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Smart Agriculture System Using IOT

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ABSTRACT

Water has always been perceived as a gift from the gods as it rained from the heavens. Water is most essential thing for agriculture. Agriculture plays important role in India and world the soil fertility is very important factor in plant life. For the maintainace of soil nutrient level fertilizers are added in soil with the use of modern technology through automated techniques. In India about 70% families depend on farming. The main feature of the paper is monitoring temperature, PH, moisture in agriculture field and using smoke sensor detection of fire in farm field is done. Through WIFI module the measured value was sended toward the farmers mobile through virtuino app.

Keywords : Arduino mega,16*2 LCD, soil moisture sensor, smoke sensor, temperature sensor, PH sensor, relay, water pump, fertilizer pump, WIFI module.

I. INTRODUCTION

Agriculture is the foundation of manufactures, since the productions of nature are the materials of art. Agriculture is most important thing in growth of country. Agriculture is backbone of all developing countries; it uses about 85% of available fresh water. Agriculture is a source of employment, it providing employment to many of the peoples.in automated irrigation system the farming is done through use of many devices like sensors and controllers. Automated irrigation model is real time monitoring system it monitors soil properties like temperature, humidity, moisture and PH etc. the need of automated irrigation system is to overcome over irrigation & under irrigation in farm.

By using the concept of automated irrigation system, a farmer can save water up to 50%. This concept depends on two irrigation methods: conventional irrigation methods like overhead sprinklers, flood type feeding systems i.e. wet the lower leaves and stem of the plants. The area between the crop rows become dry as the more amount of water is consumed by the flood type methods, in which case the farmer depends only on the rain water. To reduce these drawbacks new technique is developed it is automated irrigation technique, through which small amounts of water applies to the parts of root zone of a plant. The plant soil moisture stress is prevented by providing small amount of water resource. When the components like sensor are activated, all the components measure specific value of soil and gives the output signal to the Arduino mega, and the information will be displayed to the farmer.

II. LITERATURE REVIEW

Aditya P, Saylee S, Sagar T, Pratik R (2018) "Automated Water Irrigation using Arduino Uno" In this paper automated irrigation and soil moisture control by Arduino using soil moisture sensor [1].

Abhishek Kumar and Magesh.S(2017) "Automated Irrigation System Based on Soil Moisture using Arduino" In this Paper an automation of farm irrigation and soil moisture control by Arduino using soil moisture and sensor and L293D [2]

Archana and Priya (2016) proposed a paper in which the humidity and soil moisture sensors are placed in the root zone of the plant. Based on the sensed values the microcontroller is used to control the supply of water to the field. This system doesn't intimate the farmer about the field status [3].

V. R. Balaji and M. Sudha (2016) proposed a paper in which the system derives power from sunlight though photo-voltaic cells. This system doesn't depend on electricity. The soil moisture sensor has been used and based on the sensed values PIC microcontroller is used to ON/OFF the motor pump. Weather forecasting is not included in this system.

R. Sub Lakshmi (2016) proposed a paper to make irrigation system simpler, the complexities involved in irrigation is tackled with automation system using microcontroller and GSM. Based on the sensed values from soil moisture, temperature and humidity sensors, the GSM sends message to the farmer when these parameters exceed the threshold value set in the program. The nutrient content in the soil is not determined by this system [5].

G. Parameswaran and K. Shivaprakash (2016) proposed a smart drip irrigation system using IOT in which humidity, temperature and pH sensors are used. Irrigation status is updated to the server or local host using personal computer. The farmer can't access about the field condition without internet [6].

Reshma and Basharat (2016) proposed an IOT based automatic irrigation system using wireless sensor networks in which various sensors are used to measure the soil parameters. This system provides a web interface to the user to monitor and control the system remotely. Weather monitoring is not done in this system [7].

Sonali D. Gainwar and Dinesh V. Rojatkar (2015) proposed a paper in which soil parameters such as pH, humidity, moisture and temperature are measured for getting high yield from soil. This system is fully automated which turns the motor pump ON/OFF as per the level of moisture in the soil. The current field status is not intimated to the farmer [8].

Karan kansara (2015) proposed an automated irrigation system where the humidity and temperature sensors are used to sense the soil conditions and based on that microcontroller will control the water flow. Farmer will be intimated through GSM. This system doesn't monitor the nutrient content in the soil [9].

