Plant irrigation System

1st Mohammed Jamal
Faculty of Computer and Information Systems
Islamic University
Madinah, Saudi Arabia
362049583

2nd Ahmed AL-Abboud
Faculty of Computer and Information Systems
Islamic University
Madinah, Saudi Arabia
361010783

3rd Ahmed Saleh
Faculty of Computer and Information Systems
Islamic University
Madinah, Saudi Arabia
362047783

Abstract

In present days, in the field of agriculture farmers are facing major problems in watering their crops. It's because they don't have proper idea about the availability of the power. Even if it is available they need to pump water and wait until the field is properly watered, which compels them to stop doing other activities. which are also important for them, and thus they loss their precious time and efforts. But, there is a solution is a solution is the use of plant irrigation system not only helps farmers but also others for watering their gardens as well. Some farmers also irrigate their farms at random way where water consumption significantly. As a result, there is a chance to get the plants damaged. This project is an excellent solution for such kind of problems. Having an automatic plant watering system is one of those gadgets that helps make daily life just a little bit easier. This project aims to help people and farmers to irrigate their plants in a modern and organized manner that helps reduce water consumption and increase plant productivity This project is a mobile application linked to the irrigation network on the farm or garden so that the user can know the water temperature and the soil moisture ratio. Based on these indicators he sends an order to open or close the water.

I. INTRODUCTION

With two thirds of the earth's surface covered by water and the human body consisting of 75 percent of it, it is evidently clear that water whether groundwater, rainwater or otherwise, is the secret of life on earth. Given the limited nature of these sources, water is a source of strength and a major force in people's lives. Agriculture plays an essential role in the economic and social development in the world. Globally, the farm is the largest consumer of water and consumes 85 per cent of the withdrawn water in the Middle East. Water use by irrigation is often very inefficient if a small portion of the water is used effectively to irrigate the plants and crops while the remaining water is disposed

Irrigation is the replacement or supplementation of rainwater with another source of water. The main idea behind irrigation systems is that your lawns and plants are maintained with the minimum amount of water required.

Water is a fragile natural resource and we must incorporate methods to conserve it and not over-use it. The implementation of an irrigation system will help conserve water, while saving you time, money, preventing weed growth and increasing the growth rate of your lawns, plants, crops and flowers.

II. LITERATURE REVIEW

In the age of advanced technology and electronics, the life style of the human should me smart, simpler, easier and much more convenient. So, therefore; there is a need for many automated systems in human's daily life routine to reduce their daily activities and jobs. Here an idea of one such system named as automatic plant watering system is very useful. As many people are facing a lot of problem watering the plants in the garden, especially when they away from the home. This model uses sensor technologies with microcontroller in order to make a smart switching device to help millions of people.

Watering is the most important cultural practice and most labor-intensive task in daily greenhouse operation. Watering systems ease the burden of getting water to plants when they need it. Knowing when and how much to water is two important aspects of watering process. To make the gardener works easily, the automatic plant watering system is created. There have a various type using automatic watering system that are by using sprinkler system, tube, nozzles and other.

A Review on Automated Irrigation System using Wireless Sensor Network. parameters and environment. Hence there is a need of efficient monitoring and control system. In today's era, the traditional methods that are used for irrigation, such as overhead sprinkler and flood type, is not that much efficient. They result in a lot of wastage of water and can also promote disease such as fungus formation due to over moisture in the soil. Automated irrigation system is essential for conservation of the water and indirectly viability of the farm since it is an important commodity [3].

85% of total available water resources across the world are solely used for the irrigation purpose [3]. In upcoming years this demand is likely to increase because of increasing population. To meet this demand, we must adopt new techniques which will conserve need of water for irrigation process. In automation system water availability to crop is monitored through sensors and as per need watering is done through the controlled irrigation. The advancement in the technologies has enabled the use of state-of-art technology at a reasonably low cost. Wireless sensor network (WSN) can be used in such system to enhance its monitoring capability by distributing sensors all over the field and monitoring environmental parameters remotely. WSN consist of small nodes which work on its own and has a sensor embedded. They collect the data and transmit it over wireless medium to a central system where data from all the nodes is collected and processed [3].

