Automatic Gardening System using Arduino

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ABSTRACT

In India, farming assumes an essential part in the improvement of food production. In Irrigation framework, contingent on the soil , water is provided to plant. Regardless of however climate it is, either excessively hot and dry or excessively shady and wet, you need to have the capacity to control the measure of water that achieves your plants.The "programmed water supply framework " is the framework checks the soil moisture by moisture sensor. The framework utilizes the ATmega328 miniaturized scale controller. It is modified to detect moisture level of plants at specific example of time, if the moisture content is not as much as determined edge which is predefined as per specific plant's water require then wanted measure of water is provided till it achieves limit. This spares water and the plants can get ideal level of water. This will expand the efficiency of the product. Framework is outlined such that it reports its ebb and flow state and also remind the client to add water to the tank.All this notices are made through portable application. We trust that through this model we as a whole can appreciate having plants, without being stressed over missing or carelessness. The framework is continuous based and concentrates the correct state of fields.

Keyword: *Irrigation, arduino, Gardening*

1. INTRODUCTION

Localized irrigation in modern drip irrigation systems, the most significant Drip Irrigation advantage is Continuous increasing demand of food requires the control in highly specialized greenhouse vegetable rapid improvement in food production technology. In a production and it is a simple, precise method for country like India, where the economy is mainly based on irrigation. It also helps in time saving, removal of human agriculture and the climatic conditions are isotropic, still error in adjusting available soil moisture levels and to we are not able to make full use of agricultural resources. Maximize their net profits.The main reason is the lack of rains & scarcity of land Irrigation is the artificial application of water to the soil reservoir water. The continuous extraction of water from usually for assisting in growing crops. In crop production earth is reducing the water level due to which lot of land is it is mainly used in dry areas and in periods of rainfall coming slowly in the zones of un-irrigated land. Another shortfalls, but also to protect plants against frost. This project will ripen and contrivance an automatic garden monitoring system that can be utilized to improve the condition of household gardens and can also be expanded to greenhouses. [1] This will make the planned use of water so that we can fight with the problem paucity of water. Arduino board is the back bone of whole system as provides an interface between the analog sensors and digital systems, while it also does calculations and other functions for determining the task to be executed by modules. [2] Real time data will be collected by employing several analog and digital sensors, such as light, temperature, soil moisture sensors. [3] These sensors will then be integrated with an Arduino microcontroller. To make device more user friendly remote access is done through GSM. T h e users c a n a l s o adjust the conditions of the garden accordingly improving the health of the user's plants

To analyze the economic drivers and future investments of a potential soil moisture sensor in Tanzania, we focused on three areas: the need for soil moisture sensor, desired design specifications and commercial opportunity. Each key area was initially approached individually.The results of each key sector were compiled and evaluated, narrowing the scope and creating an iterative process. Final market analysis resulted in the formation of a preliminary market research study. Determination of the need for a soil moisture sensor is based upon analysis of key agricultural products in Tanzania. Key crops for analysis are selected from literature review of major

subsistence high value crops. For each agricultural product selected, an economic scenario analysis and study of crop requirements were conducting using information provided.

2. PROBLEM STATEMENT

The most important problems faced are the misusage of electricity and its wastage. Sometimes due to carelessness of the authorities and the workers lamps left ON which results in wastage of electricity. Water wastage is another problem which needs to be dealt with. Our project helps to overcome all these problems. In this project, we are using the GSM to control the overall system. We can avoid the wastage of water by using the water sprinkler During the everyday exercises numerous individuals regularly neglect to water their plants and along these lines it winds up trying for them to keep their plants sound and alive. Additionally it is a test for agriculturists to keep up their fields and oversee watering of plants during lack of water. In light of the above foundation, we believed that it is important to execute the computerized framework which will deal with plants considering every unique part of home cultivating framework and in addition bigger scene and causes them to become solid. Therefore our venture expects to execute a straightforward framework utilizing programmed water system watering a little pruned plant or harvest with insignificant human intercession.

