Agro Land Mapping Vertical of Geospatial Data Center

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Abstract- *Agriculture is done in every country from ages. Agriculture was the vital development in the rise of human civilization and growth. As the world is trending into new technologies, it is a necessary goal to trend up with agriculture also. As we know in India 70% of population depends on agriculture and one third of the nation's capital comes from it. Soil reflects both natural and human activities. It changes in its properties with respect to environmental issues. In order to know the soil particular location, it was decided to study the soil nutrient contents and moisture level. Agriculture applications rely on accurate land monitoring, for timely food security control and support actions. As traditional monitoring system requires field works or surveys performed by experts , which is very expensive, slow, and sparse. Agriculture monitoring systems are looking for sustainable land use monitoring solutions, starting with geospatial data for cheap and timely mapping. The only solution to this problem is Smart Agriculture by modernizing the current traditional methods of agriculture. Traditional Agriculture is transforming into Smart Agriculture due to prominence of IOT. Hence the project aims at making Agriculture Smart using Automation and IOT Technologies.*

Keywords- IOT, Agriculture, Sensors, Smart Farming, Soil.

I. INTRODUCTION

Many methods have been developed for assessing the availability of soil nutrients, but for a variety of reasons none are universally applicable. We discuss the conceptual basis for measuring nutrient availability and describe the strengths and limit actions of some of the methods for assessing non agricultural soils. We also discuss methods for characterizing soil acidity, Moisture, Temperature and PH because they often control nutrient cycling and availability. Irrigation is the most important part of agriculture to yield maximum profit from your investment in the field.

A system has to be developed to perform irrigation automatically which acts dynamically upon the weather conditions. We are going to design smart system in agriculture monitoring that checks different parameter with Digital mapping and Irrigation System. This IOT system is powered by Arduino and consists of temperature sensor, moisture sensor, humidity sensor and irrigation system. The intention for approaching smart agriculture is to increase its agricultural productivity and its incomes. In the proposed system we are going to monitor real time parameters of soil and environment through various soil and environmental monitoring sensors. This model is useful to increase agricultural production. agriculture with applications ranging from food security control, area and yield forecasting, crop estimation, and export planning. In that, the problem of identifying paddy areas during cultivation cycles is one of the core routines. Traditional paddy monitoring and planning frameworks rely on observational field work . Such data collection method, however, requires extremely high, even impractical, resources of expenses, time, and human labors for measuring the fields, integrating statistical results, and eliminating spatial/temporal errors. Moreover, the paddy areas are not static: they subject to distinct cultivation cycles of crop types and unexpected weather conditions due to climate change. Agriculture monitoring systems are looking for sustainable solutions, starting with remote sensing on geospatial data for cheap and timely updates of data. Moisture Remote sensing data acquired in multiple bands, including optical, thermal, and microwave, have been used to estimate soil moisture globally.

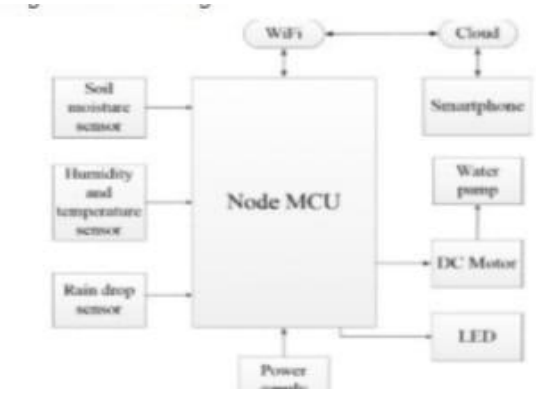
Practically, there is no field of science or research which performs smartly without using the modern sensors. The wide usage and need of sensors; and IoT employed in remote sensing, environment and human health monitoring make the applications as intelligent. In the last decade, the agriculture applications have also included the utilization of many types of sensors for monitoring and controlling various types of environmental parameters such as temperature, humidity, soil quality, pollution, air quality, water contamination, radiation, etc.

Internet of Things is the group of devices with software, sensors, and networking that enables the communication and sharing of data between the objects. The benefits which farmers are obtaining by adapting the IoT program are innumerable. It has helped farmers to reduce costs and increase crop yields. One of the major purpose of the irrigation system is to provide and maintain the ideal

environment in terms of temperature and soil moisture for the optimum growth of crops. With the usage of smartphones and computers, users can access the data stored in the cloud. User can keep track on the crops and able to control the water, pumps and fans in the control panel of the user interface. The primary aim of smart irrigation system is to provide and maintain the optimum conditions for the crops. Through cultivating in an environment with sufficient water supply and ideal temperature, growth of plants can be improved and thus the productivity of the agriculture field will increase as well. By using this technology, we can increase productivity and can feed more people in future.