III. PROPOSED WORK

This is the block diagram of Automated Irrigation System Using Arduino Mega 2560 it is consisting of multiple sensors like moisture sensor, smoke sensor, PH sensor, temperature sensor which are connected with Arduino mega.

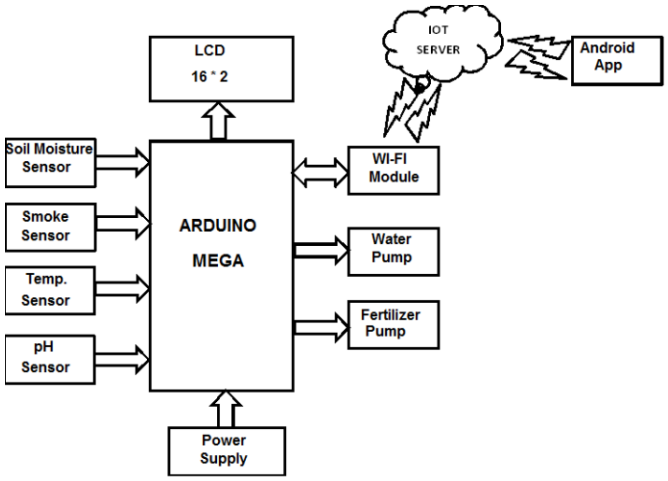


Fig 1 : Block Diagram of Smart Agriculture System Using IoT

In this given project at input side moisture sensor (fc 28) is used for measurement of soil moisture according to soil type. The next sensor is smoke sensor (MQ2) is used for measurement of multiple harmful gases like co2, co etc., the measured value of this gases is sended toward Arduino. the another sensor is PH sensor is the measure of acidity or alkalinity of water and soil which is determine by the relative number of hydrogen (H+) or hydroxyl (OH-) ions present the ph value (below 7) it is known as acidic and (above 7) it is known as basic .The PH of solution like soil or water can change with temperature respectively. This all sensors measured value are given to Arduino mega for processing.[4]

In the given project the LCD is used for display the given values. A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images with low information content, which can be displayed. In given project 16*2 LCD is used.

The water pump is used for supply of water to given crop field the water pump is used to a supply water for a particular area. It can be electronically controlled by interfacing it to an Arduino mega 2560. It can be triggered ON/OFF by sending signals as required. The process of artificially supplying water is known as pumping. There are many varieties of water pumps used. This project employs the use of a small water pump. Another pump is used for providing fertilizer to crop according to their need the fertilizers are provided. According to crop need the specific N, P, K fertilizer are provided to crop.

The most important part of project is Wi-Fi module through which the given information is sended to cloud for accessing the information to user and through specific app the user can control the parameter of project.

The following table shows the PH range and temperature range for particular crop.

CROP	PH RANGE	TEMPERATUER
Sugarcane	6 to 7.7	20 to 26 degree Celsius
Onion	5.5 to 6.5	10 to 35 degree Celsius
Wheat	4	25 to 30 degree Celsius
Maize	5.8 to 6.8	18 to 27 degree Celsius
Cotton	5.8 to 8	18 to 30 degree Celsius

Table 1 : Crop and its PH Range and Temperature range

ADVANTAGES

- Automated irrigation system saves water and time.
- Automated irrigation system improves plant growth.
- Through automated irrigation system only areas that need water, receive it.
- Through automated irrigation system soil nutrients are preserved.
- The automated irrigation system is flexible, low power consuming, low maintainace, remote operation.
- Automation eliminates the manual operation of opening or closing valves.
- System can be operated at night, water loss from evaporation is thus minimized.
- Irrigation process starts and stops exactly when required, thus optimizing energy requirements.

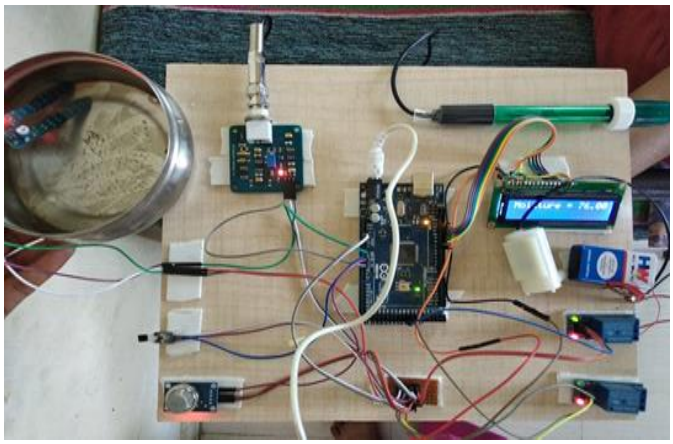
APPLICATIONS

- The automated irrigation system is applicable for fields, green house, poly house and plantations.

