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IOT Based Smart Irrigation and Tank Monitoring System by Using Microcontroller

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Abstract - *Agriculture is the primary occupation in our country for ages. But now due to migration of people from rural to urban there is hindrance in agriculture. So to overcome this problem we go for smart agriculture techniques using IOT. This project includes various features like GPS based remote controlled monitoring, moisture & temperature sensing, proper irrigation facilities. It makes use of wireless sensor networks for noting the soil properties and environmental factors continuously. Various sensor nodes are deployed at different locations in the farm. Controlling these parameters are through any remote device or internet services and the operations are performed by interfacing sensors with microcontroller. This concept is created as a product and given to the farmer's welfare.*

***Key Words*: Moisture sensor, temperature and humidity sensor, fire sensor, ultrasonic sensor, LDR, Polyhose.**

1. INTRODUCTION

Now a day's there is huge enhancement in technologies which have a significant impact on various fields like agriculture, healthcare etc. Agriculture is the primary occupation in our country. India's major income source is depending on agriculture therefore the development of agriculture is important. In today also most of the irrigation system is operated manually. The available traditional techniques are like drip irrigation, sprinkler irrigation etc. These techniques are need to be combined with IoT so that we can make use of water vary efficiently. IoT helps to access information and make major decision making process by getting different values from sensors like soil moisture, water level sensors etc. This proper focuses primarily on reducing the wastage of water and minimizing the manual labour on field for irrigation so that you can save time, cash and power of the farmer.

This project focuses primarily on reducing the wastage of water and minimizing the manual labour on field for irrigation. It provides an alternative to a primitive method of irrigation in which an alarm intimates a farmer when water reaches a certain level of the tank. The farmer then shuts off the alarm manually and closes the water inlet to stop the supply. Leakage of water from the tank or a damaged alarm can result in wastage of a valuable resource. The proposed system will allow farmers to continuously monitor the water levels inside the water tank and the moisture level in the field, controlling the supply remotely over the internet. When moisture goes below a certain level, Drip irrigation would be turned on automatically, thus achieving optimal irrigation using Internet of Things.

2. LITERATURE SURVEY

Plenty of research work has been done to improve the performance of agriculture field.

In [1] the system uses arduino technology to control watering and roofing of the green house. It uses statistical data acquired from sensors (like temperature, humidity, moisture and light intensity sensors) compared with the weather forecast for decision making. Kalman filter is used to eliminate noise from the sensors.

Agriculture System (AgriSys) [2] uses temperature, humidity sensors and the fuzzy inference to input the data from sensors. The system monitors the sensors information on LCD and PC.

Muhammad (2010), [3] Proposed a simple approach to "Automatic Irrigation control problem using Artificial Neural Network Controller". The proposed system is compared with ON/OFF controller and it is shown that ON/OFF Controller based System fails miserably because of its limitations. On the other hand ANN based approach has resulted in possible implementation of better and more efficient control. These controllers do not require a prior knowledge of system and have inherent ability to ANN based systems can save lot of resources (energy and water) and can provide optimized results to all type of agriculture areas.

A] TANK OVERFLOWS CONTROL MODEL

The tank overflow control model is a primitive method in which a wire is introduced at a desired water level inside the tank. When water reaches this level, it touches the open

wire and completes a circuit resulting in an alarm to notify the farmer. The farmer then shuts off the alarm manually. In case of water leakage, the buzzer will never go off and the motor may keep running for a long duration, causing wastage of water and electricity.

B] IOT BASED AUTOMATED IRRIGATION SYSTEM

This system uses a technique for irrigation in which the farm is periodically irrigated using a sprinkler, with a certain volume of water. The irrigation stops automatically once the given volume of water has been sprinkled. This system does not take the moisture content of the soil into consideration before irrigating it. This may result in the farm getting over irrigated if the moisture content of the soil is already high.

C] THE SOIL MOISTURE CONTENT MONITORING AND IRRIGATION SYSTEM CONTROL, WHICH IS BASED ON INTERNET OF THINGS

This model calculates the soil moisture and irrigates the farm accordingly. The soil moisture content is not monitored continuously. Once water has been sprinkled, it doesn't check if the moisture content of the soil is sufficient.

