A Review Paper on Weather Data Vertical of Geospatial Data Centre

Karuna Gawade[1], Priti Gupta[2], Samiksha Jadhav[3], Piyali Mondal[4]
[1, 2, 3, 4] Dept of Electrical Engineering
[1, 2, 3, 4] Viva Institute Of Technology, Virar.

Abstract- *A weather station can be described as an instrument or device, which provides us with the information of the weather in our neighbouring environment. For example, it can provide us with details about the surrounding temperature, sun intensity, humidity, rainfall, wind speed. Hence, this device basically sensesthe temperature, pressure, humidity, light intensity, rain value. There are various types of sensors present in the system using which all the above mentioned parameters can be measured. It can be used to monitor the temperature or humidity of a particular room/place. With the help of temperature and humidity we can calculate other data parameters. In addition to the above-mentioned functionalities, we can monitor the light intensity of the place as well. We have also enabled to monitor the wind speed. We can also monitor the rain value. The brain of the prototype is the ESP8266 based Wi-fi module Nodemcu. This system is based on finding the real time data of weather conditions. This system will have an application which will provide information anytime.*

Keywords- IoT, ESP8266, sensors, Nodemcu, Humidity

I. INTRODUCTION

A weather station is a installation, either on land or ocean, with instruments and outfit for measuring atmospheric conditions to give information for rainfall vaticinations and to study the rainfall and climate. The measures taken include temperature, atmospheric pressure, wind speed, wind direction.

Currently significance of climate monitoring is great in numerous ways. Climate monitoring is necessary to maintain good crop growth, to insure safe working conditions in assiduity, etc. Constant growth in Technological made the process of surveying environmental parameters much easier than in the history. These detectors are electronic bias that are extensively used to cipher different normal physical and environmental parameters. By using detectors to study climatic conditions, the results will be accurate and the whole system consume lower energy and briskly response will be there. The recently generated system then describes the power of the rainfall observing station. It includes wireless technology, which is also connected to Wi-Fi. Then, the system monitors the rainfall conditions and updates the data on the website. The reason the data on the website is streamlined is because the rainfall conditions of a particular position we can measure anywhere. The system consists of a temperature detector, a moisture detector and a light sensitive resistor. All these detectors are able of measuring the corresponding meteorological parameters. The system is designed for use in large structures and transnational companies, but also wherever we want to know the temperature and moisture. The system is supplied with a microcontroller for all detector control. In our system, the wireless standard has been chosen, which analyses the conditions of the operation, so that the climatic conditions are constantly covered and streamlined. There are numerous network norms for communication, but these aren't just completely localized communication processes. In our case, we need to ensure that the rainfall conditions in a particular place are instructional everyplace. Other communication technologies, similar as ZigBee, can do the communication in nearly the same Wi-Fi range, but they cannot shoot information, they can only change data with each other. The (www) must have a customer- configuration to communicate. The customer must be connected to a with an available IP address. The system is conforming of all the detector outfit that the customer must be to shoot data to the web. To establish a connection between the touch network and the Internet, we use a Wi-Fi module, which acts as another communication interface and is controlled by a microcontroller. The Wi-Fi module work as wireless connection to serve. After configuring the Wi-Fi module with an Internet source, it acts as a customer and transfer the data of detector back to Microcontroller. Weather information is necessary for the planning and implementation of watershed programmes, especially in understanding factors like groundwater recharge, the relationship between recharge & discharge and in aspects like irrigation planning. Rainfall and other weather data are not easily available and the weather data is expensive. The only long-term data available are the meteorological datasets available on India Water Portal (at district level). There are no hard facts and figures or historic data available during the planning and implementation of most watershed development programmes in India. Other

measurable parameters are, cloud cover, sunshine hours and evaporate-transpiration. Some of this information is gathered using satellite data for weather forecasting. The weather parameters can be measured at one place through the installation of a weather station and can be manual or automatic. When direct solar radiation is not blocked by clouds, it is experienced as sunshine, a combination of bright light and radiant heat. When blocked by clouds or reflected off other objects, sunlight is diffused. Sources indicate an "Average over the entire earth" of "164 watts per square meter over a 24-hour day". The ultraviolet radiation in sunlight has both positive and negative health effects, as it is both a requisite for vitamin D3 synthesis and a mutagen. Sunlight takes about 8.3 minutes to reach Earth from the surface of the Sun. A photon starting at the center of the Sun and changing direction every time it encounters a charged particle would take between 10,000 and 170,000 years to get to the surface.

