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Smart Water Irrigation System using ARDUINO

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Abstract: ***Now days, farmers are facing major problems in watering their crops, so the main purpose of this paper for agricultural automation and increases Agricultural growth of country. In Smart water irrigation system not only helps farmers but also others for watering their farms as well as per crop selected for production, water supplied will change, also checking availability of water level in tank. This Smart water irrigation system senses the moisture content of the soil by using moisture sensor and then automatically switches the pump. A proper management of usage of water in irrigation system is very important because the main reason is the shortage of land reserved water due to lack of rain, without management use of water as a result large amounts of water goes waste due to this reason, we use this automatic watering system for plant to use optimum amount of water, so this system is very useful in all climatic conditions.***

Keywords: Arduinouno kit, soil moisture sensor, pump, Ultrasonic sensor.

I. INTRODUCTION

Now days, water shortage is becoming one of the biggest problem in the world. Many different methods are developed for conservation of water. We need water in each and every field. In our day to day life also water is essential. Water is considered to be basic need of human. Water is needed for everyone human beings, animals, plants, etc. Agriculture is one of the fields where water is required in tremendous quantity. Wastage of water major problem in agriculture. Every time excess of water is given to the fields. There are many techniques to save or to control wastage of water from agriculture. India is basically an agriculture country, and all its resources depend upon the agriculture output. Water is evidently the most elements in the plant life. Water is normally supplied to plant by nature through rains. However, the total rainfall in a particular area may be either insufficient, or ill timed. In order to get maximum yields, it is essential to supply the optimum quantity of water, and to maintain correct timing of water during the period of excess rainfall and releasing it to the crop and as and when it is needed .Thus, the necessity of irrigation can be summarized in the following parts:

A. Less rainfall
B. Non-uniform rainfall
C. Controlled water supply

The artificial way of water supplying to the agriculture land at the right moment in an appropriate volume for the proper growth of the plant in order to get maximum yield of cultivation is technically irrigation. But irrigation also include clearing away of excess water from agriculture land. There is greater necessity of Indian agriculture. India has great diversity and verity of climate and weather conditions. These conditions range from extreme of heat to extreme of cold and from extreme dryness to excessive rainfall. Due to some reasons irrigation needed in Indian agriculture.

D. Uncertainty of monsoon rainfall both in time and place.
E. Irregularity in distributing of rainfall throughout the year.
F. Excessive rainfall causing flood.
G. Drought is an annual event in some areas.
H. India is land of Rabi crops. But there is not rainfall in winter months.
I. Some soil need more water.

II. THEME

Our project is for farmers. We have modelled a farm in which drip and sprinkler system is used. Both drip and sprinkler, are controlled through solenoid valves. These valves are controlled by Arduino (controller) with consideration of inputs from water level indicator placed in tank and moisture sensors place in farm. Water level indicator is placed in tank and its input is given to

controller by using electrical wires. Moisture sensors are placed in farm. Farm has two sections. One section uses drip irrigation and other uses sprinkler. Two moisture sensors are placed in one section. In that, one is at start and other is at end of that farm section.

