

Computerized Control of Sprinkler with Weather Report

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Abstract—Farming is the field in which largest use of water is made. Also it is used in domestic, industrial uses. Computerized Control of Sprinkler with Weather Report System is developed to optimize water use for agriculture crop. The system has a distributed wireless network of temperature, light intensity, humidity and soil moisture sensor placed in roots zone of the plants. In addition Server handles the information about sensors and pass the information to a web application. An algorithm will be developed with reading of temperature, light intensity, humidity and soil moisture that are programmed in micro controller-based Server to control water quantity. This system will be completely controlled by computer. Which will be help to farmer to take decision regarding to provide water to crops according to temperature, light intensity, humidity which will be provided by this system. This sensor are controlled by micro controller. This system can be access by GPRS system.

Index Terms—Automation, crops, Irrigation, environment, temperature, humidity, light intensity.

I. Introduction

The micro-controller based computerized control of sprinkler with weather report real time Irrigation system will supply the following: As there is no unexpected use of water, a lot of water is saved from being wasted. The irrigation system is used only when there is not sufficient moisture in the soil and the micro controller decides when the motor should be turn on/off, saves a lot time and water for the farmers. a lot of water is saved from wastage of water. This also reduces the work of farmers, as they don't have to go and resolve the motor on/off automatically. The constant increasing demand of the food provisions requires a rapid improvement in food production technology. In many countries like India where agriculture and the climatic conditions are isotropic. we are not able to make full use of agricultural possessions at standstill . The main reasons are the lack of rainy water and land lake water. The continuous water removal at normal intervals from earth is dropping the water level as a result of which the zones of un-irrigated land are frequently increasing. Also, the unexpected use of water accidentally results in wastage of water. In an Automated Irrigation System using (AVR ATMEGA-16L), the most significant advantage is that when the moisture in soil goes below a determined threshold value only then water is supplied . In current time, the farmers have been using irrigation system through the labor-intensive control in which the farmers irrigate the land at regular intervals by turning the water-pump on/off when essential. Sometimes these procedures consumes more water and sometimes the water supply to the land is delayed due to which the crops dry off. Water shortage reduces plants enlargement before visible wilting occurs. In addition to this development rate becomes slow, light weight fruit follows water shortage. This problem can be absolutely solve if we use Automated Irrigation System in which the irrigation will take place only when there will be strong requirement of water, as optional by the moisture in the soil. Irrigation is the artificial use of water to the soil usually for supporting in rising crops.

This system is completely controlled by computer. This system will help to farmer to take decision of when to provide water to crops according to temperature, humidity, light intensity which will be provided by this system. These sensors are controlled by microcontroller. This system can be access by GPRS system[1].

As we were introduced above there are some existing methodologies which are one of the great and important steps towards farmer's life comfort and proving themselves as developed country .Computerized control of sprinkler system is the main concept which is used in most of the farms ,they have implemented it . By this system water is provided to the agricultural crops through the sprinkler.

This was introduced early in 2004, but later implemented .the way it is introduced was very responsive by peoples, it was completely new concept so keeping in mind all the people gives green signal and finally it is implemented.

II. Limitation of Existing System

There are so many concepts to provide water to agricultural crops .as we have discussed in above system water is provided to the crops through sprinkler but weather detecting sensors are not provided this can be unnecessary use of water in farm which causes spoilage of agricultural crops. So to overcome such spoils we are going to design a new system and last but not least to reach towards developed country .If system has capability of providing water properly according to weather report, by amending such system or you can say by reforming such system we can develop the agricultural field of India.

