AUTOMATIC PLANT WATERING SYSTEM USING REAL TIME CLOCK

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Abstract - *In daily operations related to farming or gardening watering is the most important practice and the most labor intensive task. No matter whichever weather it is, either too hot and dry or too cloudy and wet, you want to be able to control the amount of water that reaches your plants. Modern watering systems could be effectively used to water plants when they need it. But this manual process of watering requires two important aspects to be considered: when and how much to water. In order to replace manual activities and making gardener's work easier, we have create automatic plant watering system. By adding automated plant watering system to the garden or agricultural field, you will help all of the plants reach their fullest potential as well as conserving water. In this paper we have used ATmega328 microcontroller. It is programmed to sense moisture level of plants at particular instance of time, if the moisture content is less than specified threshold which is predefined according to particular plant's water need then desired amount of water is supplied till it reaches threshold. Generally, plants need to be watered twice a day, morning and evening. Thus, the microcontroller is programmed to water plants two times per day. We hope that through this prototype we all can enjoy having plants, without being worried about absent or forgetfulness.*

*Key Words***: Farming, watering, automatic system**

1 . INTRODUCTION

We all know that plants are very beneficial to all human beings in many aspects. Plants helps in keeping the environment healthy by cleaning air naturally and producing oxygen. Many people love to have plants in their backyard. But due to civilization and insufficiency of place many people used to grow plants in a mold or dirt, pot, and placed on the windowsill. This plant are dependent on conventional breeding - watering, and provide the right amount of sun to sustain life and growth. In busy schedule of day to day life, many time people forget to water their plants and due to this plants suffers many disorders and ultimately died. In addition, the world's biggest problem in modern society is the shortage of water resources, agriculture is a demanding job to consume large amounts of water. It is very essential to utilize the water resources in proper way

Thus, a system is required, to handle this task automatically. Automated plant watering system estimate and measure the existing plant and then supplies desired amount of water needed by that plant. It is minimizing the excess water use as well as keeping plants healthy.

2. Problem Statement

During day to day activities many people often forget to water their plants and thus it becomes challenging for them to keep their plants healthy and alive. Also it is a challenge for farmers to maintain their fields and manage watering of plants during shortage of water. Based on the above background, we thought that it is necessary to implement the automated system which will take care of plants considering all the different aspects of home gardening system (for system based on household purpose) as well as larger landscape (for the system based on agricultural farms) and helps them to grow healthy. Therefore, our project aims to implement a simple system, using automatic irrigation, watering a small potted plant or crop with minimal human intervention.

3. PROPOSED IDEA

There are three functional components in this paper. They are moisture sensor,RTC DS1307 and motor / pump. Arduino board is programmed using the Arduino IDE software. Moisture sensor is used to detect the soil moisture content. Motor / pump is used to supply water to plants.Microcontroller (ATmega328), is the brain of the system.In case of soil_moisture value is less than threshold system automatically triggers water pump on till sensor meets threshold and then sets off automatically. Automated plant watering system estimate and

measure the existing plant and then supplies desired amount of water at specific time using real time clock needed by that plant.

4. Block Diagram
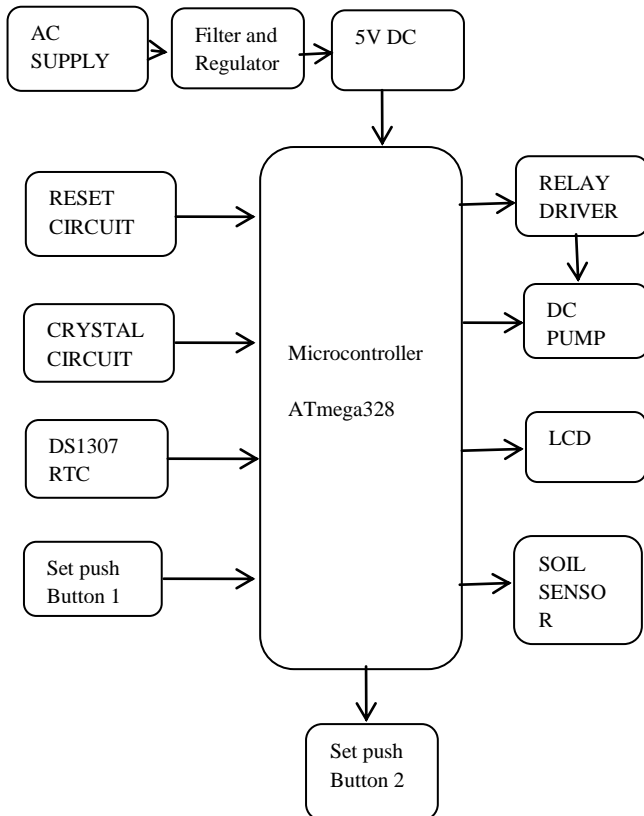
In this project we used Real time clock DS1307 RTC, MicrocontrollerATmega328, relay driver, DC pump and soil moisture sensor. The DS1307 RTC is used for tracking time.RTC triggers the relay during a specific hour at Morning and evening each day.So the water supply given to plant automatically.

The main control unit is microcontroller it is operated with 5V supply controlling timing pulses of DS1307 RTC. Timing is displayed on LCD. input provided to the switch by the user and set time will be stored in microcontroller memory then timer will be start.