II. LITRATURE REVIEW

Ibrahim Mat, Mohamed Rwandan Mohd Kassim, Ahmad Nizar Harun, Ismail Mat Yusuf, "Smart Agriculture Using Internet of Things", has explained in this paper that farming systems based on the embedded systems, IoT and wireless sensor networks for Agri-farm field and livestock farms and describes the future scopes of relevant technologies in smart farming and includes the description of systems with the electronic circuitry of the systems, used network protocols and smart distant monitoring systems for PCs and Smartphones, etc. Farmer can monitor the field Condition Remotely. It leads to organic Farming. Microcontroller is used for controlling the sensing and communication block and reading soil parameter such as ph moisture and temperature. It is also used for sending data acquired from sensor to smart phone. STM32LI2RE is microcontroller unit. . Abhiram MSD, Jyothsnavi Kuppili, N.Alivelu Manga, "Smart Farming System using IoT for Efficient Crop Growth", The system proposed uses a microcontroller (NodeMCU) which has a Wi-Fi module (ESP8266) over it. Smartphone with blynk is used as user interface. Soil moisture sensor, humidity and temperature sensor (DHT11) and rain detection sensors along with DC motor and Deek robot are used. This DC motor is connected to a water pump which pumps water to the crops when the DC motor is ON. The soil moisture sensor senses the moisture level in the soil . Depending on the level of moisture, NodeMCU decides whether to water the crop or not. By using appropriate functions and conditional statements in the code written for the NodeMCU functioning, the watering of the crop starts by NodeMCU making DC motor ON when the moisture content is below a threshold value and is made OFF when there is enough moisture content in the soil. The humidity and temperature sensor gives the humidity and temperature values of the atmosphere which determine whether the crop is suitable for growth . Some crops grow only in particular weather conditions and some give better yield only for a particular temperature range. The raindrop sensor measures the intensity of rain. If there is enough rainfall to provide soil with required water, the crops are not watered. Even after raining, if the crops are not having sufficient water then water is pumped again by making DC motor ON. Data reaches the blynk cloud from NodeMCU through Wi-Fi from Wi-Fi module present on NodeMCU. The outcome is Adequate water is pumped and rain is also utilized efficiently. Farmer can know that there is need of Water or not.

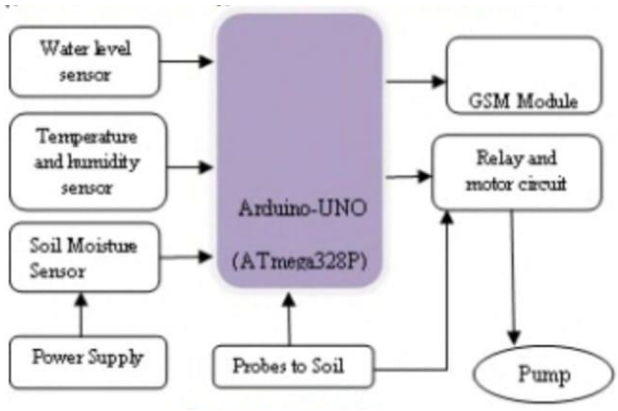


Abdullah Na William Isaac, Shashank Varshney, Ekram Khan4,"An lot Based System for Remote Monitoring of soil characteristics" In this work, a device for remote monitoring of soil characteristics through smartphones is proposed. The proposed device is reliable, cost effective, power efficient, and works in real time. By means of Bluetooth communication, the sensor node sends data to a nearby smartphone, where an application, BT Terminal, is used to view the soil characteristics. Soil sensor calibrations have shown satisfactory results and the device can be used with reliability. This work makes an important contribution by proposing a reliable and feasible IoT based device for remotely monitoring soil characteristics and takes a step forward in the integration of IoT and agriculture to achieve the goal of smart agriculture.so the outcome of this project was to Remote monitoring of soil is done. Along with measuring of soil temperature humidity and ph level.

Remote monitoring of soil has the potential to perform agriculture practices and develop entire system.

Matti Satish Kumar, T Ritesh Chandra, D Pradeep Kumar," Monitoring moisture of soil using low cost homemade Soil Moisture Sensor and Arduino In this study, the previous research conducted in recent 2-3 decades on soil moisture sensors was reviewed and the principles of commonly used soil moisture sensor and their various applications were summarized. Furthermore, the advantages, disadvantages, and influencing factors of various measurement methods employed were compared and analyzed. The improvements were presented by several scholars have established the major applications and performance levels of soil moisture sensors, thereby setting the course for future development. These studies indicated that soil moisture sensors in the future should be developed to achieve high-precision, low-cost, non-destructive, automated, and highly integrated systems. Also, it was indicated that future studies should involve the development of specialized sensors for different applications and scenarios. This review research aimed to provide a certain reference for application departments and scientific researchers in the process of selecting soil moisture sensor products and measuring soil moisture.. So the outcome is that Measuring soil moisture to know the condition of soil and get information about Need of water. IITH mode is used as sink sensor node provide low power communication. Xb radio as sensor node is used for monitoring agriculture parameter with raspberry which acts as a gate to the internet. This paper also aims to highlight the use of the sensors and IoT for remote sensing and agriculture applications in terms of extensive discussion and review.

