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Automatic Temperature Monitoring and Controlling Water Supply System

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Abstract--- *Nothing is impossible without agriculture. 70% of the Indian population depends on agriculture. India ranks 74 out of 113 major countries in terms of food security index. In India agriculture is composed of many crops with the foremost food staples bring rice and wheat. Farmers can save their time by smart irrigation. This paper shows how the farmers can save their time using smart irrigation and how the pests which damage the crops can be killed on time. The crops are planted and the moisture sensors are placed on the soil. If the moisture level of the soil is reduced the sensors which has been placed in the soil have the ability to detect and automatically the crops are watered. In this paper, automatic irrigation is done by using sensor so that the crops will not be affected from dry condition. The sensors placed on the field can detect the moisture level in the field and according to it the motor will be operated automatically. The information's of the sensor data's are sent through GSM. It collects data from different sensors deployed in a measured distance. It is powered by Arduino, DC motor and GPRS module. It will check water level, humidity and moisture level of the crop. The sensor senses the water level and switch on the water pump automatically. All the commands are given by the Arduino and is displayed in the LCD screen. It will also keep track of the previous data of humidity and temperature hence it is possible to set the required temperature based on type of the crop being cultivated.*

Keywords--- *Motor Driver, Transmission Rate, Arduino, Radio Frequency, Cultivation.*

I. INTRODUCTION

In developing countries like India cultivations plays a major task and it is the back bone of the economical level of India. Cultivation is one of the important resources of income for the highest number of peoples in India. It is the important provider to the Indian economical status. Communication technology involvement and its usages have been developed still in agriculture department in India. Some steps are taken by Indian Government likes message to farmer's cell phone and vendor's data to cultivator etc. Depends on survey 70% of the people from India gets employment from cultivation and it provides 27% of GDP. Cultivation is based the status of monsoons. When there is a change in monsoon status it affects the cultivation as the yield of production will not be proper. If the cultivation portion is large, it is very difficult to contact and maintain each portion of lands. In large cultivated area sprinkling water is also not easy. Less amount of crop yields and dreadful crops leads to economic sufferers. The moisture content of the soil and fruitfulness of the soil is important factor in agriculture. Now, different types of methods are used to decrease the importance of the rain.

In this situation IoT concept are face these problems and increase the various cultivation attributes like quantity, quality and reduce cost of cultivated production. Iot concepts entirely changed the cultivation area and allow the

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farmers to face the problems in cultivation. IoT technology integrated with irrigation system is used to support farming. When smart irrigation system is used for cultivation, most of the process or tasks are done in automatically. Using IoT with sensor technology automatically reduce water usage and improve cultivation methods.

IoT makes an interconnection between fixed computing devices by using internet facility. IoT connects various objects by using sensors. In cultivation filed, various types' sensors are used to collect the data from the fields like moisture sensor, humidity sensor and temperature sensor. The collected data from the sensors transfer to the data storage area via Android system. In controller section analyses the data from the sensors and take the proper action depends on the data.

This research paper is divided into V parts. Section II describes about some existing irrigation systems. Section III deals with proposed block diagram of smart cultivation system. Section IV shows the result and discussion part. Section V discuss about the conclusion part.

II. LITERATURE SURVEY

Angel C et al., developed a good irrigation system used to reduce water usage. The authors proposed a new automated Smart Irrigation system for cultivation. Here various types of sensors are used in the cultivated area likes temperature sensor, moisture sensor and soil sensor. The data were collected from this various sensors. The proposed system using the sensed data automatically takes the proper act for cultivation and sends the messages to the user. The main objective of this proposed system is reduce energy while the data communication time [1].

Pavankumar Naik et al., constructed a new system for automatic irrigation system. The various sensors are used to collect the moisture level from the soil. Based upon the sensed data the motor will be going to ON or OFF condition. The sensed data from the sensor and the status of the motor was displayed to user through android application [2].

S Nalini Durga et al., designed a new irrigation system based on moisture on the soil using Arduino controller. It was designed and tested with real data successfully. In this system mainly focused on water content of the plant. The water content of the plant was measured by using moisture sensor. If the moisture level reached the threshold level, the particular sensor send the signal to the Arduino board. Then the board automatically initiates the water pump to turn ON and provide the water to the particular crop or plant. If the preferred moisture level is occurred the system stay on its own and the water pump is going to OFF mode. The proposed system tested with real data and executed successfully [3].

Rashid Hussain et al., implemented a new smart irrigation using wireless sensor network. This system is used to control the pests on the farm and check the soil contents of the farming area. This proposed system necessary to find the level of water and level of moisture, pH value etc. This is used to avoid the pests from the plants. In this proposed system is used to read the activities of the pest and take the steps according their activities. Controller unit is used to process the sensed data and GPS module is used to transfer the data to the base station. The objective of this research paper was monitor the crops remotely and save the plants from the insects [4].

