SMART IRRIGATION SYSTEM USING IOT

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Abstract: Agriculture has been the essential occupation for a long time in India, yet a few sections of our nation are facing the danger of water scarcity because of poor use of the water assets. The present situation requires the usage of water assets proficiently because of different reasons like growing populace, climatic change and quick urbanization. This prompts relocation of individuals from country regions to urban territories so there is impediment in farming, to defeat this issue we go for smart irrigation system using IoT. This undertaking incorporates checking of moisture level of the soil. Sensor is placed inside the area of the field, it makes utilization of WSN systems for knowing environment factors and noting the soil properties continuously. Controlling these parameters are through any remote gadget or internet services and the operations are performed by Wi-Fi, microcontroller, interfacing sensor, Accessibility of water to the product is observed through sensors and according to its need watering is finished. This is a Portable Incorporated application monitored system. The goal of this system is to monitor plants and control water supply.

Index Terms **- Internet of Things (IoT), Microcontroller, WSN, Moisture Sensor, Arduino Uno.**

I. INTRODUCTION

Agriculture sector is the major source of income for our country and as indicated by 2011 horticulture registration of India, an expected 61.5% of 1300 million Indian populace are in rural areas and are subject to farming. In India the major part of the farming methods are worked physically. The fundamental necessity in Agriculture relies upon soil properties and based on that the sort of crop to be developed is decided. Different innovations have been created to effectively utilize water resource. In rural regions of India, the electric power supply is just limited to couple of hours and farmers suffer from continuous power cuts and low voltage supply, consequently farmers fail to participate in the watering process at correct time, so keeping it in mind the end goal to monitor and control the water supply, smart irrigation system using IoT is produced, performed and verified. It is an automated water system which don't require any human physical participation, it is simple and easy to perform. C++ programming is being used in coding part.

II. LITERATURE SURVEY

System has been produced for the need of farmers, based on WSN. The system constantly monitors the moisture of soil. A calculation is utilized with limit estimation of soil moisture that will be looked after constantly. The system begins and stops watering, relying upon moisture substance inside the soil. It also recommends minimal budget sensor-based information procurement system which is useful for sensing and watering the system. Impedance based moisture sensor have been developed by the authors. The working of the sensor is by the difference in impedance between the electrodes kept inside soil, to monitor and control the water system by WSN systems and water supply pump. Sensor is placed in the agriculture farm, it quantifies the dryness and wetness contents of the field. These sensors are made connection with the wireless gateway by which data is sent periodically, analyse the data, compares with specified value and act as per the outcome received to perform needed activity. The system monitors and control the whole framework using Global system for mobile module the farmer operates the system with the mobile based application by knowing the status of the field.

III. PROPOSED SYSTEM

Smart irrigation system using IoT comprises of Arduino uno, ESP8266 Wi-Fi module, water pump, motor driver, soil moisture sensor and smart phone is used for monitoring the system. The dependency of water varies for each plant based on the plant growth at different levels. The plants are watered concerning the water requirement at their distinctive phases of growth automatically.

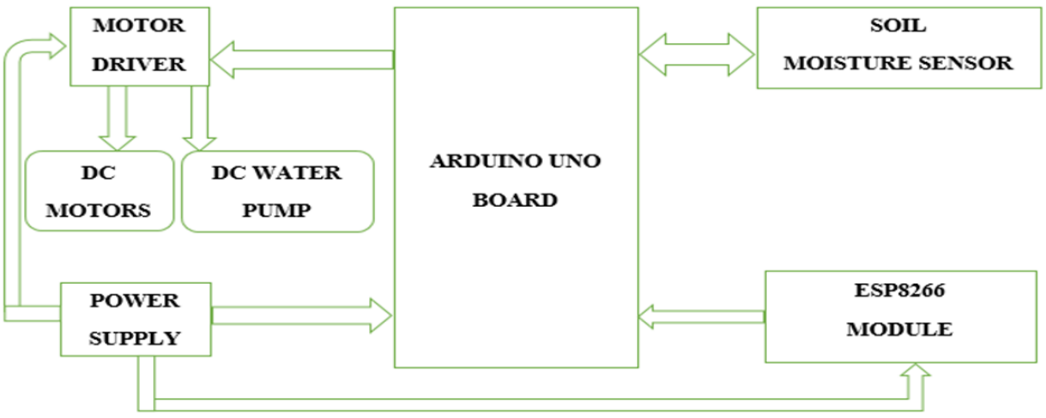

Figure 1: system architecture

IV. COMPONENTS USED

1. Arduino Uno

It is an open source hardware and software development platform, performs as microcontroller for building digital devices and interactive objects, also easy to use and flexible to modify the design. They are relatively less expensive than many more microcontrollers. The software of Arduino works on Windows operating system, Linux and many other platforms.