3. BLOCK DIAGRAM

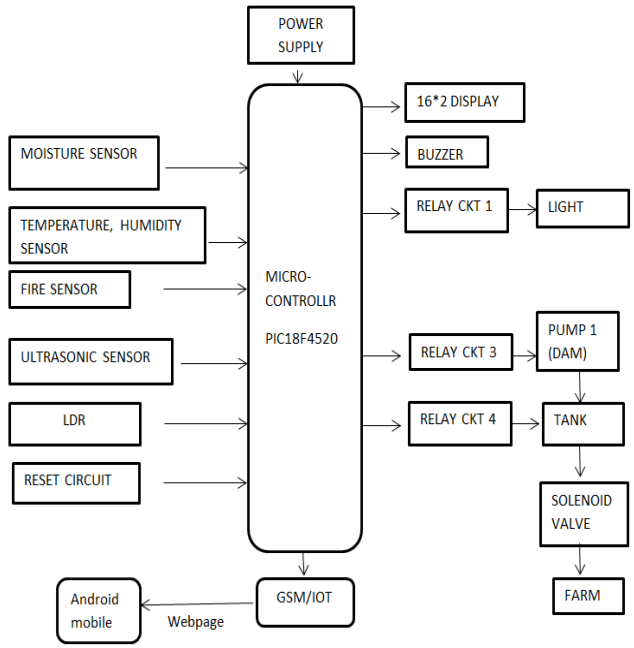


Fig1.Block Diagram Of smart system

3.1 BLOCK DIAGRAM DESCRIPTION

This project is to measure the parameters automatically along with soil moisture, temperature and humidity so that maximum water cannot be waist. Initially the position of panel is set by using the switches. One soil moisture sensors are used to sense the water level of the soil and then the show the level .Temperature sensor is used sense the temperature of the farm .Humidity sensor is used to sense the humidity. Fire sensor is used to the protection of the farms.

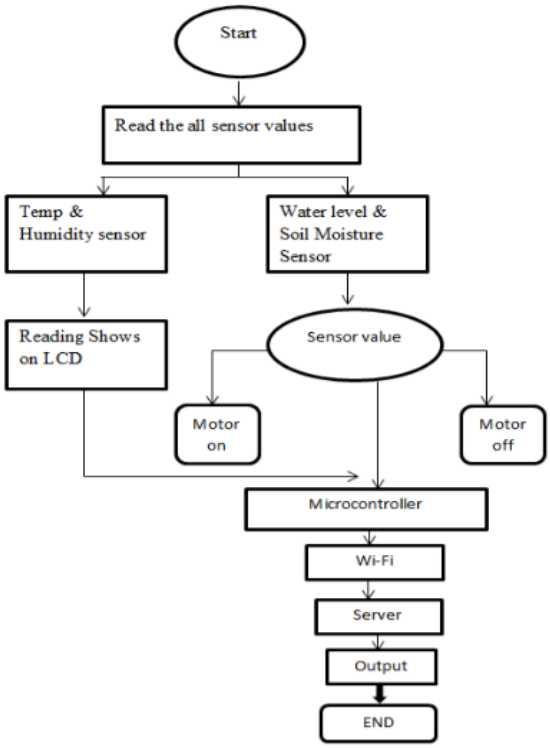
Ultrasonic sensor is use to the sense of water level e the tank2. LDR is used to the night .We can used 4 Relay. We are using PIC18F4520 for controlling all the blocks. Four relays and two DC motors are used. 16x2 LCD Display is used to display all the parameters. We also obtain the alert fire on the mobile through GSM. And also display the parameter on the free webpage on the mobile.

We are using here; thingspeak.com server .It is an IoT analytics platform service that allows you to aggregate, visualize and analyze live data streams in the cloud. Thingspeak provides instant visualizations of data posted by farmer devices to thingspeak.

Why we can use this? Because, it is easily configure devices to send data to thingspeak using popular IoT protocols. Visualize your sensor data in real time.