The number of devices connected to the Internet is experiencing an explosive growth. The interconnection of

smart objects embedded with sensors enables them to interact with the environment and among themselves, forming a Wireless Sensor Network (WSN). These network nodes perform acquisition, collection and analysis of data, such as temperature and soil moisture. Such data can be employed to automate the irrigation process in agriculture while decreasing water consumption, resulting in monetary and environmental benefits. The high storage and processing capabilities, the rapid elasticity and paper-use characteristics makes Cloud Computing an attractive solution to the large amount of data generated by the WSN. This paper proposes and evaluates on a real deployment a cloud-based Wireless Sensor and Actuator Network (WSAN) communication system. This solution monitors and controls a set of sensors and actuators, respectively, to assess plants water needs.(4)

III. PROBLEM STATEMENT

The use of water by irrigation is often very inefficient if a small portion of the water is used effectively to irrigate the plants and crops while a large amount of the remaining water is disposed of without interest, so the cost is very high. On the other hand, people cannot see their plants and their gardens when they are outside the house, which may lead to death and damage to these plants. There are also problems with the consumption of a large amount of water in traditional irrigation, and the immersion of the land in water leads to increased salinity and thus reduce fertility.

IV. AIM

Increase plant productivity when irrigating in a modern and organized manner by building application and use of sensors that help farmers to irrigate their plants in an easy and economical manner that contributes to water conservation.

V. ARGUMENTS

There are some important arguments which most people mentioned for plant irrigation system, most importantly :

- Preserving water through irrigation in a modern and organized manner.
- The rate of water added can be controlled. and distribution of water regularly.
- Reduce the costs required for irrigation in the traditional way.

VI. OBJECTIVES

- Building an application.
- Use sensors to measure the water temperature, soil moisture and weather temperature .
- Source of water for example: tank, river, lake, etc.
- Connect the sensor to the application.
- Connect the open and close water process to the application.

VII. METHODS

1) Literature Analysis.

Many irrigation systems are a wired device connected to the water source and controlled manually, either in our system will be equipped with remote control and reading data through the application where the user to know the temperature of water and soil moisture and open and close the water remotely. Of some systems used in plant irrigation:

a) Drip irrigation: A type of localized irrigation in which drops of water are delivered at or near the root of plants. In this type of irrigation, evaporation and runoff are minimized.

b) Rotary systems: This system is best suited. This system tells more space in smaller amounts of water over a longer period. It operates in a circular motion where the sprinklers reach large areas.

2) Gathering information.

We searched and compiled the information needed to build the system and relied on the search for information on scientific journals, previous statistical studies and researches and sites interested in this field.

3) Implementation.

The plant irrigation system is applied to a prototype to ensure that functions and tasks are performed as required and to test the accuracy of measurements from the sensors.
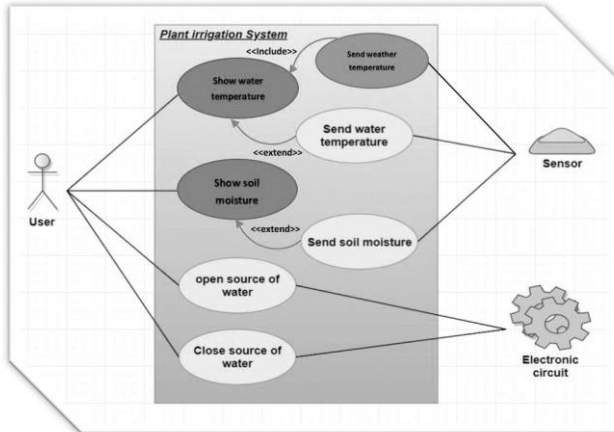
4) Survey.