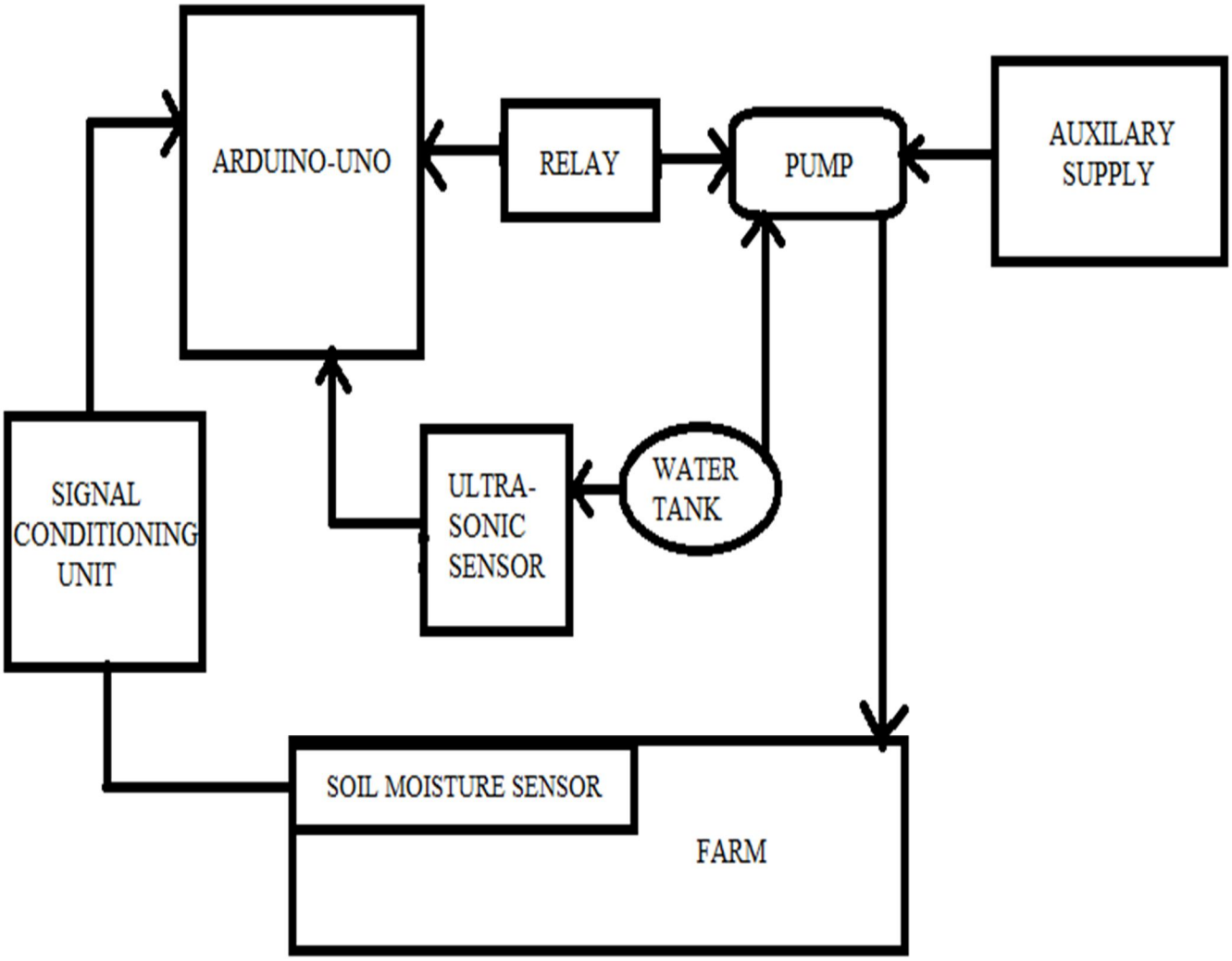

Fig.1- Block digram

A. Soil Moisture Sensor

The soil moisture sensor is used to measure the volumetric water Content in the soil.
Measure the loss of moisture over the time due to evaporation and plant uptake.

B. Water Pump

A water pump (being represented as motor) was a device used to move or pull water out of a well or pond and displaces it volume by physical or mechanical action. It is most considered as the heart of the irrigation system. Before selecting an irrigation pump, a careful and complete inventory of the conditions under which the pump will operated was considered.

C. Solenoid Valve

The irrigation system was managed by the solenoid valve connected to one of the relays. This arrangement allowed the controller to command the irrigation event without the need for the supervision. Solenoid valves may use metal seals or rubber seals, and may also have electrical interfaces to open (normally open) or close (normally closed) while the valve is not activated