The pump will be start the convenient time of user then time will be stored in memory checking and comparing with microcontroller internal stored data.the microcontroller will store and check the value of timer simultaneously pump will be lift in the water if the water level is increased as the root level of plants sensed by soil moisture sensor if it is acrossed threshold level microcontroller turn off the

pump and RTC will be closed time.this will be contineous for repeated process .

4.1 Flow Chart
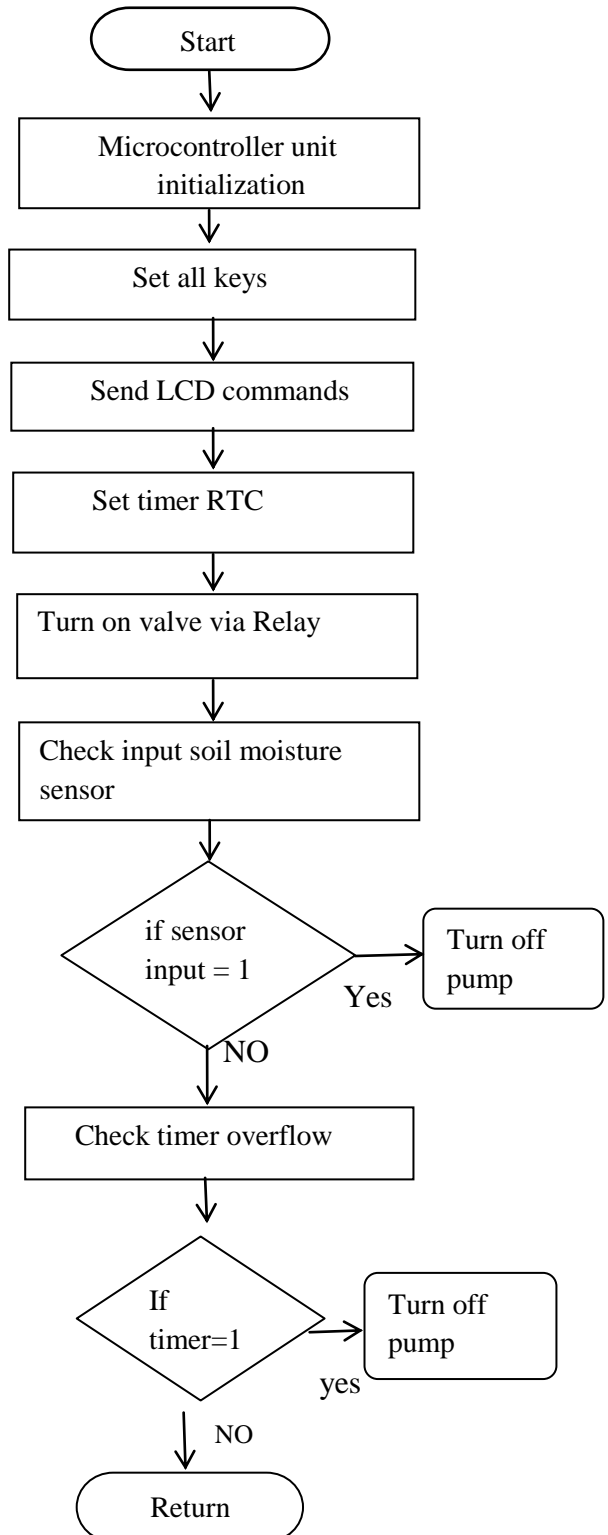
5. Result

Thus the "AUTOMATIC PLANT WATERING SYSTEM USING RTC" has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. The device consist of soil moisture sensor, Microcontroller, relay, Submersible mini water pump, DS1307 RTC, LCD and watering pipe. The parameter for this testing is based on the detection results from the soil moisture sensor.

From this work, we can control the moisture content of the soil and According to soil moisture, water pumping motor turned on or off via the relay automatically. This saves water, while the water level can be obtained in a preferred aspect of the plant, thereby increasing productivity of plants.

The moisture sensors measure the moisture level (water content) of the plants. If the moisture level is found to be below the desired level, the moisture sensor sends the signal to the microcontroller which triggers the Water Pump to turn ON and supply the water to respective plant.Using this sensor, we can see that the soil is wet or dry. If it is dry, the motor will automatically start pumping water.

The microcontroller gets the current date and time from DS1307 RTC and to turn on a relay that supplies 5 volts to the pump . LCD display information about the different conditions of the soil and shows the real time and date using RTC component.When the desired moisture level is reached, The relay will off .Then microcontroller will send signal to the motor.This will result in turning off the motor.

Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. The system has been tested to function automatically. Thus, the functionality of the entire system has been tested thoroughly and it is said to function successfully

6. Conclusions

Automated plant watering system using RTC optimizes the usage of water by reducing wastage of water. This project can able to contribute towards socioeconomic development of the nation. It has fast response and system is user friendly. The primary application of this project is for farmers and gardeners who do not have sufficient time to water their crops or plants regularly. This project also covers an application for farmers who are wasting water unknowingly during irrigation. The main objective of this plant watering system is to make it more innovative, user friendly, time saving and more efficient than the existing system.

Due to the direct transfer of water to the roots, water conservation takes place and also helps to maintain the moisture to soil ratio at the root zone constant to some extent. Thus, the system is efficient and compatible to the changing environment. Hence, this system is very useful as it reduces manual work and also helps in proper utilization of water and other resources. This project can be extended to greenhouses where manual supervision is less. Fully automated gardens and farm lands can be created using this principle in the right manner on large scale

7. REFERENCES

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