

Automatic Irrigation System with Water Level Indicator in Well and Humidity Level of Soil

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Abstract— All living animals, vegetables and other species required the water as an expedient for life. So, water is very worth full. It is necessary to be used with new techniques to keep free from decay for long last time. Agriculture Industry uses the water in large scale. In large scale the effective use of water is not occurred by users and hence valuable quantity of water gone to sink. As the saving of small droplets made the useful source hence it is very valuable. The person or society understood this importance is effectively achieved the success. Recently the farmers face the challenge of betterment in the growth of plants and vegetables within less cost. This challenge partially completed by the modern automated irrigation system. As the content of water in the soil is not easy to measure as well as to maintained. Shortage of water is a critical problem faced by the world and so leakage of water is a big guilty carried by society. It is the important cause to initiate the research in this field.

Keywords— Controller, Irrigation, Moisture, Sensors,

I. INTRODUCTION

In the circulation field of water Pumps are very important device. In water reservoir to carry the controlled working of water circulation, the automated water controller circuit is utilized. To sense the water level in the reservoir, the metal plate assembled with the sensor is hang on the water tank. A control device regulates and commands the system of operation. So automated controller involves the scheming of system such that there is slightly interference occurred by human. The goal of this project is to initiate the step towards the solution of major problem of shortage of water. The automated controller saves the water and also helps the circumstances of living.

Drip Irrigation is one of the micro irrigation system which is effectively circulate the water at the root of crops. The system has a centralized controller which provides the signal in the SMS form. That signals are collected by the GSM feature of SIM card. After that this data continuously provides in the signal form to the ARM.

This data output is displayed on the LCD monitor after processing operation. So the complete circuit collects the different input parameters and after that provides the detailed feedback to the initial source of control system i.e. motor pump of water source.

The control on the pump motor is simply conduct by the modification in the conventional starter. After starting of the motor the controller continuously received the signals from the field and it is simultaneously also displayed on LCD. When the moisture content reaches up to required value, the motor automatically turned off.

Generally the system consists with four main levels: empty, high, medium and low level. The base station also connects with the data base system controlled by computer. Microcontroller, GSM module, Sensor panels, receiver, signal transmission network, mobile and computer are the important components of the controlled system. Several parameters like temperature, humidity, pressure of the soil are controlled at various stations and then it is analyze at the central base station. The system composes with the Bluetooth based remote controlled system. The types of crops, temperature and moisture content in the soil are decided the time of irrigation.

II. PROBLEM DEFINITION OF PROPOSED WORK

Conventional irrigation system is very lengthy process requires human expedient and hence labor costs. In recent days the modern systems utilizes the automated controllers but it is in limited scale and hence it is not totally effective. In mass irrigation system the effectiveness of irrigation is not better and the goal is left far away from the achievement. The Project set the task of controlled irrigation system for small use with reducing the loss & cost of labor.

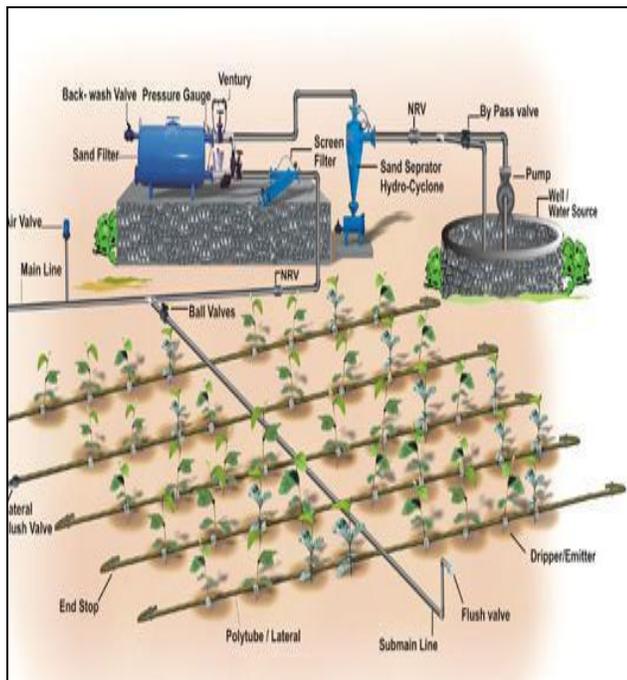
There is the scope to overcome the drawbacks of the conventional system like fungal infection to the leaf of crops due to the wetting of lower leaves during flood irrigation system. By applying irrigation at the root zone in drip system the point of scope achieved successfully. This system can be used easily with two or three times per day and it also useful to avoid the moisture stress in the crops. The production rate of crops yield by this system is also improved. The quantity of water required by it is about 50% of the sprinkler or flood irrigation system. The requirement of energy to pump the water in this is reduces and hence less energy cost is consumed.