III. SYSTEM ALGORITHAM

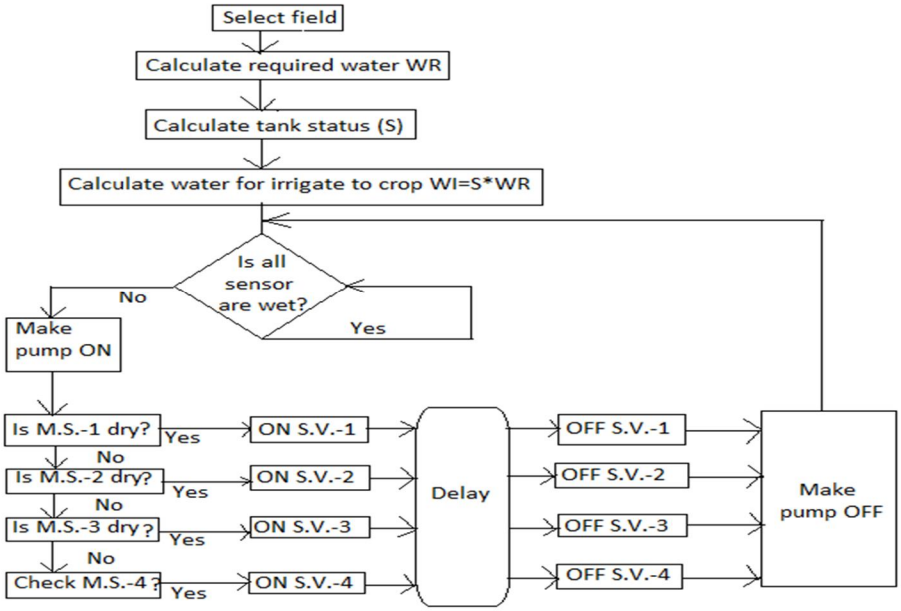

Fig.2- Algorithm

Water requirement of every crop is different for its overall growth. There are different predefined values of required water for different crops. These values are stored in the program by default. Here firstly we have to choose the type of crop. Then calculate the water required for that crop (WR).

calculating the required water, check the status of the tank and according to the water level present in the tank give the feedback signal to the controller.

signal as 0.5. If the tank is 25% filled with water the give the feedback signal as 0.25.

Now, determine water to irrigate (The actual amount of water which is to be provided to the crops). The water to irrigate is depends on both actual water requirement and status of tank.

Then check the condition of the moisture sensors which is placed in field. Check for if all sensors are wet or not. If all sensors are wet, then there is no need to provide the water. Keep the pump in OFF condition. If there is signal of dryness from any of the sensor, then check which sensor is dry and make ON the valve of respective sensor.

Finally make the pump ON and keep this program in infinite loop by monitoring the condition of the moisture level continuously.

IV. SIMULATION MODEL

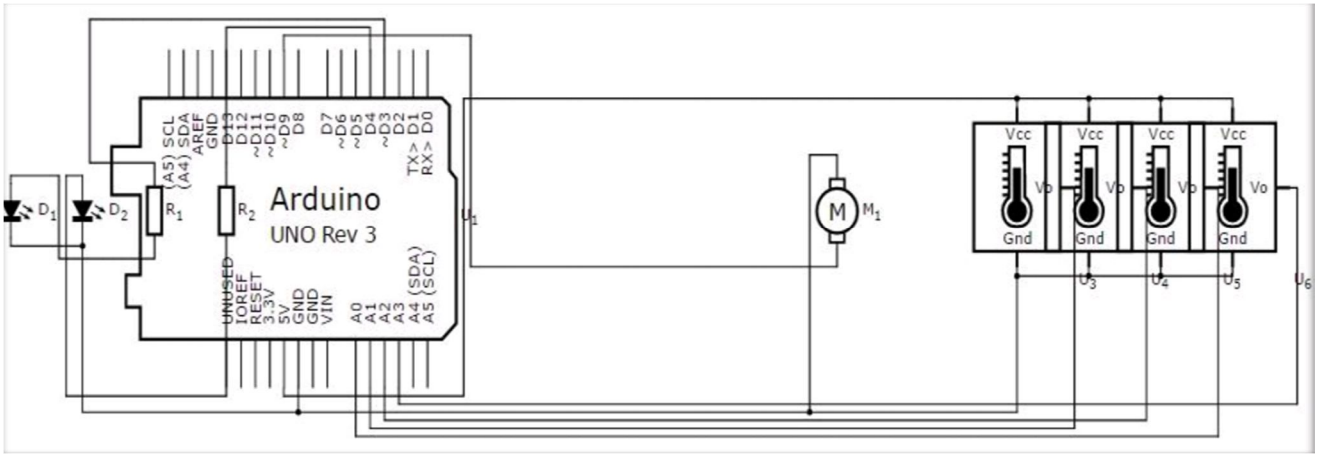

Fig.3- Simulation Model

For simulation we used the website named as circuit.io. Here in this simulation we choose temperature sensors as moisture sensors, two LED's taken as a two solenoid valves and for water pump one motor is taken. Two resistors are placed in series with two different LED's.