III. Proposed System

Now a days existing methodologies have limitations up to some limit which has become great problem to survive farmers with less

production of grains and vegetables because of spoilage of agricultural crops. protect plants against hoarfrost.[3] used in waterless areas and in periods of rainfall but also to As farming field has been said as heart of our country to improve it's economy and if this heart will not work properly how our countries economy will improve. As farmers have been facing these problems over long years so this system the new system brings out for such people who are really suffering from these problems .the main focus of this system is to supply the water properly according to humidity, light intensity and temperature. This will help the farmer to decide when to supply the water. The proposed system avoids all those things which drawbacks in existing system by some circumstances it is highly computerized controlled system by means of supplying the proper amount of water .Actually using the existing system water is supplied through sprinkler but without detecting weather report so it can be excess supply of water which causes damage of agricultural crops this is the main issue .yet no one has worked with this issue to resolve it. so we focus to this area particularly to enhance existing system .That's why this system comes into picture[4]. Sprinkler irrigation: In sprinkler irrigation delivery of water is through a pressurized pipe network to the nozzles of sprinkler which spray the water into the air. we can call that, it is a type of artificial rain. The fundamental components of this irrigation system are water source, a pipe network to distribute the water over the field, ressure pump to pressurize the water ,the Sprinklers to sprinkle the water over the field and Valves for control the flow of water.

IV. Advantages of Micro Irrigation

- (a) It saves water due to possibility of using saline water.
- (b) Efficient use of fertilizers.
- (c) Installation is easy & flexibility in operation.
- (d) Suitable to all types of land terrain & also suitable to waste lands.
- (e) Enhances plant growth and yield & better quality of produce.
- (f) Weed growth is less.
- (g) Saves labour works.
- (h) No soil erosion which saves land.
- (i) Minimum diseases and pest control.

Microcontroller:

The microcontroller is the heart of the embedded system. It checks if any corrective action is to be taken for the condition at that instant of time. Input to the microcontroller is information of temperature sensors, light intensity sensors, humidity sensors . If the sensor value is excess the threshold value then microcontroller gives the signal and send this information to the control room, though we can take some decision about provision of the water to the farm.

Temperature sensors:

In the proposed system thermistor is used as temperature sensors. The word thermistor is an acronym for thermal resistors, i.e. temperature sensitive resistor[5]. It is used for detecting very small changes in temperature. The temperature variation is reflected through appreciable variation of the resistance of the device.

Humidity sensors:

Humidity is the amount of water vapour in the air. In daily language the term "Humidity" is normally taken to mean relative humidity which is defined as the ratio of partial pressure of water vapour in a parcel of air to the saturated vapour pressure of water vapour at a prescribed temperature. The humidity sensor is of resistive type[6].

Light Intensity:

Light intensity is the intensity of rays in the environment. light intensity sensors is used for to determine the intensity of the environment.

Sprinkler motor:

Sprinkler motor is used to provide water to the farm. which is placed in the water tank and directly connected to the sprinkler system. The sprinkler system is placed in the farm. the controlling of the motor is done by micro-controller according to the server information. The Server collecting information from all sensors.

V. Design and Implementation

Developed system can be divided into two sections. First is a hardware circuit which contains sprinkler motor. The circuit has a sensors module consisting of some sensors that measures real time environmental parameters like temperature, humidity, light intensity. A micro controller is used with the sensors to receive the sensors outputs and to take the necessary decision. Once temperature is more than the defined level programmed at microcontroller, microcontrollers gives signal to servers. Again, once the measured humidity value is more than the defined level which is programmed at microcontroller, it gives the signals. Similarly when light intensity cross the defined level of the preprogramed at microcontroller, it gives signal to the servers[7]. These are the product perspective fertilization, automatic Sprinkling, automatic nutrients, Centralized control. The system will be in visual basic which helps to form graphical user interface. It can display the parameters in the forms of graph. It also generate and prints the reports of parameters. The different environmental parameters received by the ground control PC will be displayed in those manners in the LCD screen. The parameters consists the temperature, humidity, light intensity etc. the computers stores the parameters in the hard disk and user can see that information any time[6].