Also the other parallel works like feed of supplement or disease prevention sprays made successfully with dry rows. The whole objective area is sub grouped in the small fields containing moisture sensors. The location of these sensors is at particular depth under the ground. The close working cycle used the feedback signal of sensors to the microcontroller and according to it the motor actuates ON & OFF operations.

III. AUTOMATIC IRRIGATION SYSTEM

A. Irrigation

The On and OFF operations of pump motor are carried by using automated controlled valves. The input power required to it is provided through microcontroller. As this system is an automated system, it performs the task though the labors are not available. This system is also able to provide the water soluble nutrients at the crop roots to improve its performance. Also in green houses to produce high quality vegetables, flowers, etc. this system proves adequate efficient and precise also.



3.1 Overview of Automatic Irrigation System^[1]

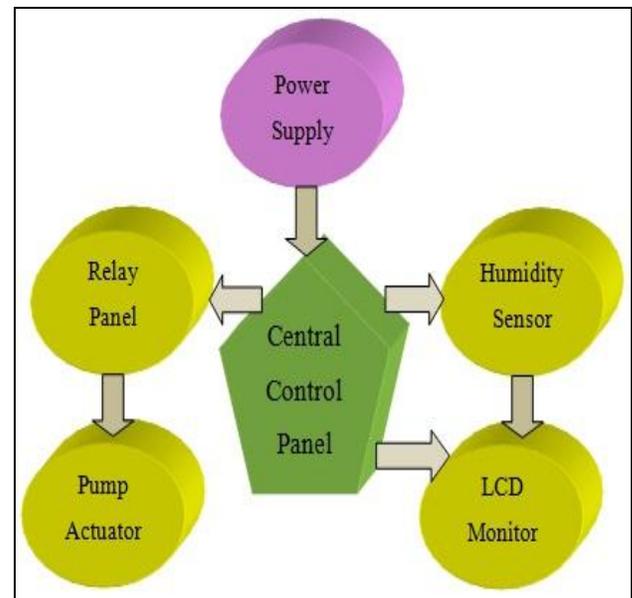
B. Soil Moisture

The contents of water or moisture in the water cycle of atmosphere are very important parameter not only for the small scale agriculture but also for nurseries, gardens and large scale modeling.

Before the implementation of this system, the knowledge and behavior of the soil-moisture relation is must. These behavioral characteristics are depends on the texture, density and contents of the soil. Due to the soil and moisture contacts the conventional sensors oxidized and hence in modern sensors the use of immersion gold is carried. It has more advantages than the conventional one like Oxidation resistance, planarity, etc.

C. Block Diagram

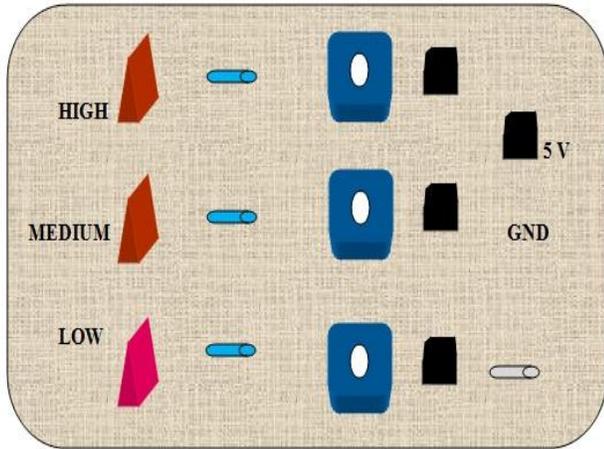
The Central control panel is the heart of this automotive system. The electric supply is the main input energy form provides to operate both the control system as well as the pump motor. Also two main sub braches are attached to this control panel. The first branch consists of the Pump actuators via relay panel. The second branch is the chain having of humidity sensors. There is also the LCD monitor fixed to displays the status of the working system.



