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IoT based Weather Monitoring System

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Abstract:- The model proposed in our project is an innovative method for tracking the climatic conditions for a specific place. IoT "Internet of Things" is the concept that's being used here, It's innovative & effective way to link to the internet and join the entire universe of things on the network. In today's world IoE or Internet of Everything is ruling almost all industries. IoE provide solutions to various real life problems using wireless devices and by transferring the data over the network wirelessly. It has now become possible to merge the concept of Iot with other domains like Machine Learning, Artificial Intelligence, Cyber Security etc. Our System is an Iot based Weather Monitoring & Prediction System. Here the combination of IoT & ML concepts have been used.

I. INTRODUCTION

The present days high-speed Internet linking more and more peoples across the world as become possible. The Internet of Things (IoT) is a step away, connecting not just people but also all electronic machines together. With Wi- Fi enabled devices costs this trend will only gather more propel. The main concept behind the Internet of Things (IoT) is to connected electronic devices via a network and then retrieve the data from these devices (sensors) that can be distributed in any vogue, upload them to any cloud service where the collected information can be analysed and processed. These data may be used to inform people by different means, such as using a informative website containing the values of different parameters and also using Machine Learning Techniques. The Iot based Weather Monitoring system features to monitor temperature and humidity level, Barometric pressure, light intensity, air quality and rainfall.

Upcoming technology is to bind the whole world in one place. It is achievable to link all objects, material and sensors to transfer the information achievable at different places & process / analysis data to organize applications such as traffic signalling, mobile health tracking in medical use and methods of industrial protection, etc. IOT provides a large range of interface communication with different protocols and different application properties to receive the maximum user interaction. Climate monitoring is vital to maintain good crop growth, to ensure safe industrial working conditions etc. Constant progress made the scanning phase of environmental parameters much simpler than in the past. These sensors are Electronic instrument commonly used to measure various natural, physical and environmental parameters. They provide the data that can then be fed into cloud.

The results would be reliable by using sensors to exmine climatic conditions and the entire system will use not so much resources, and there will be quick response. This system includes wireless technology, which also has Wi-Fi connectivity. Here the weather conditions are controlled and the data is bring up to date on the website. A weather monitoring system could be understood as a system that gives us weather reports in our environment which makes it intelligent and interactive through wireless communication with objects. For example, it can give us information of the atmospheric temperature, humidity, rainfall level and pressure etc. This system essentially senses temperature, humidity, rains and pressure for the specific place. This prototype contains different types of sensors which can be used to calculate all the above parameters. The prototype brain is Node MCU board along with ESP8266 Wi-Fi Module. The Node MCU is connected by four sensors namely the temperature and humidity sensor (DHT11), the rainfall sensor (YL83), and pressure sensor.

II. RELATED WORK

Weather Monitoring systems have play an vital role for keeping the weather conditions of the room in check. There are already various existing and proposed weather monitoring systems. This section goes through various papers and shows the literature survey of the same.

This system has shown the simulation of a weather monitoring system on the proteus simulation software. The main board used here is the Arduino board.
In this system they have used DHT11, Soil Moisture Sensor and vibration sensor, esp8266 WIFI module and Arduino board. The data collected from these sensors is then displayed on the blink server. This system consists of a Node MCU that is connected to a Raspberry Pi as a main processing unit for the entire system and all sensors and tools. The sensors dht11, rain sensor and pressure sensor are used to recover data and process the analysis using the data collected through the microcontroller.
The processed data is uploaded and stored as a database via node Mcu on a website. Here sensors are used along with Arduino, to display the current values(status) and shows predicted rainfall based on the trained data sets. The weather prediction is done based on the older datasets collected and compared with the current values. Software: Arduino Compiler 2. PLX-DAX 3. Anaconda 4. Jupiter Notebook . Google Collab. ARIMA ML Model is used here .This model predicts future values of the various weather parameters which are then displayed onto the server. The Hardware used . Node MCU ESP 8266 Wi-Fi Module, DHT11, BMP280 . Software Thing Speak, website and database.