Rain gauges are thought to be the most ancient weather instruments, and they're believed to have been used in India more than 2,000 years ago. A rain gauge is really just a cylinder that catches rain. If an inch collects in the cylinder, it means an inch of rain has fallen. It's that simple. Most standard rain gauges have a wide funnel leading into the cylinder and are calibrated so that one-tenth of an inch of rain measures one inch when it collects inside. The funnel is 10 times the cross-sectional area of the tube. Rainfall as low as .01 inches can be measured with this instrument. Anything under .01 inches is considered a trace. The collected data by weather monitoring system can easily be exported to a PC via a serial port to make subsequent data analysis or graphic and digital storage thus automatic data collection is possible without giving up PC resources.

II. BLOCK DIAGRAM

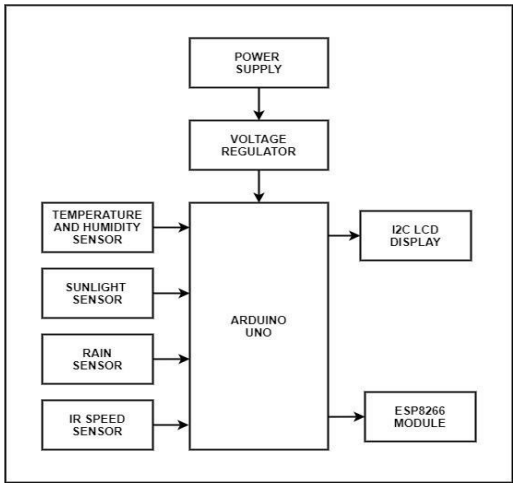

Fig. :-1: Block Diagram Of Weather Data Vertical Of Geospatial Data Centre

The figure (1) Shows Block diagram of weather data vertical of geospatial data centre. In this block diagram main block is Arduino uno. On the left side four blocks are connected to Arduino uno. First block is temperature and humidity sensor which measure temperature and humidity of surrounding area. second block is sunlight sensor which measure sun intensity in lux. Third sensor is rain sensor which measure the rain fall. Fourth sensor is IR speed sensor which measure the wind speed. There are 2 blocks on right side which are 12c LCD displayand ESP8266 module respectively. Power supply block supplies power to the voltage regulator and voltage regulator block regulates the voltage supply to the Arduino uno.

III. METHODOLOGY

The proposed system consists of mainly four main sensors which are for measuring temperature, humidity, sun intensity, rain fall, wind speed. Focus of this system is to collect data from this sensor and upload it to the website where it can be monitored on daily basis all the data will be real time data which will updated time by time. All this data can be used to analyze and use it for research purpose and many other useful purposes. The system uses Arduino microcontroller along with ESP8266 module to make it IoT enabled. Sensors such as DHT11 for measurement of temperature and humidity, rainfall sensor and sunlight sensor are used in this system. The system uses Arduino microcontroller along with ESP8266 module to make it IoT enabled. Sensors such as DHT11 for measurement of temperature and humidity, rainfall sensor and sunlight sensor are used in this system. Data from all these sensors is read by Arduino UNO and then displayed on the I2C LCD Display. The data is then sent to cloud server using ESP8266 module. Power supply is connected across voltage regulator which supplies voltage to the Arduino uno. voltage regulator regulates the voltage. ESP8266 module helps for connection between Arduino and the server where values are going to be collected and stored. The server will be classified as per the parameters like rain fall then sun intensity and then humidity and temperature. All this data can be monitored anytime and can be made available anytime. At first measuring device are set in proper position without any obstruction of anything.All the measuring devices are connected through ESP8266 which allows transportation of data from Arduino to the server. All the data will be stored on the server in classified format according to the parameters. All the data stored will be published on the website which can be viewed anytime from anywhere on the server. All the data can be monitored and used for decision making about crops and any other things such as planning some projects. All the data will be also useful for academic purposed which should be analyzed properly.

IV. LITERATURE STUDY

Abhay Sharma, [1] have proposed this design generally combines by the two study fields grounded control systems and data gathering fashion, to produce a large database system depending on the employed attributes to induce the presented data. The main effects then have been chosen grounded on the detectors that are used hectically to make the system to design an efficient rainfall monitoring design. Ravi Kishore Kodali and Snehashish Mandal,

