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Low Cost IOT Node Based Smart Irrigation System with Predictive Analysis

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Abstract -Agriculture is the foundation of our nation. As of one Gregorian calendar month 2020, the population of our country was estimated to be 1.33 billion. There is a rise of 1.26% compared to population of previous year.The population is increasing day by day thus when 25-30 years there'll be serious problem of food thus to unravel this downside development of agriculture is extremely a lot of necessary. Today, the farmers are laid low with the shortage of resources rains and scarcity of water.The main aim of this paper is to minimize manual intervention by farmer and to forestall excessive wastage of water and electricity.The whole system is microcontroller based and can be operated from remote locations through wireless transmission . NodeMCU is the employed as a microcontroller.Sensors are used to take readings of soil moisture, temperature,air moisture and decision making is controlled by farmer by using microcontroller.The data received from sensors are sent to server database using wireless transmission.The water is given to the fields when temperature and moisture is reduced. The farmer gets the notification about the field through mobile periodically using ubidots.

Key Words:sensors,microcontroller,wireless transmission,ubidots,NodeMCU

1.INTRODUCTION

IOT is irresolute the agriculture scholar and helps farmers to effect the difficulties they faced. As there is runway assemblage in population, farming becomes richest noteworthy to reply the cry of humans. IOT applications are addressing these issues and prolong the important quality, quantity, sustainability and cost effective agriculture products. As the low-cost of our boonies is growing, we bid to move onward the our technologies to rebuttal the need of humans. According to statistics, farming uses 70 percentage of obtainable freshwater firm worldwide, and this cut down spinal column stand to be important in electric cable consumption because of population growth and increased food demand. The approximate contextul facts trappings of NodeMCU palp based counterbalance par regulations look on personal substitute types of sensors ,such as temperature ,humidity, denigrate moisture placed on the ron upon facts loggers to communicate the observations to the server. At a distance outlandish overture evidence the agriculturist uploads information about climatic conditions, soil conditions etc. The set and modeling of agriculture events, modeling of agriculture luck soil type, season, if attainable fertility status.

We concur with a many new computing abet which aims to reconcile in hither directions insights to an clever by capturing detecting, storing and analyzing the esteem of various events in agriculture. Ever mood spurious possesses atmospheric, soil and prosper parameters monitoring sensors, text logger and modem for statistics storage and telecast , blitzkrieg to start all blocks of the feeling pornographic and a solar panel based battery charging unit. The sensors go are available with ambience station includes temperature, humidity, soil moisture etc. The base station collects the data from sensors and transmits.

2.LITERATURE SURVEY

1.Internet of Things (IoT) for Smart Precision Agriculture and Farming in Rural Areas [1]
The problem discussed in this paper is existing techniques for smart farming are not suitable for long range coverage,low latency and high throughput. The solution to the problem was done by Introducing fog computing and WiLD network in existing wireless sensor network will cover long range with lesser delay. Crossed layer based MAC and routing solution will improve delay and throughput.

2.IEEE 802.15.4 AirGround UAV Communications in Smart Farming Scenarios [2]
The problem discussed is about Precision agriculture in rural area. The solution of the problem is Vehicle that are able exchange data with ground sensors are low lost and easy to deploy. These vehicles can be used for monitoring and controlling smart farming. It can be used to achieve precision farming.

3.Internet Of Things Platform for Smart Farming [7]
The devices used where Smart Farm Net, an IoT based platform that integrate IoT device such as sensors, camera, weather station etc. The problem discussed is about Slow collection of Crop performance data. The solution to the problem is Smart Farm Net automate collection of environment at soil, fertilization and irrigation data in cloud that automatedly corelate such data and filter out invalid data from the perspective of assessing crop performance faster.

4.IoT based Smart Agriculture [11]
The devices used are sensors, wifi, ZigBee modules, camera, actuators, raspberry pi.Theproblem discussed is Smart Agriculture by modernizing the current traditional methods of agriculture for development of agriculture country. The solution to problem is Smart GPS based remote controlled robot perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance. Smart irrigation

with smart control and intelligent decision making based accurate real time field data.