2. Soil Moisture Sensor

Sensors changes over the Physical parameters into the Electric signals. This framework comprises of soil moisture sensor Figure 2. The moisture sensor is utilized for estimating moisture substance inside field, to detect the moisture content Copper electrodes are utilized. The conductivity between them measures the level of moisture content.

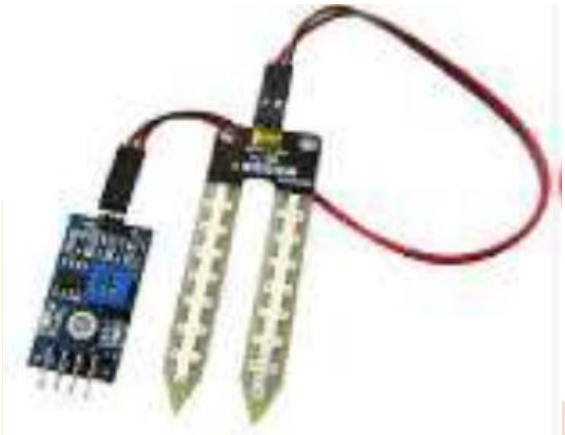

Figure 2: soil moisture sensor

3. ESP8266

ESP8266, cost efficient Wi-Fi microchip, it is an independent SOC with coordinated TCP/IP convention stack that can give any microcontroller access to our Wi-Fi arrange, has dual functionality of self-contained host to control entire application and Wi-Fi adapter to other microcontrollers. GPIOs to interface with Sensors in advanced versions.

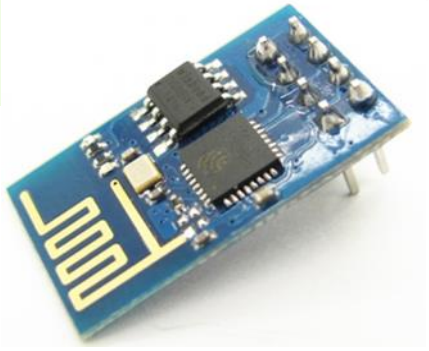

Figure 3: ESP8266 Wi-Fi module

V. Implementation

The system comprises of Soil moisture sensor to quantify water content of soil. The soil sensor is kept inside the field. It will check the estimation of that sensor; threshold state is offered by the soil property. In the system when the condition of sensor getting the value lesser than the threshold set point, the Microcontroller initiats to ON the motor pump at that point watering to the plant is provided persistently to achieve required sensor value of moisture content. When the moisture level is high, the Microcontroller initiates to OFF the motor pump, at that point the supply of the water is paused. Arduino Uno sends Data generated and tracking data of the sensor and water pump by Wi-Fi, by using android application called "Virtuino" which will be associated with ThingSpeak web server through internet to monitor the activities at the system.

