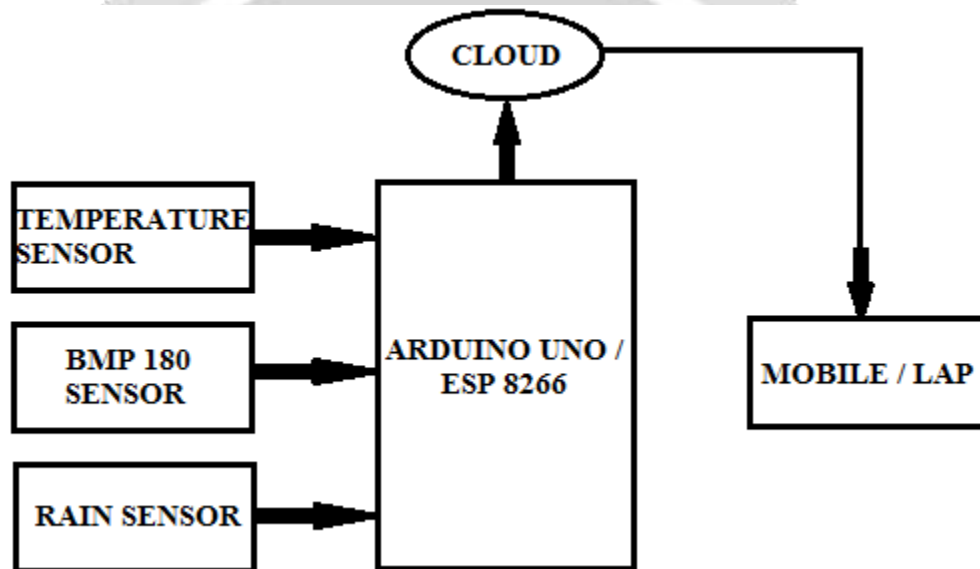


Fig.No. 1 Block Diagram For Proposed System

3.1 Advantages of Proposed System

- Low Cost
- trouble free to use
- high accuracy

4. RESULT & DISCUSSION

Thingspeak is an open data platform for the Internet of Things. It sends data to the cloud. Using this we can analyze and visualize our data. Finally on the basis of those we can react or trigger an action. It provides real time data collection and other devices an technologies like Particle Photon, Raspberry Pi, Twitter, Electric Imp, Esp etc.

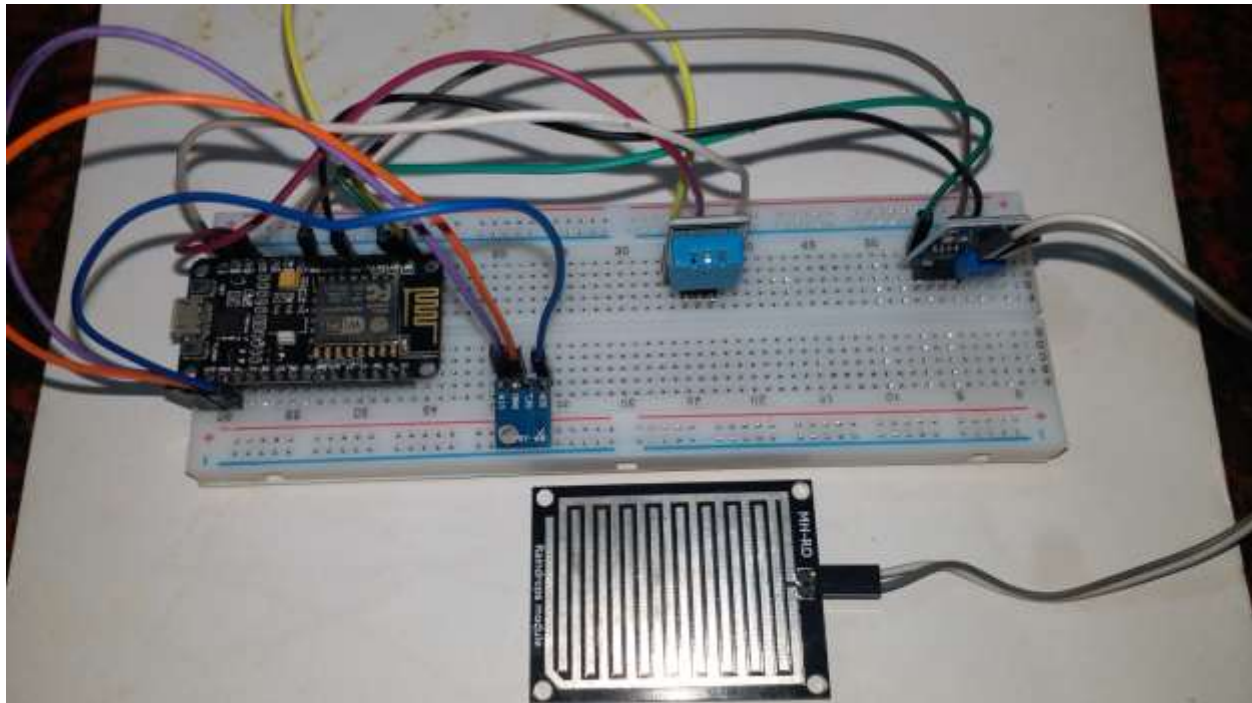


Fig.No. 2: Snapshot of Hardware Prototype

5. CONCLUSION

The paper demonstrates a simple and low cost system design to measure climate components in perfect competence. The availability of such system is extremely preferred particularly, with the establishments, companies that depend considerably on taking decisions based on inputs variations; consequently, weather prediction processes will be taken into considerations. In addition, the system is considered perfect for controlling the sites based on the change in weather conditions. The system works as a supervisor controller, which govern places depending on the fluctuations of the weather or other conditions via feedback operation principles. Hereby, we conclude that the proposed system can be separated in to two different parts. The first part is excessively helpful for the companies and other organizations that are put in charge to plane and manage their works based on weather situations; such as, Transportation systems, Airways, and the Agriculture as a high priority. These projects can be lused in Agriculture and helpful to farmer on uneven climate change. Houses, Markets.

6. REFERENCES

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