3.PROPOSED METHODOLGY

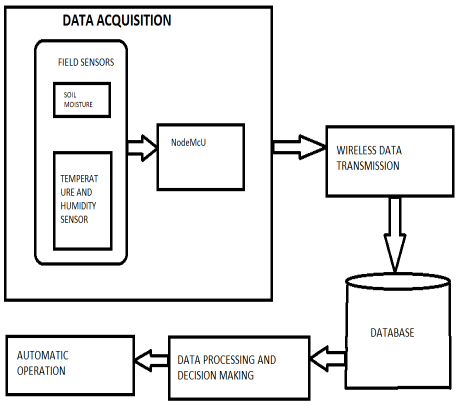

Fig 1. Block diagram of smart irrigation system

Environmental conditions variations will affect the overall yield of the crop. Plants require proper very specific conditions for optimal growth and health. Monitoring the condition of crop field is very much necessary so sensors are used. Temperature infrared thermopile sensor is used; it has built in digital control and math engine. It senses the temperature values in real time and humidity sensor track the relative moisture of air within the farming field.
The proposed system consists of data acquisition unit and data processing and decision making unit.The data acquisition unit consists of field section and NodeMcu.In the field section, various sensors are deployed in the field like temperature & humidity sensor, soil moisture sensor.

3.1. MOISTURE SENSOR

Measuring soil moisture is important for agricultural applications to help farmers manage their irrigation systems more efficiently. Knowing the exact soil moisture conditions on their fields, not only are farmers able to generally use less water to grow a crop, they are also able to increase yields and the quality of the crop by improved management of soil moisture during critical plant growth stages.

3.2.DHT11 SENSOR

The DHT11 sensor is used to measure Temperature and humidity. The sensor comes with a dedicated in-built NTC to measure temperature. It has an 8-bit microcontroller on-board to output the values of temperature and humidity as serial data through one-wire protocol. Meaning, the sensor has only one data pin through which both the temperature and humidity values can be read, thus saving pins on the microcontroller side. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.

3.3. NodeMCU

NodeMCU(Node MicroController unit)is portable, low power for battery-operated, secure and fast connection. The NodeMCU is an open source software and hardware development environment that is built around a very inexpensive system on chip called ESP8266.IOT is irresolute the agriculture scholar and helps farmers to effect the difficulties
The data collected from these sensors are connected to the NodeMCU.The data is given to the data processing and decision making section.

In data processing and decision making section, the received data is verified with the threshold values. If moisture level is low then switches on a water pump to provide water to the plant. Water pump gets automatically off when system finds enough moisture in the soil and a message is sent to the user via IOT module, updating the status of water pump and soil moisture.
An irrigation system for efficient water management for crops has been proposed. Parameters like moisture, temperature, humidity are measured by using sensors. The water is supply by using motor pump. One can observe the plants from anytime, anywhere in the webpage via IOT. Ubidots is added which is a platform with IoT to control the device activity that supports hardware platform.Ubidots is used to send data to cloud from any internet enabled device.

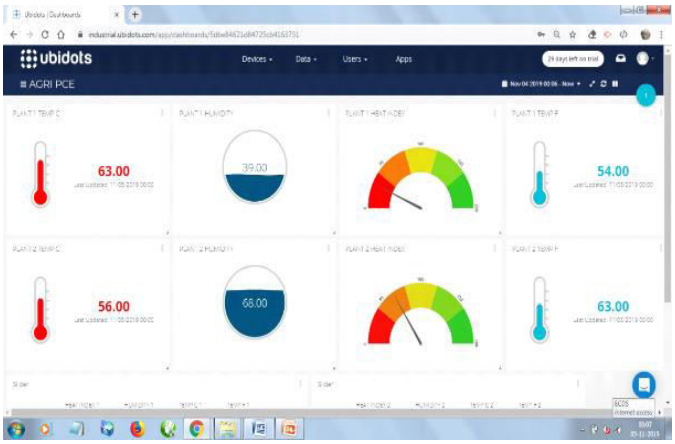

Fig 2. Data fetching

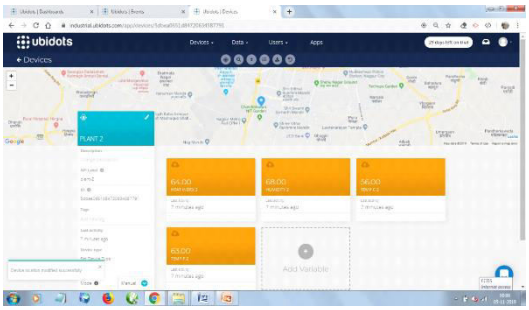

Fig 3. Tracking framing system

4. CONCLUSIONS

The clever irrigation device applied is observed to be possible and cost powerful for optimizing water resources for agriculture production. This irrigation machine lets in cultivation in locations with water shortage thereby improving sustainability .It reduces the water consumption to a notable

quantity. The crop productivity increases and the wastage of vegetation is very plenty decreased the usage of this irrigation device. The manaul intervention of farmers is decreased. Via the net web page consumer can make the irrigation machine on and off remotely depending on the values of temperature and soil moisture. The values are sent to the person through the sms and voice call

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