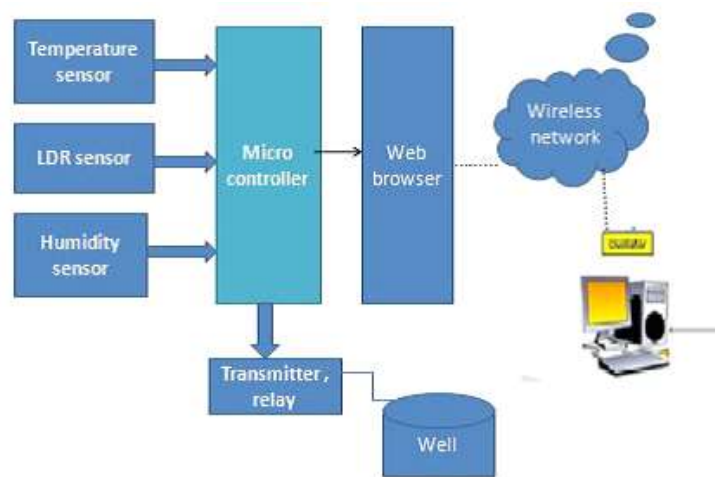


Fig.2 Block Diagram Of System

a. Temperature Sensor

Using this we are going to monitor the temperature level inside the farm area. According to the temperature microcontroller will take the decision to provide water to the agricultural crops. In the proposed system thermistor is used as temperature sensor .the word thermistor is an acronym for thermal resistor. i.e., a temperature sensitive resistor .it is used to detect very small changes in temperature. The changes in temperature is reflected through appreciable variation of the resistance of the device. database and can view all the data[8].

b. Humidity Sensor

Humidity is the amount of water vapour in the air. In daily language the term “Humidity” is normally taken to mean relative humidity which is defined as the ratio of partial pressure of water vapors in a parcel of air to the saturated vapour pressure of water vapours at a prescribed temperature. The humidity sensor is of resistive type[9].

c. Light Intensity Sensor

Light intensity is the intensity of rays in the environment light intensity sensors is used to determine the intensity of the environment.

d. Soil Moisture Sensor

Soil Moisture Sensor is used to measure the waightness of soil[10]. When sensors gives low pulse it means that the soil is dry and when it gives high pulse it means that soil is wet.

VI. Algorithm

ProcedureEnvironmental_Monitoring (setpoint1,setpoint2,setpoint3,setpoint4)

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1.const int analogInpin1=A0;
2.const int analogInpin2=A1;
3.const int analogInpin3=A2;
4.const int analogInpin4=A3;
5. int Sensor Value1=0;
6. int Sensor Value2=0;
7. int Sensor Value3=0;
8. int Sensor Value4=0;
9.loop()
10.Begin
11.Sensor Value1 =analogRoad(analogInPin1);
12.Sensor Value2 =analogRoad(analogInPin2);
13.Sensor Value3 =analogRoad(analogInPin3);
14. Sensor Value4 =analogRoad(analogInPin4);
15.If Sensor Value1>setpoint1 or Sensor Value2>setpoint2 or Sensor Value 3>setpoint3 or Sensor Value4> setpoint4
    Then
16.Red signle
17.Send alert message to concern person
18.End if
19.End
  
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VII. CONCLUSION

As in earlier days farming was large piece of land as whole and due to large extend of farm, it was difficult task to manage farm. Also due to unpredictable weather conditions and technically unskilled farmers agriculture field was not so progressive. Advent of 'Green Revolution' and availability of subsidies have made farmers sound. Government also started implementing new methods and experimenting for new type of crops. So, taking these all things into consideration the urge to develop an automated system for farming we have taken positive steps toward it. We are going to develop automated system named "Computerized Control of Sprinkler System With weather Report" which provides water to the agricultural crops through sprinkler according to weather report and this system will help farmer to decide regarding to provide water to crops according to temperature, humidity and light intensity. This automated irrigation system will surely help to the farmer to produce better yields.

VIII. REFERENCE

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