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Lav Gupta et al., said that the Indian economy directly based on only crop production. The existing methods are not efficient and sufficient. 18% of the yields were going too lost due to pest attack. Identify the pests and insects on plant were preventing huge losses in the cultivation. In manual identification of insects are very difficult. The purpose of his new system was collecting the details of the crops from remote places. This system contains two modules. In the first module environmental factors are calculated using various sensors. Using second module image processing techniques are used to identify the diseases on the crops. Based upon the damage level the proper treatment will be provided [5].

Atif Fareed et al., proposed a automated solution for irrigation using Mobile Irrigation Care Unit. It was constructed by using wireless sensor network for smart field monitoring system mounted on a solar motorized medium. The pesticide module and water tank modules was controlled by the microcontroller. The research contribution of this paper was pest control and save the time of the farmers [6].

J. Adeline Sneha et al., said that number of technologies are used in agriculture field. Most of the techniques decrease the quality of the yields severely. To increase the production level chemical farming was used for past years. Due to this large number of diseases are raised. To avoid the chemical farming organic farming is the suitable one. The important problem in organic vegetation is to detect the unnatural area and pest control. When administration is done manually the pest growth cannot be identified on time and the crops and yields are damaged. The result of the above problem was reducing production. The important advantages of the organic farming were reducing the usage of pesticides and decrease the manpower of the farmers. The various sensors are used to identifying pests and insects like laser sensor, optical sensor and acoustic sensor. Wireless sensor networks are used to identify the pests in initial stage [7].

Yashaswini, L. S., et al., explained agriculture had gained broad status in recent years. Using IOT the objects are connected through sensors in farm. In this research work the authors proposed a smart automated cultivated system with disease identification. This system was designed by using soil humidity sensors, heat sensors and leaf humidity sensors. The sensed data from the various sensors was collected and compared with the existing threshold values. The data were analyzed using Markov model and find the disease and that condition of the disease. The analyzed data will be transfer displayed on user's phone [8].

Pankaj Mohan Gupta1, et al., says that most of the farmers are using manual ways of farming. Internet of Things has been help the farmers to provide the information in on time and proper data about alerts regards plants, pest detection, soil moisture etc. The aim of this paper was describe about the usage of IotT in cultivation with water supply, pest control and management [9].

Subasish Mohapatra et al., implemented IoT sensors in the agriculture system. The various sensors are used to collect the data. The collected data was analyzed and developed a predictive model. This model was used done comparative analysis using real time data and provided predictive model and it can be used to predict from the explanation of special production information with their ecological condition. This model was tested by using different product in Odisha state [10].

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III. PROPOSED SYSTEM

In this paper proposed a new automatic irrigation system. This system will be used to monitor the level of water and moisture with the help of humidity sensor. If the water level is reached the threshold level the pump will be automatically going to ON stage and sprinkle the water. When the moisture level is reached the pump will be going to stop the water.

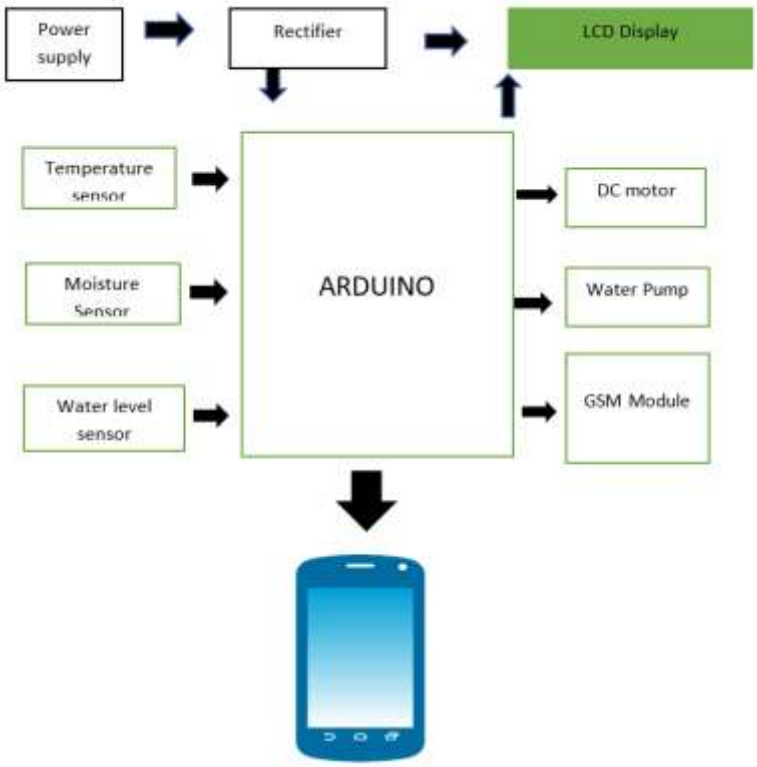

Fig. 1: Proposed Block Diagram

Power Supply

For any device it need some power to work. Here the power supply used is a 12 volts supply. If supply not possible batteries can be used. But we have to make sure that the power supply voltage will meet required criteria.

