Automated Watering and Irrigation System Using IoT

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Abstract - *Agriculture is an important source of livelihood for the people. Therefore, farmers use a variety of technologies for better yields and to reduced human intervention. Fast the development of human civilization and the development of new science and technologies change the state of health in the world, leading to significant changes in the environment. In India, population growth of about 2% per year. It is important that food production increases about 2.5% per annum to provide better food. Water resources must be used effectively and efficiently. This technique prevents over and under irrigation. Irrigation plays a vital role in the growth of plants. This automated irrigation system is proposed to provide an optimum amount of water for the growth of crops and to sense the moisture content present in the soil. The proposed system is designed with suitable sensors, signal conditioning circuits, camera module, microcontroller circuit and integrated with IoT environment to achieve automation in agriculture which is the necessity of farmers. It also prevents manual switching on and off of motor pumps. The proposed system helps in managing water efficiently by providing water in required cultivation. The system can also be implemented in small gardens in homes and parks, other than agricultural fields.*

Key Words: **PIC microcontroller, LCD, Irrigation system, Sensors, IoT**

1. INTRODUCTION

Irrigation is the process of supplying water to the crops artificially to fulfil water requirements for crops. Nutrients and other supplements are provided to the crops by irrigation. In any irrigation system, the prime motive will be to use the water efficiently so that over and under irrigation can be avoided. The manual switching on and off reduces human intervention so that overall cost can also be controlled. By using this technique, we can monitor the field from desired places

1.1 OBJECTIVE

The main objective of automated irrigation system is to minimize the wastage water and also to reduce the cost required for manpower. Since it is an automated technique it will be more efficient compared to other manual methods. The proposed system will provide an ideal amount of water required to maintain the moisture content present in the soil. Thus optimum amount of water will be supplied to the crops. The process of monitoring the crops will become more easy.

2. PROBLEM STATEMENT

It becomes a challenge for farmers to keep their plants healthy and viable. Also it is hard to maintain a field with proper moisture content during insufficient supply of water. Considering this situation, it is necessary to implement an automated irrigation system which will take care of larger fields as well as in-house gardens. This technology not only helps in increasing the productivity of crops but also updates the user with status of the plant. Therefore, it is a simple technique that provides a solution for watering a potted plant or crop with reduced human supervision.

3. PROPOSED SYSTEM

In this proposed system, soil moisture sensors are copper strands which are inserted into the ground. Soil sensitivity arrangement measures soil movement. Wet soil will be more efficient than dry soil. The soil sensor editing module has a comparison in it. The voltage from the prongs and the predefined voltage are comparable and the output of the printer is high only when the ground condition is dry. This output from the ground sensor system is provided with an analog input pencil for the small controller. The microcontroller always monitors the analogue input pin. When the moisture in the soil is above the limit, the small controller displays a message that means the same and the motor is turned off. When the effect from the soil sensing system is high i.e. the soil moisture decreases. This will activate the small controller and display the appropriate message on the LCD. When the transistor is turned on, the relay coil becomes active and turns on the motor. When the soil moisture reaches a threshold value, the output of the soil sensor output is low and the motor is switched off.

4. TECHNICAL BACKGROUND

4.1 HARDWARE DESCRIPTION

The moisture sensor is interfaced with PIC microcontroller. The input signals of the moisture sensor are sent to the PIC microcontroller. Whenever the moisture content of the soil drops, the sensor senses the change, giving signal to the microcontroller so that the pump will be activated. The microcontroller continuously monitors the analogue input pin. When the moisture present in the soil is above the given threshold value, the microcontroller automatically displays an appropriate message. It will trigger the microcontroller

