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LORA BASED SMART IRRIGATION SYSTEM USING WSN TECHNOLOGY

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Abstract- Smart agriculture method using WSN Technology, enhances the yield and reduces the human intervention towards agriculture works. The prime factors are high accuracy and low power for any WSN based ranchers. In this project we have designed a controlling mechanism for the flow of water into agricultural farms depend on the wetness of the soil and the crops. The humidity and temperature sensed by the sensor mainly depends on the action performed by the farmer. These long range data transmission of the sensed data is effectively possible by adopting LoRa. These long range network can transmit data upto 15 km; usage of this communication module ensures the remote site data transfer operation. The sensed environmental parameters are communicated to farmers via smart mobile using LoRa technology. Smart irrigation system can utilize water efficiently, in the precision place at the appropriate time in the right amount.

Keywords – Lora-Ra-02, Soil Moisture Sensor,Humidity sensor –DHT11

I. INTRODUCTION

This project proposes a smart irrigation system based on ESP32 TTGO LoRa. The system monitors different environmental factors like temperature, moisture, and the volume of water required by the crops, utilizing sensors i.e temperature, soil moisture, and water flow. The information is gathered and given to the ESP 32 TTGO placed in the farm which is connected to another ESP32 TTGO placed within the range of 5KM (range can be improved if an antenna with high gain is used) through LoRa protocol. This module is connected to IBM cloud through the internet using the WiFi stack present on ESP32 which demonstrates the continuous qualities. This enables the farmer or IBM Blue mix to control irrigation pumps and sprinklers from distant places and to meet the standard qualities which would assist the farmer with yielding better quantity and quality of the crop. Agriculture is a field where water is required in more amount. Wastage of water is a real issue in agriculture. During the cultivation more amount of water is given to the fields. There are numerous methods to spare or to control wastage of water in agriculture. In the world, the majority of irrigation systems work manually. These outdated techniques are supplanted with semiautomatic and automatic procedures. The accessible customary methods resemble drip irrigation, sprinkler system, ditch irrigation, terraced irrigation. The worldwide irrigation situation is classified by expanded interest for higher agricultural efficiency, poor execution and diminished accessibility of water for agriculture. These issues can be rectified if we make use of smart irrigation systems. Through Internet of Things, agriculture

products will have a fresh growth state, better storage preservation, and best quality. With the advancement of Internet of things, its innovation has been broadly connected to all the aspects of agriculture.

II. Proposed Algorithm

Water Supply in India is now previewed as community based demand driven system, under which it is essential to enhance capacity of local community residing in villages and small towns to develop and manage their own water supply systems. The optimization problem is essentially a kind of large scale combinatorial optimization problem. At present, many literatures come down to the problem of the set covering problem or maximum coverage. The former mainly consider the minimum number of sensors, while the latter is a major research on the optimal sensor arrangement.

III. BLOCK DIAGRAM

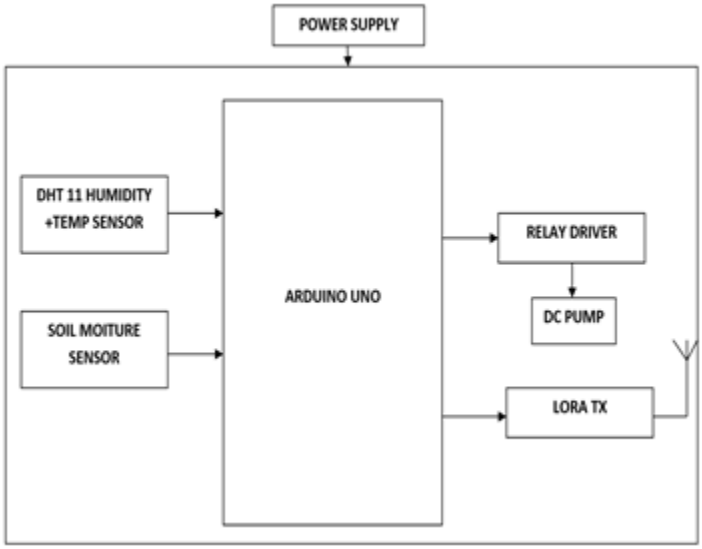

Figure 1. Transmitter

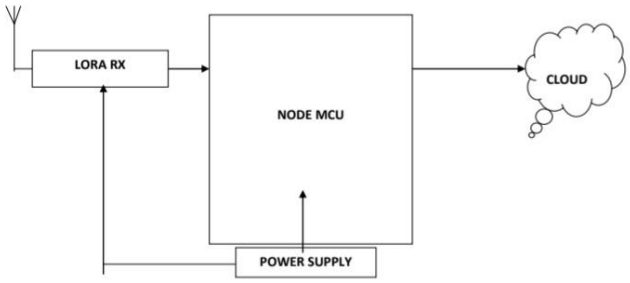

Figure 2. Receiver

IV. Experiment and Result

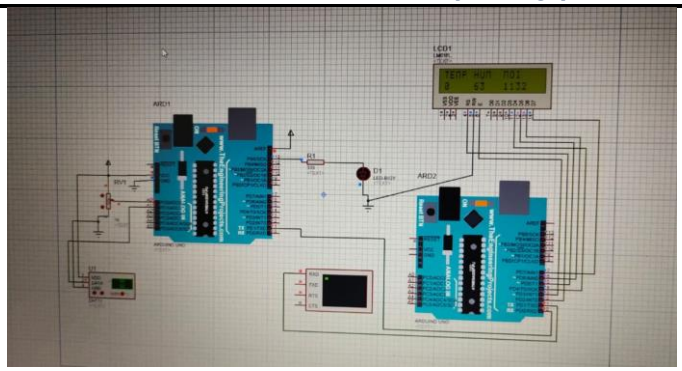

Figure 3. Software Module

After execution the modules in our proposed framework, the results have been taken. The results display humidity, Moisture levels are taken. From the eventual outcome of the examination, the system alert concerned farmers and came to know that whether the crops are in good level and also to reduce the usage of water level from a certain distance. The system helps in providing a better yield of the crop that results in more profit to the user and an increase in the food production. The LoRa based communication has been formulated considering the ease of use, low maintenance and cost. The device is completely automatic and things speak cloud makes it more secure.

V.CONCLUSION

The communication technologies of IOT play a very important role in smart agriculture system. This paper proposes a smart irrigation system based on LoRa technology. In order to validate the excellent performance of the proposed irrigation system, experiments have been carried out. Experimental results validate the applicability of the proposed system. At the same time, the advantages of LoRa technology adopted in smart irrigation system have been shown by experiments. The system proposed by us facilitates more efficient, also minimizes the cost of deployment and maintenances. According to the experimental results, the irrigation node equipped with hydroelectric generator can operate up to for decades. The communication distance between the irrigation node and gateway is up to 8KM, thus the irrigation system can cover up to 200 hectares. By mobile App, users can control the irrigation system remotely and check the status of system in time. It is believed that adopting LoRa technology to smart irrigation system will significantly simulate development of smart agriculture. Of course, we have a lot of follow-up work to do to make the system more intelligent and precise controlling.

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