- The automated irrigation system used with drip irrigation, sprinkler.
- It used in parks and gardens it transmits data to users.

IV. RESULT

The result of Smart Agriculture System Using IOT



Hardware implementation of Smart Agriculture System Using IOT

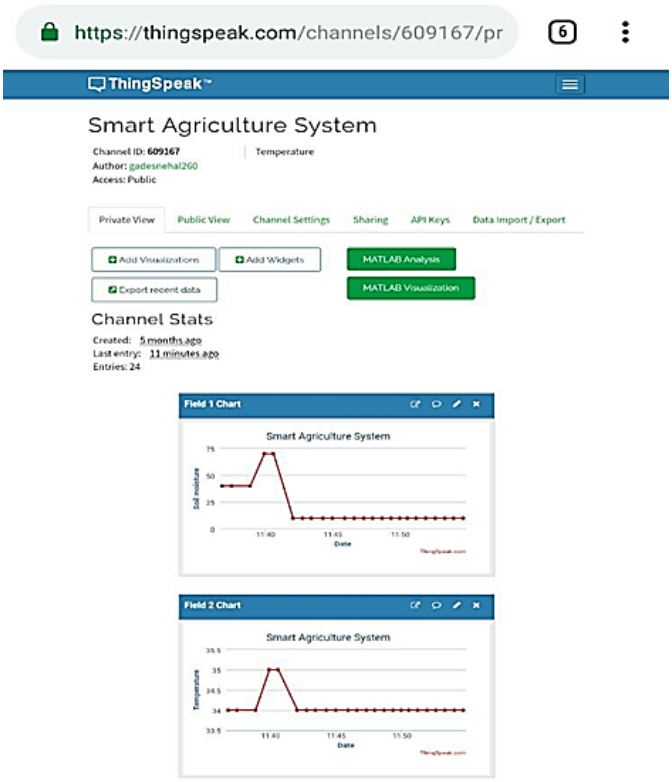


Fig 2 : Displaying moisture, temperature, smoke, ph value on virtuino app

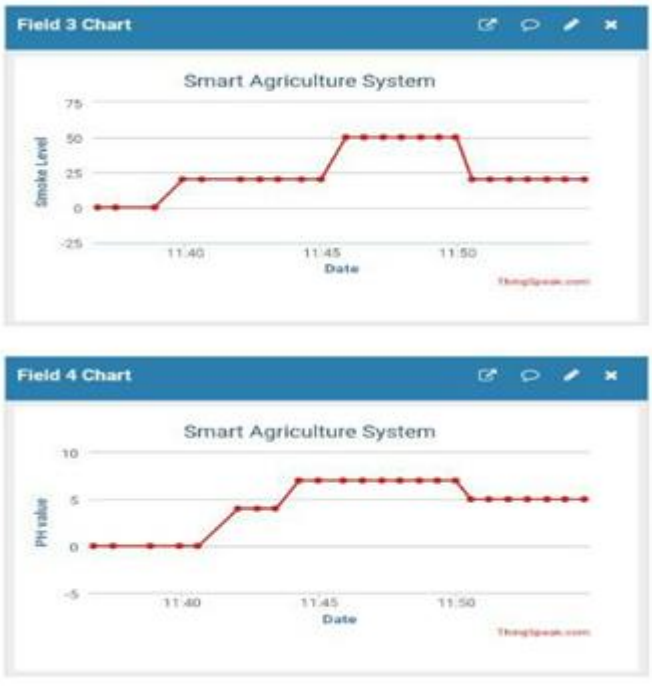


Fig 3 : The graph shown by thing speak to particular user

V. CONCLUSION

The water is most important resource on earth. In current situation saving of the water is high concerned because the fresh water resources are

become less. In this work, the farmers are fully benefited by saving natural resources by continuously monitoring the farm field and by controlling water flow. This project is benefited for the farmers and gardeners who do not have enough time to water their crops. It also controls the wastage of water during irrigation. As water supplies become insufficient and polluted, there is a need to irrigate more efficiently in order to minimize water use and chemical leaching. Recent advances in soil water sensing make the commercial use of this technology possible to automate irrigation management for crop production.

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