This is the form of survey that we give it to farmers.
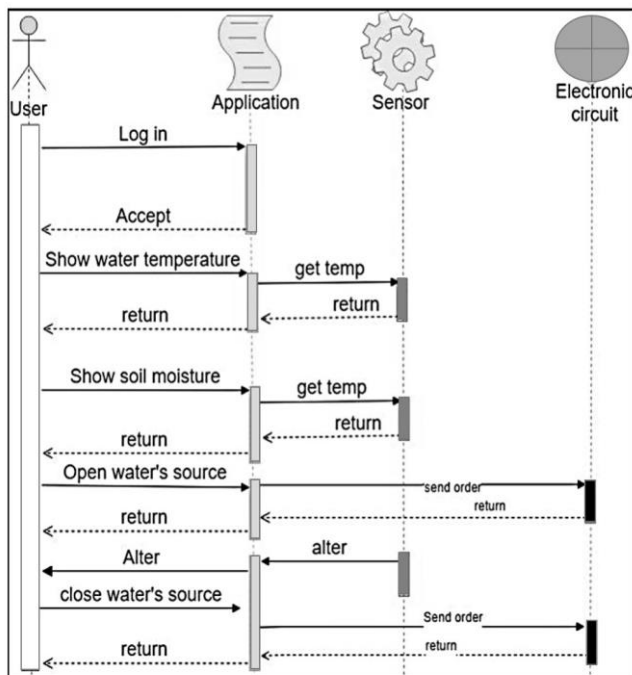
VIII. DESIGN THE SYSTEM

- Use case diagram.

The purpose of this diagram is to demonstrate the different ways that a user might interact with a system and to show the main function of the system.


- Sequence diagram .

This diagram is used to describes how-and in what order-a group of objects works together. The user can log into the application and get the measurements of water temperature and soil moisture.

Depending on these measurements, the user sends the order to the circuit to open the water source, and when the humidity reaches the required limit, the sensor sends an alert to the user, then the user sends another order to the circuit to close the water.

- Interface design.

The system's main interface contains a screen to show the measurements and four buttons to send commands the user.
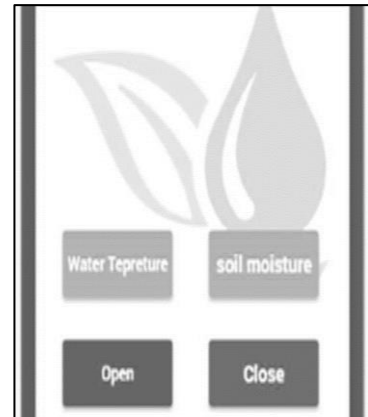
IX. SYSTEM ACTION

- How does the sensor work?:

The Jordanians send a signal to the sensor of the beginning, and the sensor starts to measure the temperature and humidity in place, then comes the role of transmission to the Jordanians and then read the values of the signal.

- How to connect the sensor to the application?:

The connection between the sensor and the application will be connected by an Arduino circuit that will be programmed to do these things so that the sensor sends signals to the electric circuit (the Arduino) that will be processed to send a signal to the application and the farmer will open the application and press the appropriate command for the operation.

- The process of opening and closing water:

When the soil becomes dry, the sensor sends a signal to electric circuit (the Arduino) , which in turn sends a signal to the server then the server will send notification to the application. The user will open the app, then press the appropriate command of the process, which will then be sent to the circle. The circuit will then process it and give it to the sensor. To open the tap, then pump water pumps to irrigate the soil. If the soil becomes wet, we do the same steps and close the tap.

X. SYSTEM BENEFITS

a) Lack of need for workers and thus reduce financial costs.
b) Maintains high soil quality using a small amount of water.
c) Reduces water costs and large pumping operation on agriculture.
d) Do not need too big generators and thus reduce energy consumption and reduce the process of environmental pollution.

XI. CONCLUSION

Irrigation is the artificial application of water to the soil. It is used in agricultural production where there is insufficient water at the right time for crop production and can also be needed where the crop is out of its natural range. There are potential risks associated with irrigation. If either the amount of water or the quality is incorrect, the farmer runs the risk of not only wasting water but also damaging the soil. This study shows that precision irrigation systems with moisture sensors are extremely.

Advantageous for growing crops in agricultural systems. In the study, when comparisons used to

determine the amount of water required in the plant growth stages and obtained climatic data are

considered, it is identified that appropriately meeting the amount of water determined for each

period is effective for agriculture growth. Thus, an important advantage is obtained by adjusting the

amount of water needed in the plant growth stages and by consuming the water depending on the

soil moisture with classic drip irrigation systems. When the total water demand is calculated.

When the technological point of view is considered, the system can be operated through integration with smart phones. Thence, all system can be controlled. Especially if one considers that smart phones are widely used.

We will hope that after we implement this plant irrigation system the percentage of consumption of water will decrease and the productivity of plant will increase.

In the future work, we can add more features such as to convert the system to automatic mode so that the system decides by itself the date of opening and closing.

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