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RASPBERRY PI BASED WEATHER REPORTING OVER IOT

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ABSTRACT

Weather forecast these days is unpredictable to be exact because of the climate changes drastically over weather. In cause of that, Weather Reporting System is mostly used to monitor the continuously changing climatic and weather conditions over controlled areas likes house, industry, agriculture and etc. in real time monitoring. Internet of Things (IoT) platform use is Thing Speak it's should be able displaying the weather parameters and the information will visible wherever in the world and it's also displaying on the OLED with two-way microcontroller communication via Wi-Fi hotspots. The condition of some particular place that be reported by satellite weather report system does not give the exact condition. However, the problem occurs when needed the accurate weather report for current time. With weather reporting system all weather parameters sensor will be controlled by ESP32 microcontroller as the server that will send all the data collected by sensors to the database by Thing Speak and will visible anywhere in the world and also display on OLED that use We MO's D1 mini as its microcontroller and a client. This data then will be compared with the weather forecast data and statistics made by forecast station. All data collected will be also saved in Google sheet format by IFTT tool for easier to analyses the data. This system will monitor the changes of weather condition happening over the environment and then provides the users fastest way to access the information from anywhere.

INTRODUCTION

Here we introduce a smart weather reporting system over the Internet. Our introduced system allows for weather parameter reporting over the Internet. It allows the people to directly check the weather states online without the need of a weather forecasting agency. System uses temperature, humidity as well as rain with humidity sensor to monitor weather and provide live reporting of the weather statistics. The system constantly monitors temperature using temperature sensor, humidity using humidity sensor and also for rain. Weather monitoring system deals with detecting and gathering various weather parameters at different locations which can be analysed or used for weather forecasting. The aim of this system is achieved by technologies such as Internet of Things (IOT) and Cloud. The idea of internet of things is to connect a device to the internet and to other required connected devices. Using Internet the information from the IOT device can easily be transferred to the cloud and then from the cloud to the end user. Weather Monitoring is an essential practical implementation of the concept of Internet of Things, it involves sensing and recording various weather parameters and using them for alerts, sending notifications, adjusting appliances accordingly and also for long term analysis. Monitoring weather's condition plays an extensive role in every person's life. The impact of the environment's condition causes numerous challenges in various fields like agriculture, industry, constructions as well as more other fields. But the measured impact occurs mostly in agriculture and industry. As we all know, agriculture perform a crucial role in India's Economy. Almost One fourth of India's economy is acquired from Agriculture. Over the recent year, smart agriculture was a debated topic in the world. In IoT, the smart word indicates that the use of minimum parameters produces a better result. It reduces the use of land, water, time as well and the uses of the new technology and science for the enhancement of crops.

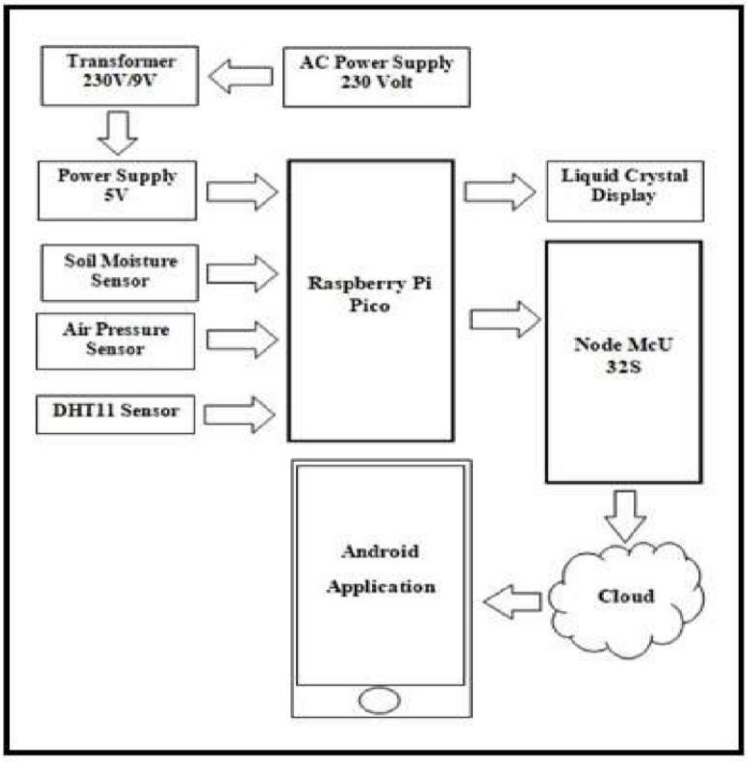
LITERATURE SURVEY

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.

SYSTEM ARCHITECTURE

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.

BLOCK DIAGRAM

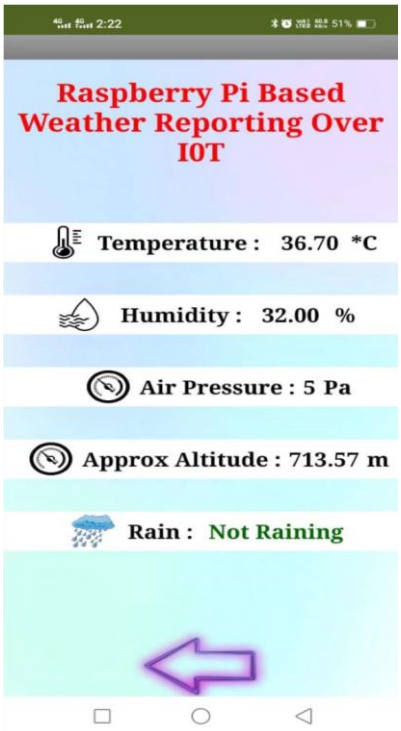


WORKING

Case1: When the input of the inverting terminal is higher than the input of the noninverting terminal.

Case2: If the input of the inverting terminal is lower than the input of the non-inverting terminal. The input to the inverting terminal is set to a certain value by varying the potentiometer and the sensitivity is set. When the rain board module's surface is exposed to rainwater, the surface of the rain board module will be wet, and it offers minimum resistance to the supply voltage. Due to this, the minimum voltage will be appearing at the non-inverting terminal of LM393 Op-Amp. The comparator compares both inverting and non-inverting terminal voltages. If the condition falls under case (1), the output of the Op-Amp will be digital LOW. If the condition falls under case (2), the output of the OpAmp will be digital HIGH. The below diagram shows the equivalent circuit of both the conditions.

RESULT



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.

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