J.Karpagam, P.Bavithra, I.Infranta Merlin, J.Kousalya, "IoT Based Smart Farming" tried to convey that Smart irrigation system is completed operated with the help of the microcontroller (Arduino-UNO) . Various sensors like water level sensor , temperature and humidity sensor and moisture sensor are connected to the microcontroller. Then the Arduino is further activated by the inputs received from these sensors. Once the inputs are received from the sensors, then the microcontroller gets activated. The microcontroller analyses the different scenario and start to operate accordingly. This microcontroller further sends the signal to the motor that whether it should be turned on or not according to the atmospheric conditions. The sensor which is placed inside the soil determines the condition of the soil and the output is given in voltage. Then it compares the output voltage with the reference voltage. If the reference voltage is higher than the soil condition which is the output voltage , then the microcontroller passes the signal to the relay and this relay turns on the motor there by the agricultural land gets automatically irrigated . In the other scenario , the relay does not passes the signal and it remains in off condition, therefore the motor does not gets operated. In this way we get to know IoT based Smart Farming is mainly used to reduce the amount of water is wasted.



III. PROPOSED METHODOLOGY

When the IOT based smart Agriculture Monitoring system and agro land mapping system starts, it checks the Temperature, Humidity ,Moisture level and soil nutrients. Sensors sense the level of water and if the temperature level is high or if water level in the soil goes down the certain level which is to maintained , it automatically starts the pump using a relay. This is all displayed on the 16X2 I2C LCD display module.

This way we get information about humidity, moisture ,water level and the nutrients in the soil with date and time, based on time. This information will also be uploaded real time on the IOT website using the Wi-Fi module. All sensors are integrated into the Arduino Uno. These sensors provide information about the ambient conditions for the Arduino Uno. Arduino Uno makes the necessary decisions /actions and uses cloud computing to inform farmers about sensor readings and necessary actions. And also send them a message with the help of GSM .2.SOIL MOISTURE SENSOR It detects soil moisture. The sensor has both analog and digital output input and operates according to the principle of open short-circuit. The LED output indicates more or less

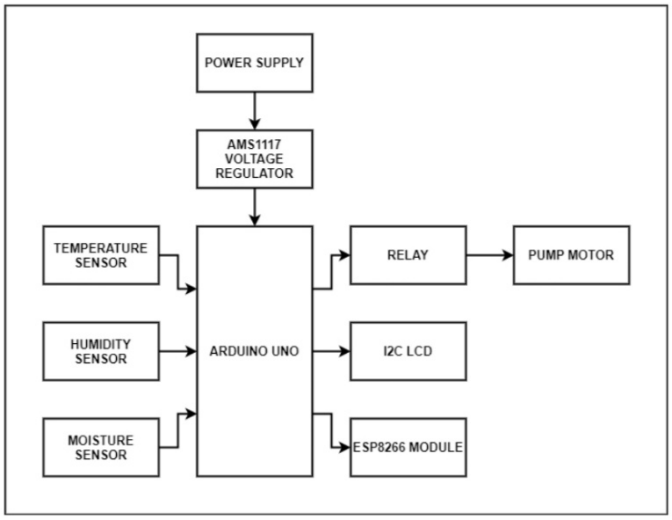
the output in this system. The LED output indicates more or less the output in this system. When the ground is dry, the electricity stops flowing and acts as an open circuit. If the ground is wet, the current passes and the circuit is short and the output is zero. Sensor information is indicated by levels. It is corrosion resistant so the sensor has a long time to handle the cost of the farmer at minimal cost TEMPERATURE AND HUMIDITY SENSOR

It is used to measure temperature and humidity. This system displays information about how well it worked. Suppose the threshold is exceeded, the LED starts flashing and the values are immediately displayed on the web page and the farmer can check the data.

The smart sensors are in fact used in a wide number of applications related to environmental monitoring such as for instance air quality control; water contamination assessment; water contamination monitoring; radiation assessment, that also contribute to monitoring the territory, the environment and may impact on several fields. Geospatial analysis, IOT and environment informatics are used in which Environmental Informatics obtained through IoT and the spatial analysis of geospatial techniques.

Examination of soil is very crucial to extract field specific information, which is useful while making decisions at certain stages. Main objective of analyzing soil is to check the nutrient status of the farm land, so particular measures are taken depends on the deficiency of the field. Some factors that's helps us to analyze soil nutrients includes type of soil, history of crop, fertilizers, irrigation level, etc. There are many manufacturers who are providing sensors and tools which helps in soil testing, these kits assist farmers to know the quality of the soil. Depends on the data provided, remedies can be taken to increase the growth of the crop.

IV. BLOCK DIAGRAM



V. CONCLUSION

Thus, the system is useful to monitor the parameters for agriculture such as temperature, humidity, moisture via IOT module. The system reduces the manual work and man power. This set up was carried out to using by Arduino UNO, temperature and humidity sensor, soil moisture sensor and IOT module. IOT sensors are capable of providing farmers to the information about crop yields which are valuable to production and offer the precise data.

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