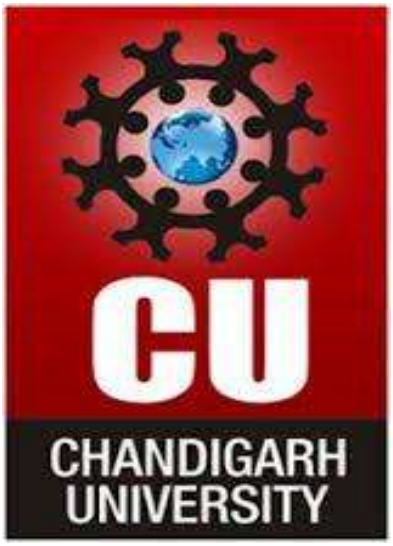
Weather detection using IoT

Submitted in partial fulfillment of the requirements for the award of degree of

BACHELOR OF ENIGNEERING

IN

COMPUTER SCIENCE AND ENGINEERING



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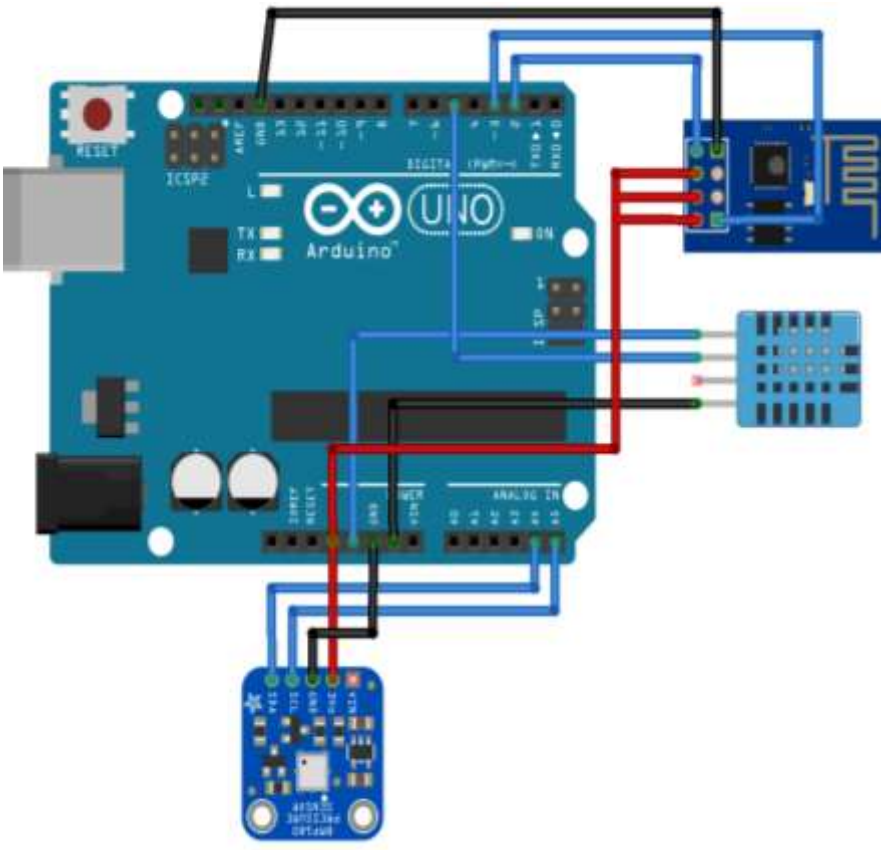
Introduction

Having information about current and future weather conditions is very important no matter what you are planning whether you are planning a road trip or decisions related to agriculture. Weather prediction using IoT project developed over here aids in such direction. Using modern IoT devices like Arduino along with temperature and humidity sensor, rain detection sensor and many more various such small equipment and programming them to properly pass and coordinate the collected data we are creating a database of weather report of some specific locations, then based upon this database and use of various algorithms we can keep track of and also determine the future weather conditions of any place.



In the IoT enabled weather monitoring system, Arduino Uno measures certain weather Parameters like temperature, humidity, rain level, location coordinates and then store it in a cloud-based database accessible all time over network to users and IoT devices. Then over time this data can be used know about real time weather conditions and also to predict weather forecast with help from GPS satellites. The system stores data over cloud-based server so it is accessible over internet to anyone anytime from anywhere with access to internet.

Use of IoT devices enable this system to deployed anywhere in any condition. This project due to being made using IoT devices can be easily modified to user needs. It can be placed inside one's house to measure and regulate temperature humidity and light and it can also be deployed in agriculture land to collect temperature, humidity of air and soil, amount of light reaching areas of plants, amount of rain occurred over time.

Feasibility Study

This IoT based device is very easy to make and operate. Anyone with basic knowledge of computer can operate our device once completed.

The need and applications of precise and accurate weather statistics data is very large. Having such useful data aids in crafting custom solutions required at various places like at farming lands to cultivate plants, at animal husbandries to provide suitable and comfortable atmospheres for animal to live. This are just 1% of applications of the data collected by the system. So, having devices that can collect such data is a necessity.

IoT based devices makes this work very easy and cost-efficient. IoT microcontrollers and sensors are very cost efficient and easily available so the overall cost of the device to developed in this project is very low.

The needs of such solution are very high as everyone can make use of it according to them requirements. This project can be easily modified according to the needs the user. Users can adapt this project to their needs by addition or removal of sensor on the Arduino board.

Having availability of this project solution will automate a many of human operations which are rather very time consuming and prone to error when done with hands manually such as measuring humidity of soil or taking a report of water level in field.

Methodology/ Planning of work

This project requires working hardware and corresponding software programming to work properly. The very first part of development will include assembling the Arduino Uno board and sensor with proper configuration. Then the Arduino microcontroller needs to be programmed to collect data from attached sensors and transmit it to database in cloud over WIFI network connected to internet. The Arduino makes use of mqqt protocol to transmit the data over to the database. The data transmitted by Arduino can include information about temperature, humidity, rain level, light levels. The mqqt client used over here is mosquito. The database is stored in Google cloud services. Information stored in database can be used make predictions of weather conditions by use of machine learning algorithms.

Team member wise Distribution of work.

Mishra Nitin Sherbahadur(18BCS1988)

- Configuring Arduino Uno and sensors.
- Programming of Arduino board.

Dhruv Bhattacharjee (18BCS2072)

- Setting up Arduino and cloud database communication.
- Creating and handling database.

Innovations in Project

The project developed over here is not targeted towards user with any specific needs and requirements. Due it being IoT based the unique thing about it is that it can be easily molded according to the needs of user. The benefit of this project is can also collect data for use over time and can also provide real time information to user. It can transmit data over internet enable WIFI network or a GSM based network connection giving it real time connection to database anytime from anywhere. Being small in size it can be deployed in almost all places of interest.

Software and Hardware Requirements

Hardware requirements:

- Arduino Uno
- DHT11 Temperature and Humidity sensor
- Raindrop detection sensor
- ESP8266 WIFI module
- GSM module for Arduino
- NodeMCU ESP8266 Microcontroller
- Internet enabled WIFI connection
- Computer (Required initially only once to program Arduino)

Software requirements:

- Window/Linux/Mac OS
- Arduino IDE
- Python
- Eclipse mosquitto
- MongoDB
- Google cloud services

Bibliography

https://www.google.com/

https://www.youtube.com/

https://www.arduino.cc/en/

https://mosquitto.org/documentation/