3. PROPOSED SYSTEM

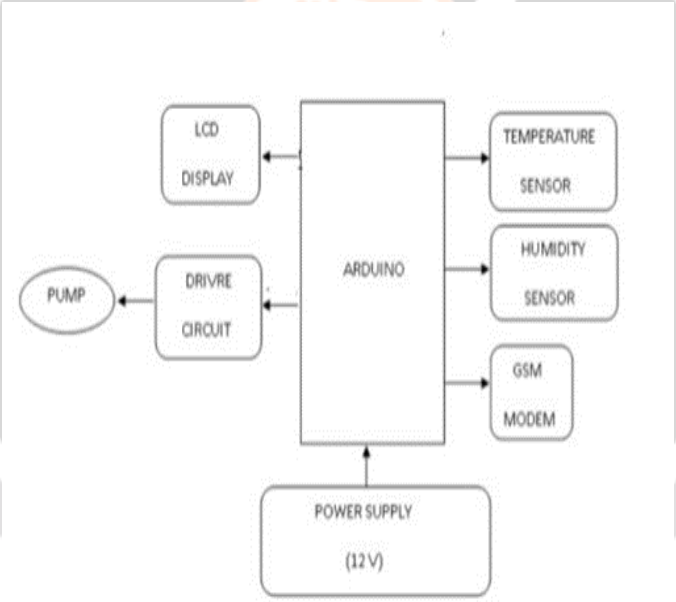

Fig-1: System Architecture

There are two functional components in this project. They are moisture sensor and motor / pump. Arduino board is programmmed using the Arduino IDE software. Humidity sensor is used to detect the soil moisture content. Motor / pump is used to supply water to plants. Soil moisture and temperature predetermined range is set particularly for specific plants requirement, and according to that system is being operated. Microcontroller (ATmega328), is the brain of the system. Both humidity and temperature sensor is connected to the controller's input pin. Pump and servo motor coupled to the output pin. 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. The overall activity is reported to the user using mobile application.

4. PROCEDURE FOR PAPER SUBMISSION

4.1 ORGANISATION OF THE REPORT

The report is divided into 4 parts and each part deals with the different aspects of the system.
*(i)System Design***:** This part talks about the existing system, how they are designed and the issues associated with them. Furthermore, it describes the features of the system proposed and the requirements for operating it.
*(ii)Module Description***:** This part describes each module implemented in the system, i. e., how the data is processed in each and what are the steps involved from the user's point of view . Each module is diagrammatically represented so that there is a clear understanding about what happens at that particular step.
*(iii)System Implementation***:** This part deals with an overview of the platform for which the system is developed for. It also talks about the parameters needed for running the system and provides a sample of code used, along with screen shots of the output.
*(iv)Conclusion***:** This part concludes the report and discusses the possible enhancement that can be implemented in the future improve the quality.

4.2 OBJECTIVE

Very important reason of this is due to unplanned use of Types of Irrigation water due to which a significant to surface irrigation waste that water is supplied near the root zone of sprinkler irrigation. The plants drip by drip due to which a large quantity of water is saved. At the present era, the farmers have been the conventional irrigation methods like overhead using irrigation techniques in India through manual control sprinklers, flood type feeding systems.