Temperature Sensor

It is used to sense the temperature of the field. We can give the water supply based on temperature also so we need to keep track of temperature of field.

Moisture Sensor

It is used to sense the moisture present in the field. It is placed one by one with the minimal distance. The data it senses is transferred to the Arduino through wired or wireless mode. The main aim of this sensor is to sense the moisture of field. Thus it can give command to the water pump to give water if moisture is low.

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Water Level Sensor

In some crops like paddy we need to have excess of water. In such cases we use water level sensor. It will measures the water level of crop and give data to the arduino.

Water Pump

It is used to supply water if any one parameter of moisture, Temperature, Water level is low. The motor will pumps water based on requirement.

GSM Module

The data which is collected is transferred to the farmer mobile number as short message service form which is stored in Arduino.

LCD Display

The data which is collected is shown in liquid crystal display. Sometimes when user can't able to get SMS can check the status on LCD display attached to the kit.

IV. RESULTS AND DISCUSSIONS

In our proposed work a model based on smart irrigation concept is designed. Connections are given as per the block diagram where the two types of sensors for temperature and moisture is used. These two sensors are placed over the field which will measure the temperature and moisture of the field. A water pump is connected to the microcontroller which will start to pump water when the temperature increases and same the motor will pump water if moisture level decreases. Simultaneously all the values are sent through GSM.

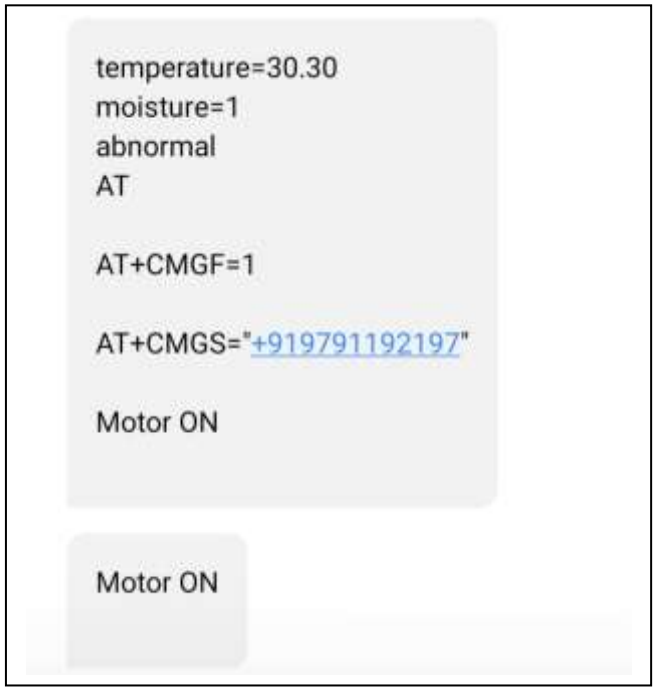

Fig. 2: Message from Arduino

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Type of soil	Time	Dry Condition(V)	Wet Condition(V)	Temperature
Red	10:20:25AM	4.95	1.56	29.34
	12:10:12PM	4.86	1.61	29.79
	2:35:34PM	4.82	1.95	29.21
Black	10:23:27AM	4.57	1.40	29.30
	12:12:15M	4.56	1.43	28.52
	2:36:34PM	4.56	1.49	29.14
Clay	10:25:29AM	4.47	1.22	28.61
	12:15:18PM	4.42	1.27	28.78
	2:38:34PM	4.39	1.30	29.26

Fig. 3: Tabulation of parameters

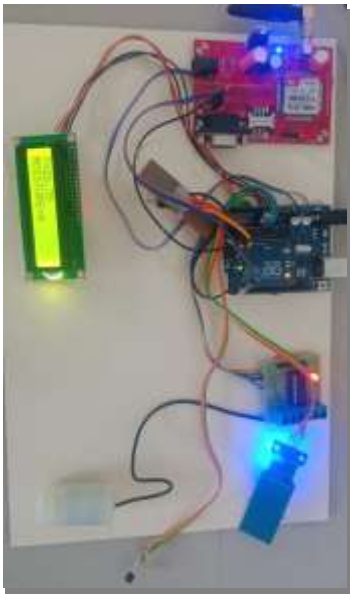

Fig. 4: Module

V. CONCLUSION

Agriculture plays a vital role in the development of a country and it also acts as backbone to our country.

India is a land of diversity which 80 percent of land is used for cultivation. Earlier cultivation was more effective and profitable. But nowadays due to global warming and climatic conditions doing agriculture has become a major strain. Water scarcity and rainfall is also low. To solve this problem we are doing automatic irrigation system using GSM. Here we are doing automatic monitoring and controlling system of water pumping according to the sensor values. By following our ideas the farmer can yield well and can gain more profit.

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