Here we used Arduino Uno board as a main controller of our system. There are 6 analog input pins (A0-A5) and 14 digital output pins (D0-D13). Out of which 4 temperature sensors (as a moisture sensors) are connected to A0 to A3 analog input pins. Two LED's as a solenoid valves connected at D3 and D4 output pins. One motor as a water pump connected to pin D9. The supply to motor and LED is given through Arduino from pins VCC and GND.

Here first we collected the data required for the simulation like basic information about Arduino, pin functions of the Arduino, etc.

In this simulation we choose temperature sensors as a moisture sensors, two LED's taken as a two solenoid valves and for water pump one motor is taken. Two resistors are placed in series with two different LED's.

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V. COMPARISON OF OLD RESULTS AND NEW RESULTS

In the old system results only considering the moisture content presents in the soil, and according to that operating pump to control the irrigation to farm. Our new system results are considering moisture content in soil as well as water level available in tank and type of crop. Thus system operates and controls water pump for irrigation. In old system, total available water is irrigated to farm. Here we have utilized water more efficiently as we are irrigating farm with consideration of water level. If available water in tank is full (i.e. 100%), then total water is irrigated. We have also provided crop selection facility to farmer as growth period and water requirement of various crops is different. So system becomes more efficient. Such facility was not provided in older system.