and an appropriate message will be displayed on the LCD. pH values will be determined by using the sensor and will be displayed on the LCD. The obtained values from the respective sensors will be monitored and the pump can be turned ON or OFF based on the obtained values. SMS will be sent to the user via Wi-Fi module.
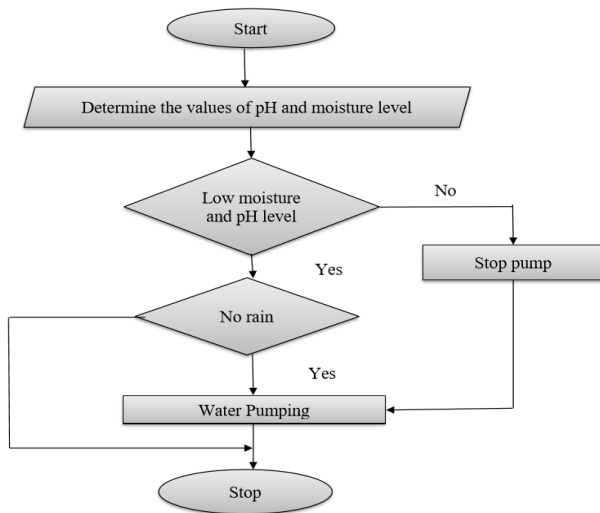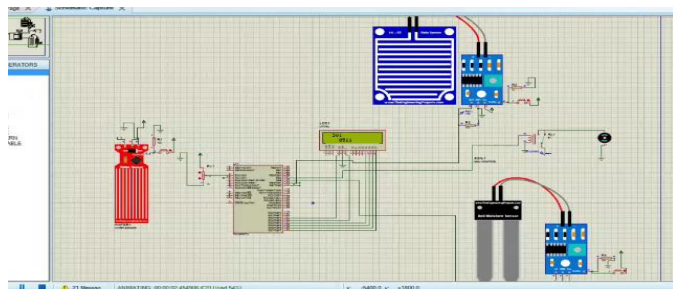

4.2 SOFTWARE DESCRIPTION

This system is designed using Proteus software which is a free software platform. Here we can find these sensors and can also install sensor libraries. These sensors are connected to a microcontroller and can also be simulated.

4.2.1 EXPERIMENTAL RESULTS
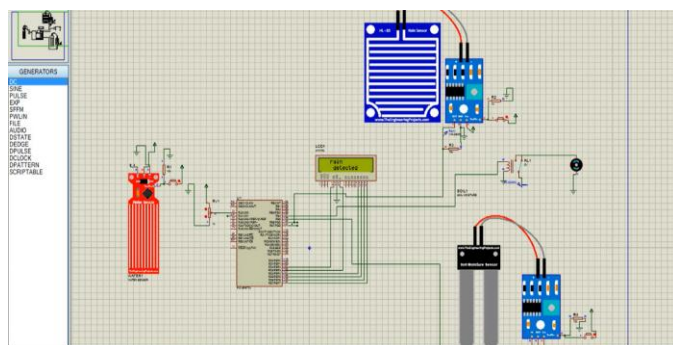
**Fig 1 –** Automated Irrigation System

Fig 2 – LCD displaying moisture value

By simulating the above circuit in Proteus software, the amount of moisture content, pH values are determined by using the respective sensors. With the help of the rain sensor, the moisture condition of the soil will be determined. As per the program when the soil is wet, the water pump will be turned off and in dry condition pump will be turned on. And the collected data will be sent to the cloud platform via Wi-Fi module and the notifications will be sent to the respective user.
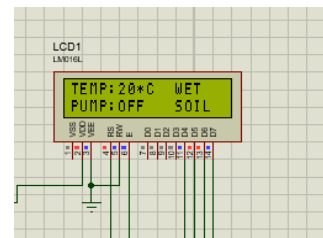
Fig 3 – LCD display in wet condition (zoom view)
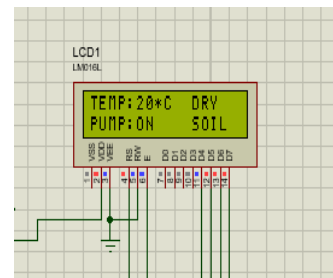
Fig 4 – LCD display in dry condition (zoom view)

5. CONCLUSIONS

Artificial process of providing water to the soil for planting crops called irrigation. Agriculture is one of the areas where water is most needed a large amount. Today, water scarcity becomes one of the problems major world problems. So, in order to overcome this issue, microcontroller automatic drip irrigation system is introduced. More watering The system can wet the lower leaves of plants. When the soil is irrigated, the soil will be saturated and lasts for a long time. These conditions lead to plant infections. Ways to irrigate more plenty of water. Therefore, this technology is used to solve this problem.

6. FUTURE SCOPE

This automated system for multi-cropping will be developed with full automation of fertilizer input to the farm. In this work, an attempt is made to develop an automated irrigation control and monitoring system using android technology which will definitely help to enhance crop cultivation.

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