4.3 FIGURES

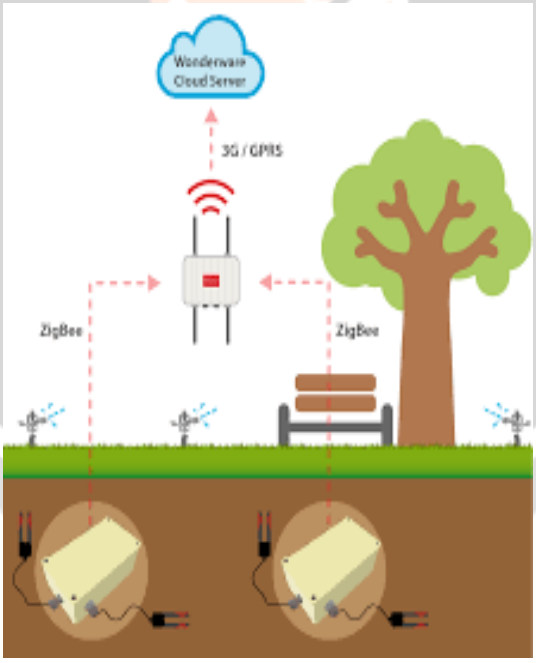

Fig-2: Smart irrigation sample diagram

Fig-3: Scenario where necessary sunlight is obtained

5. MODULE DISCREPTION

Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of an example, soil moisture sensors measure the volumetric water content by implication by utilizing some other property of the dirt, for example, electrical protection, dielectric steady, or communication with neutrons, as an intermediary for the moisture content. The connection between the deliberate property and soil moisture must be adjusted and may differ contingent upon ecological factors, for example, soil write, temperature, or electric conductivity. Reflected microwave radiation is influenced by the dirt moisture and is utilized for remote detecting in hydrology and farming. Convenient test instruments can be utilized by agriculturists or plant specialists.

A. Microcontroller

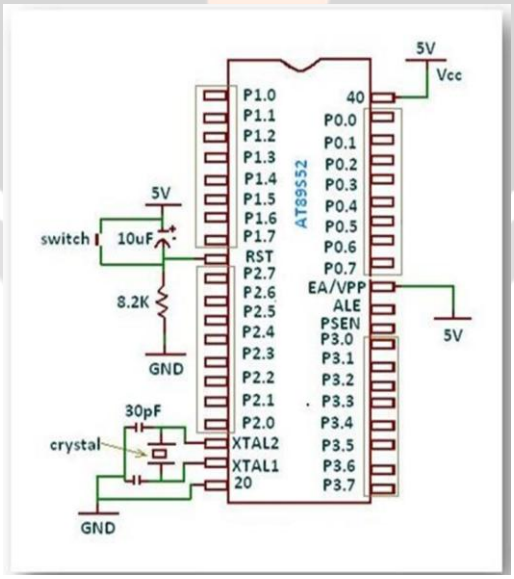

Fig-4: Microcontroller

It Consists of 28-pin AVR Microcontroller having Flash Program Memory: 32 Kbytes. Furthermore, EEPROM Data Memory: 1 Kbytes consists of SRAM Data Memory: 2 Kbytes. With I/O Pins: 23 and Timers: Two 8-bit/One 16-bit and an A/D Converter: 10-bit Six Channel is available.

Micrococontroller comprises of PWM: Six Channels with an oscillator named RTC: Yes with Separate Oscillator.

B. Moisture sensor

Fig-5: Moisture sensor

C. Water Pump

Fig-6: Water pump

A small pump plus a driver. A driver is to provide enough current for the pump, my application needs a spray distance about one meter, so this pump is enough. But if you need to make a system that needs a large spray range, you may need larger pumps, or even a pressurized device to make the projectile even farther, such as the watering system in a

tea garden.

D. LCD (Liquid Crystal Display)

LCD panel consists of two patterned glass panels in which crystal is filled under vacuum. The thickness of glass varies according to end use. Most of the LCD modules have glass thickness in the range of 0.70 to 1.1mm.

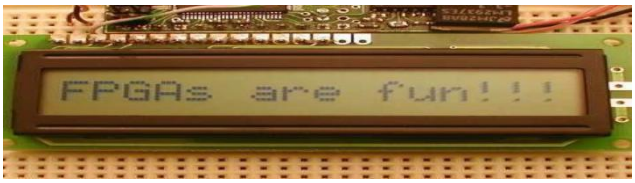

Fig-7: LCD

A picture of a liquid crystal displayNormally these liquid crystal molecules are placed between glass plates to form a spiral stair case to twist the twist the light. Light entering the top plate twist 900 times before entering the bottom plate. Hence the LCDs are also called as optical switches. These LCD cannot display any information directly. These act as an interface between electronics and electronics circuit to give a visual output. The values are displayed in the 2x16 LCD modules after converting suitably. The liquid crystal display (LCD), as the name suggests is a technology based on the use of liquid crystal. It is a transparent material but after applying voltage it becomes opaque. This property is the fundamental operating principle of LCDs.