[2] have proposed a system can give us with details about the girding temperature, barometric pressure, moisture, etc. Hence, this device principally senses the temperature, pressure, moisture, light intensity, rain value. There are colorful types of detectors present in the prototype, using which all the parameters can be measured. Masato Yamanouchi, Hideya Ochiai, Y K Reddy, Hiroshi Esaki and Hideki Sunahara, [3] have proposed system which have a high- viscosity real- time rainfall monitoring system helps us to reduce the damage of disaster. To install automatic rainfall stations (AWSs) to the real field, they've to consider a high temperature, dust, heavy rain, power outage, cost, etc. in India. In this paper, they describe how to install low- cost rainfall monitoring system to shocking terrain and make it stable through 19 AWSs installation challenge experience in Hyderabad megacity, India.Dr. Kumar Chinnaiyan,C. V Saranya, [4] have proposed system which involves the design of a dynamic sun tracking system. The module can be tracked with the help of the stepper motor also which doesn't bear detectors. This can be done by knowing the step angle. The step angle can be calculated from colorful angular positions. As this type of trackers doesn't involve detectors, they're cost-effective bones. The computations of colorful angles are grounded on the fine formulas of the intensities.P. Sushmita, G. Sowmyabala, [5] proposed system which develops a bedded system to design a rainfall monitoring system which enables the monitoring of rainfall parameters in an assiduity. Such a system contains brace of detectors like temperature, Gas and moisture will be covered and LPC1768 microcontroller (ARM9). The data from the detectors are collected by the microcontroller and also microcontroller sends the detectors data in to the LABVIEW by using the Periodical Communication and this module will keep the data in excel runner & also we can get the SMS in the mobile with the help of GSM module. Aris Munandar, Hanif Fakhrurroja, Muhammad Ilham Rizqyawan, Rian Putra Pratama, Jony Winaryo Wibowo, Irfan

Asfy Fakhry Anto, [6] have proposed the design of real- time rainfall monitoring system grounded on a mobile operation using Automatic Weather Station (AWS). The system connects to the AWS equipped with several detectors for collecting data and storing the data to the web server. Data from rainfall detector is taken from the AWS-Davis Instrument using the Weather Link software. The data is transmitted through the data jack using periodical communication, uploaded via FTP, and stored on a webserver. The Android operation reads the lines and displays the information handed by the web garçon in real- time. The system has successfully show real- time monitoring of rainfall through the mobile operation with a inflexibility in the parameters and the need of stoner interface (UI) design compared to the other result to the given problem this paper focuses substantially on data monitoring and data exchange to the serveChanda Rajurkar, S R S Prabaharan,S. Muthulakshmi,

[7] have proposed system which focuses on monitoring of use of water, consider, by one block of house in a flat system, where at the partition of channel from where the water gets diverted to colorful part of a block. Water places a vital part for living beings in their day to day lives. The earth's 71 is covered by water is a ubiquitous fact. Among which Oceans has roughly96.50 and 3 is brackish, again out of which only0.08 is accessible direct to mortal use and rest is saved in champaign regions and in different form on and in the earth face which is veritably delicate to abstract for the mortal purposes. Mohamed Darwish, OmarG. Angulo Castro, Ricardo Valenzuela, Alejandro Ortega, Gildardo Jimenez, [8] have developed system which measure the solar radiation with the intention of quantify the quantum solar energy entered in this area. To negotiate that ideal, it was developed a data accession system grounded on a pyranometer, data accession board and a computer to record and display the data. Measures attained allowed the relative analysis of this profitable system versus the Meteorological Station presently used by the Instituto Tecnologico de Nogales. Retno Tri Wahyuni, Yusmar Palapa Wijaya, [9] have established a system to cover the performance of photovoltaic power force from detector knot in a WSN system. The observed parameters are temperature, irradiance, current, and voltage. The system divided into 3 main blocks which are, customer, garçon, and communication system. The customer has detectors, RTC, original display, backup data jack, and microcontroller. The communication bias are radio- frequence module, Xbee. The garçon is a PC software developed using LabView software. Sarmad Nozad, Mahmood, Sameer Alani, Forat Falih Hasan, Mohammed Sulaiman Mustafa, [10] have d builds a database system to produce the data according to the chosen attributes. The detectors for rainfall station were used to quantify and store data about temperature, moisture, and wind speed. The collected data can be represented as direct and circular in two forms owing to the regular reading and preservation of the

data as a specific database system independently. The new technologies for the development of databases are considered the main challenge of this exploration. The entire system tracks and controls positions centrally and ever depending on the regular climate change that happens, to keep the asked positions in optimal environmental situations. The proposed device uses an ESP8266 knot MCU microcontroller to manage and cover the condition of the position whenever and wherever ever controlled NET PI network system is used. The ESP8266 serves as an AP access point, connected to the network through a Wi- Fi (router) station.

V. CONCLUSION

The system is useful to monitor the parameters for agriculture such as temperature, humidity, rain level and sunlight via IoT module. The system reduces the manual work and manpower. This set up was carried out to using by Arduino uno, temperature and humidity sensor, rain level sensor, sunlight sensor and IoT module. IoT sensors can provide farmers the information about crop yields which are valuable to production and offer the precise data. All the data can be monitored anytime and can be used for research purpose and many other useful things. The server will have real time values and will be updated time to time.

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