The system contains components: Raspberry Pi 3 Model B · DHT-11 Sensor · Rainfall Sensor · BMP-180 Pressure Sensor · Wireless Access Adapter . They Have used ML algorithms like decision tree and time series analysis. ARIMA

Model software used coding with raspberry pi in python. In This System, DHT11, LDR, NODE MCU, ESP8266 components are inbuiled . The data received from these sensors is sent to Thing Speak server site. The Data is then displayed on a Webpage. Logistic Regression Model is used to process the

Data. [8] Here, LM35 Temperature sensor, Co Sensor, Sound Sensor, ESP8266 WIFI module and mq6 gas censor are used with the Arduino board. The data received is then sent to the Thing Speak server which then displays it in graphs. Here, they have interface DHT11 Humidity & Temperature Sensor, BMP180 Barometric Pressure Sensor and FC37 Rain Sensor with Node MCU ESP8266-12E wi-fi Module. They then programmed the Node MCU To get one IP address. This IP address can be browsed from any of WEB browser like Chrome, Firefox, Internet Explorer etc.

Cleaned and pre-processed (null values and non necessary data would be removed.) As mentioned CNN (convolutional neural network) deep learning algorithm is used on the data to get the predicted values. After which the accuracy is calculated and plotted on jupyter Notebook.

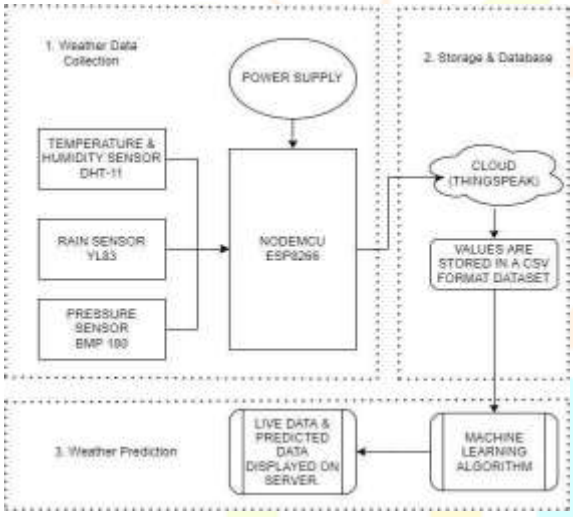

Fig. 6: Block Diagram

III. CONCLUSION

Our System enables the environment to be self-protected (smart environment) by having the sensors integrated in the monitoring environment. To implement this, sensors need to be installed to capture and interpret data in the particular area(environment). By adding sensors in the system, we can put the world into real life, it can interact across the network with other artefacts. The product of the processing of data and data analysis will then be made accessible via Wi-Fi to the end user. This offers a clever means of tracking the atmosphere and an effective, low-cost embedded system. With the Internet of Things theory, which is experimentally tested to control four parameters, which are temperature, humidity, rain and CO can be monitored. The parameters for the sensor will also be submitted to the cloud (ThingSpeak). Such information can be valuable for further study and could be easily exchanged with other end users. Model proposed can also be extended to track further data This model provides an accessible and low-cost solution to continuous atmospheric surveillance to safeguard public health from emissions.

IV. FUTURE SCOPE

- One can actualize a couple of more sensors and associate it to the satellite as a world wild component of that framework.
- Adding more sensor to screen other ecological boundaries, for example, CO2, Pressure and Oxygen Sensor. • In airplane, route and military there is an incredible breadth of this continuous framework.
- It can likewise be actualized in clinics or clinical organizations for these exploration and study "Essentially of Weather on Health and Diseases", thus to give better safeguard alarms.
- The IoT based Weather Monitoring System can be further changed and be utilized as an air contamination meter, soil dampness checker and so on.

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