A. Hardware Result

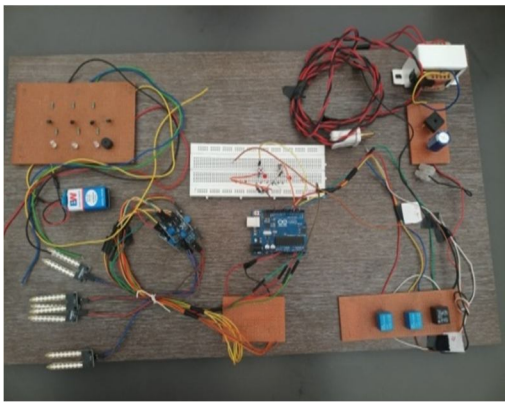


Fig.4-Arrengement Of Hardware

Fig.5- Arrangement Of Field

VI. CONCLUSION

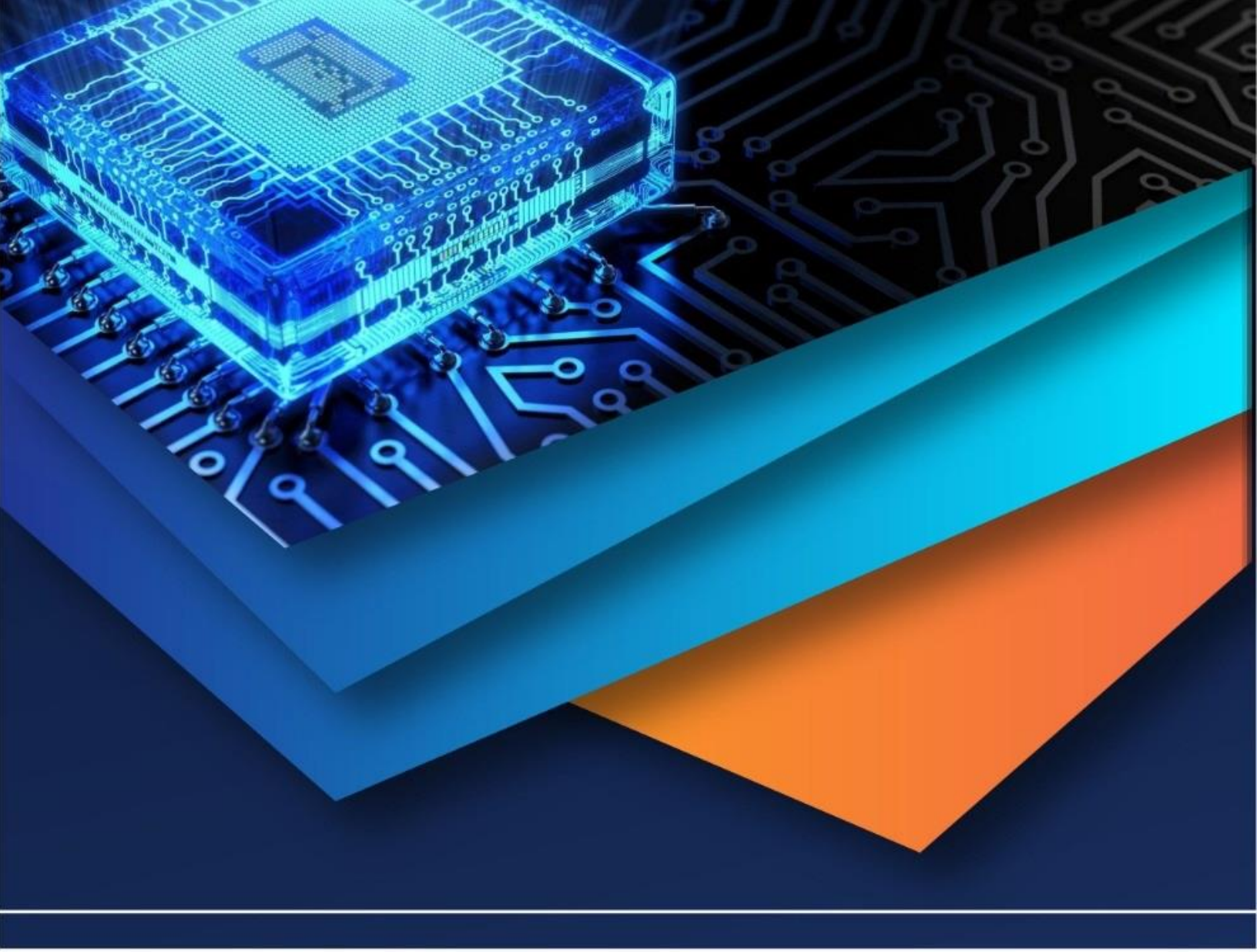
The project Smart Irrigation System is very helpful for draft areas where water availability is low and farmer wishes growth of crops. So that system works according to availability of water i.e. status of tank which is less and water is given to crops. Thus it helps to utilize water for long time. And other thing is that crop growth is achieved. This helps farmers in drought area and farmer lives their life happily and also contributes for growth of GDP of country. It is helpful for farmers in drought areas.

It helps for effective growth of crops and water is properly utilized.

It is also applicable for automation of green houses. In that application, water is given to plants with consideration of moisture content in soil.

REFERENCES

[1] Yandong Zhao, Jinfeng Guan, “Study on Precision Water-saving Irrigation Automatic Control System by Plant Physiology”, ©2009 IEEE.
[2] A. Kumar, T. Vadarmala, “Smart irrigation using low cost moisture sensors and XBee based communication”, ©2014 IEEE.
[3] Shiraz Pasha B.R., Dr. B Yogesha, “Microcontroller Based Automated Irrigation System”, (IJES) © 2014.
[4] Website of Agriculture Department, Government of India. (www.agriculture.gov.in)
[5] Tahar Boutraa, Abdellah Akhkha, Abdulkhaliq Alshuaibi, Ragheid Atta, “Evaluation of the effectiveness of an automated irrigation system using wheat crops”, Proceedings of the International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 2, Issue 2, February 2013.
[6] H.T ingale and N.N. Kasat, “Automated Irrigation System”, Proceedings of the International Journal of Engineering Research and Development, Volume 4, Issue 11 November 2012.
[7] Mahesh M. Galgalikar and Gayatri S. Deshmukh, “Real-Time Atomization of Irrigation system for Social Modernization of Indian Agricultural System”, Proceedings of the International Journal of Computer Applications, Volume 1, 2010.
[8] Pranita A. Bhosale and Prof. V. V. Dixit, “Water Saving-Irrigation Automatic Agricultural Controller”, Proceedings of the International Journal of Scientific & Technology research volume 1, issue 11, December 2012.
[9] Pravin G. Dhawale , Devendra Gowda , Vivekananda Dembre."Integration of HVDC System with Renewable Energy", Volume 6, Issue II, International Journal for Research in Applied Science and Engineering Technology (IJRASET) Page No: , ISSN : 2321-9653.



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