6.WORKING

A. Circuit Design of Auto Irrigation System using Soil Moisture Sensor

The point of the task is to control an engine in view of the dampness in the soil. The outline of the circuit is as per the following. PIC 16F877A is the principle preparing IC. A 12 MHz precious stone oscillator is associated crosswise over OSC1 and OSC2 (Pins 13 and 14). The precious stone is associated with two 33pF capacitors. The Master Clear sticks is ordinarily associated with Vcc by means of a draw up resistor. A sidestep catch is associated with ground. This catch is utilized to reset the microcontroller. The yield of the soil dampness sensor is given to RA0 (Pin 2) of the PIC microcontroller. A LCD is utilized to show the key messages. The information pins of the LCD are associated with Port B of the PIC (Pins 33 – 40). The control pins of the LCD are associated with the Port C. The associations are as per the following: RS stick of LCD to RC0 (Pin 15) of PIC, RW to RC1 (Pin 16) and E to RC3 (Pin 18).

An LED is connected between the DC supply and the collector and glows only when the motor is running.

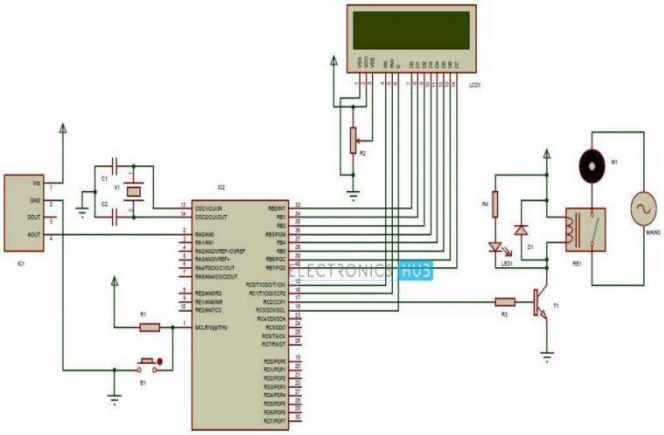

Fig-8: *Circuit Design of Auto Irrigation System using Soil Moisture Sensor*

B. Working of circuit

The idea of the project is to implement an automatic irrigation system by sensing the moisture of the soil. The working of the circuit is as follows.

The soil moisture sensor is inserted in the soil. Depending on the quality of the sensor, it must be inserted near the roots of the plant. The soil moisture sensor measures the conductivity of the soil. Wet soil will be more conductive than dry soil. The soil moisture sensor module has a comparator in it.The voltage from the prongs and the predefined voltage are compared and the output of the comparator is high only when the soil condition is dry. This output from the soil moisture sensor is given to the analogue input pin (Pin 2 – RA0) of the microcontroller. The microcontroller continuously monitors the analogue input pin. When the moisture in the soil is above the threshold, the microcontroller displays a message mentioning the same and the motor is off. When the output from the soil moisture sensor is high i.e. the moisture of the soil is less. This will trigger the microcontroller and displays an appropriate message on the LCD and the output of the microcontroller, which is connected to the base of the transistor is high.When the transistor is turned on, the relay coil gets energized and turns on the motor. The LED is also turned on and acts as an indicator.

C. Applications

The circuit can be used to measure the loss of moisture in the soil over time due to evaporation and intake. Minimizes water waste and improves plant growth. The circuit is designed to work automatically and hence, there is no need for any human intervention. The project is intended for small gardens and residential environment. By using advanced soil moisture sensor, the same circuit can be expanded to large agricultural fields.

7. CONCLUSION

The primary applications for this project are for to water their crops/plants. It also covers those farmers who are wasteful of water during irrigation. The project can be extended to greenhouses where manual supervision is far and few in between. The principle can be extended to create fully automated gardens and farmlands. Combined with the principle of rain Acknowledgment water harvesting, it could lead to huge water savings if applied in the right manner. In agricultural lands with severe shortage of rainfall, this model can be successfully applied to achieve great results with most types of soil.

8. REFERENCES

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