4. FLOWCHART

4.1 Flowchart of Parameter Measurement System



5. RESULT

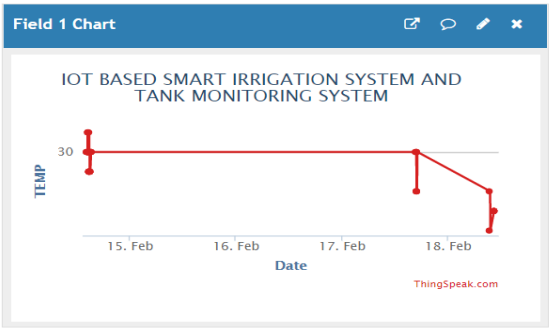


Chart-1: Temperature Measurement

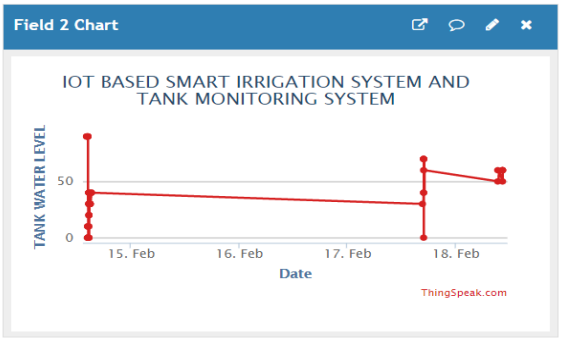


Chart-2: Tank Water Level

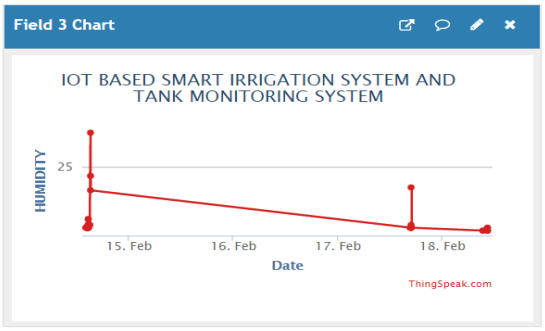


Chart-3: Humidity Measurement

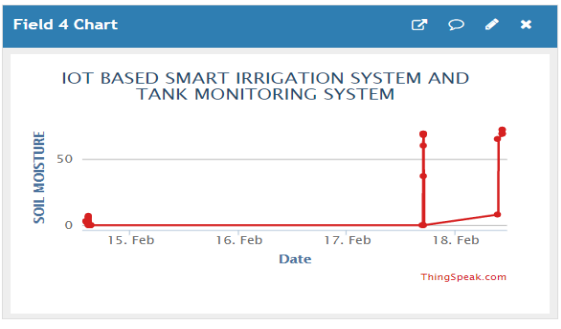


Chart -4: Soil Moisture Sensor

Fig.2- Implementation setup

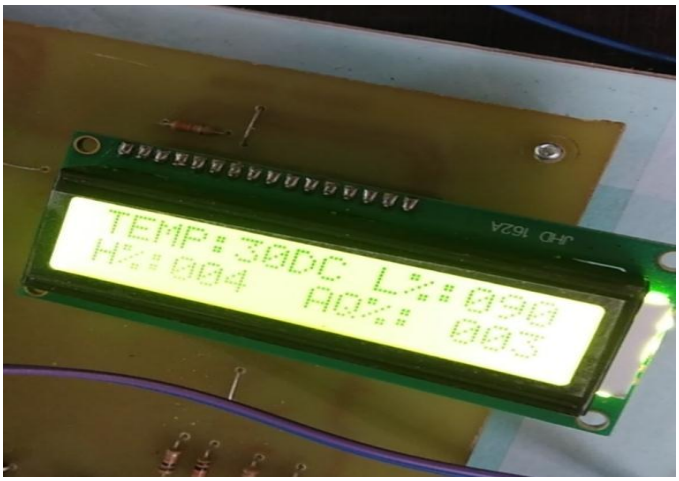


Fig.3- Output displayed on screen

6. ADVANTAGES

- To reduce human efforts, parameters are obtained on mobile through GSM.
- To save water and money.
- We can set the rotation time according to type's crop and temperature and humidity maintaining their quality.

7. CONCLUSION

Based on above mentioned system setup, different level of soil moisture & temperature, humidity value were sensed & based on predefined threshold value of soil moisture, temperature & humidity. Microcontroller controls the high

farming voltage equipment without human intervention. In the absence of human being in the agriculture field, this system provides continuous field monitoring and triggers the appropriate events according to the requirement. It reduces the human effort and cost of farming to a certain extent.

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