3.2 Block Diagram of System

D. Water Level Indicator

This model uses three tanks or levels of tropics and these are optimum for the analysis of top down and bottom up effect. There are two outlets for each tank namely a and b and water flows through it. The valves are used for the control of it. The float principle is used to operate the valves. This system uses the microcontroller to perform the automatic pumping of the water in the storage tanks and to observe the water level. The water level is displayed on the LCD monitor.



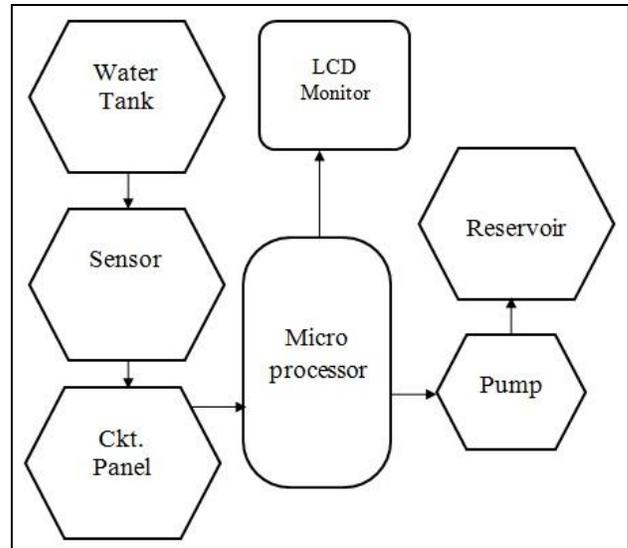
3.3 Water Level Sensor

E. Moisture Sensor

The function of the sensor is to calculate the quantity of moisture contents in the soil. The sensors having porous wires which conduct the water particles up to sensing element and hence response of this sensor is quick. Also in this work the controller circuit uses LM35 type sensor to identify the temperature.

F. Working Principle

The simple and basic working principle is followed in this project. The basic concept of soil resistance for dry and wet condition is used to work. There are two probes which are dipped in the soil to conduct during wet soil and resist when soil is dry. These conditions detect by the inverter through resistance. This inverter feed the signal to timer and the timer again provide it to the another trigger. The output of the second trigger is given to the first trigger. This triggers are activate the electric valve and further water flow ON is carried.



3.4 Working Principle of System

After wetting the soil the probes start to conduct the current. This stage activates the circuit. Hence the switch can be turned OFF the circuit. The working of water level indicator's output detect the water level in storage and provide the feedback signal to the dc motor to actuates it. And finally the core part i.e. humidity sensor is detects three groups of moisture levels from low to full.

The microcontroller produces the interrupted signal and the drip system behaviour according to it. If there is something unpredictable things are happened then the GSM technique sends the alert message to the operator. Hence a remote control kept on the system easily.

G. Challenges and Remedies:

As the pure water has less conductivity hence at that condition salt is dissolved in the water to proceeds the moisture detection. The working of the circuit is affected at more than or less than 10 V supply and hence 10 V dc adapter is used to stabilize the system.

IV. CONCLUSION

1. In the present days the agriculture and the developments in the technology of agriculture are highly important. This recently underdevelopment technique is incomparable and precise.
2. The easiest, simple and labor less option of controlling both the moisture and temperature is achieved effectively by using GSM technique.
3. The cost of both water and labor is saved.
4. The system is closed loop feedback control system hence it prevents the over and under irrigation. Also the Wastages of water is fully controlled.
5. The project work can be ideal for small as well as large scale agricultural, greenhouses, Play grounds and gardens also.

Acknowledgement

We feel great pleasure to present the Paper on project work entitled “Automatic Irrigation System with Water Level Indicator in Well and Humidity Level of Soil”. But it would be unfair on my part if I do not acknowledge efforts of some of the people without the support of whom, work would not have been a success.

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