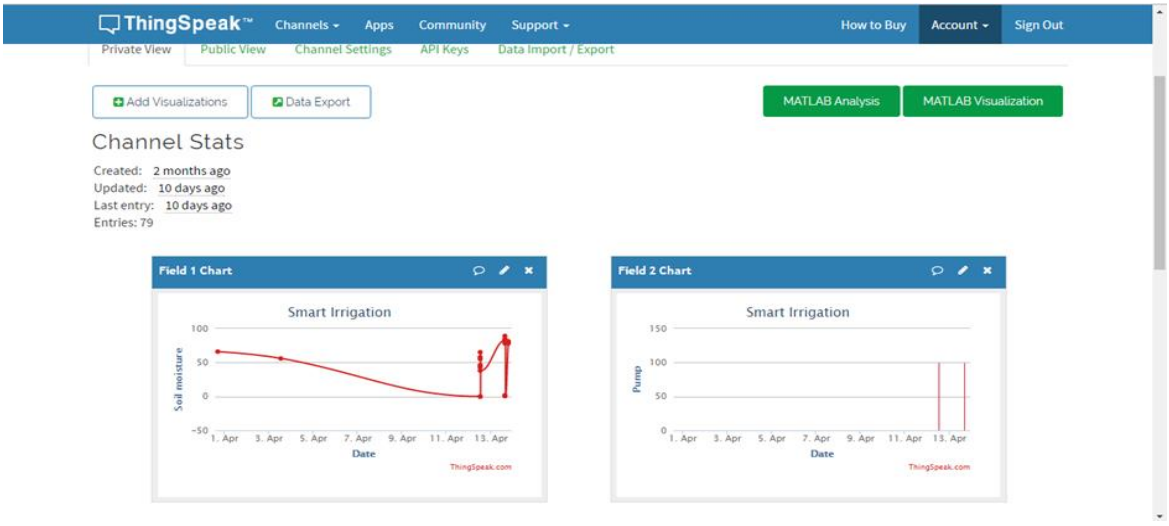

Figure4: operation carried out in system

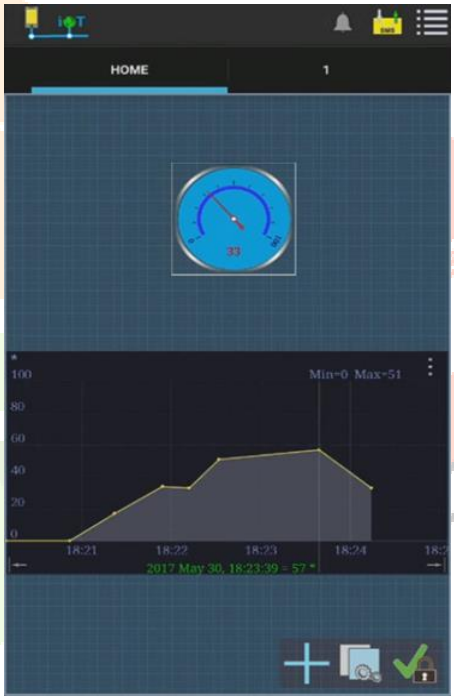

Figure 5: tracking through android app

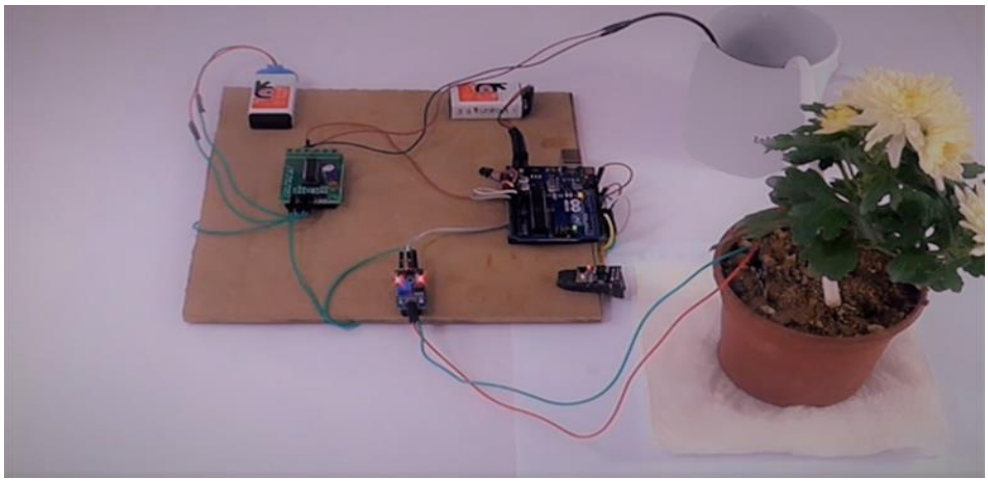

Figure 6: project setup

The smart irrigation system using IoT is set up and the working of the project is seen and verified weather it is working perfectly. When the sensor reads the soil is dry, motor gets ON and water pump begins which prompts water to stream. When the sensor reads the soil is wet, motor gets OFF and supply of water through pump is stopped. By using an android application Virtuino to keep track of the status of the water pump and the sensor this application uses Wi-Fi to operate. Android application and the microcontroller are interfaced with ThingSpeak web site using API keys. Arduino IDE is used for programming and this program is also called as sketch the code is verified and uploaded into the Arduino Uno board. This code has the instructions of the tasks to be performed and it is uploaded to the microcontroller. The AT commands or Hayes Commands is given for controlling the modems to connect Wi-Fi network, connect microcontroller to ESP8266, which helps to control motor driver to perform the required operation to supply water.

VI. Conclusion

This Project successful develop a system that can help in a Smart irrigation system using IoT by examining the moisture level of the field. As it directs the automatic watering with no physical participation the smart irrigation system using IoT ends up proving as a useful system for farmers. This system will be an essential application which is useful for agriculturists and cultivators. The famers miss out the watering process at correct required time for the plants because of the voltage drops and power cuts in their region. The water content of the soil is known with the help of the moisture sensor. When the moisture level is not more than the minimum threshold value initiated, the sensor data is recorded at Arduino Uno, after that Arduino Uno initiates motor driver to turn ON and supply water to the plant. No need of going to agriculture field, we will have the status of the sensor and water pump on web site and the mobile application interfaced. System do not require more maintenance, it is inexpensive, as well as scalable. In future we should look after to add much more specifications, so that many more tasks could be performed.

VII. Acknowledgment

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