

Automatic Water Supply System Using Smart Irrigation Techniques

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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.

1. INTRODUCTION

Limited water framework in introduce day spill water framework structures, the most gigantic Drip Irrigation advantage is Continuous growing enthusiasm of food requires the control in incredibly particular nursery vegetable quick change in sustenance age advancement. In an age and it is a clear, correct technique for country like India, where the economy is basically in light of water framework. It moreover helps in proficient, ejection of human agriculture and the climatic conditions are isotropic, still bungle in changing open soil soddenness levels and to we are not prepared to make full use of rustic resources. Enlarge their net profits. The essential reason is the nonattendance of deluges and lack of land Irrigation is the reenacted use of water to the dirt store water. The constant extraction of water from as a rule for assisting with creating yields. In alter creation earth is reducing the water level in light of which bundle of land is it is for the most part used as a piece of dry zones and in the midst of precipitation coming step by step in the zones of un-overwhelmed arrive. Another deficiencies, yet furthermore to guarantee plants against ice.

To analyze the budgetary drivers and future theories of a potential soil soggy sensor in Tanzania, we focused on three zones: the necessity for soil clamminess sensor, needed arrangement conclusions and business opportunity. Each key zone was at first pushed toward individually. The outcomes of each key part were fused and evaluated, narrowing the expansion and making an iterative system. Last market examination achieved the course of action of a preliminary measurable reviewing study. Affirmation of the necessity for a dirt clamminess sensor relies upon examination of key plant things in Tanzania. Key items for examination are browsed composing review of genuine subsistence high regard crops. For each green thing picked, a financial circumstance examination and examination of item necessities were coordinating using information gave.

2. PROBLEM DESCRIPTION

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

There are two utilitarian segments in this project. They are dampness sensor and engine/pump. Arduino board is customized utilizing the Arduino IDE programming. Moistness sensor is utilized to recognize the dirt dampness content. Engine/pump is utilized to supply water to plants. Soil dampness and temperature foreordained range is set especially for particular plants necessity, and as indicated by that framework is being worked. Microcontroller (ATmega328), is the cerebrum of the framework. Both moistness and temperature sensor is associated with the controller's info stick.

Pump and servo engine coupled to the yield stick. If there should arise an occurrence of soil dampness esteem is not as much as edge framework naturally triggers water pump on till sensor meets limit and after that sets off consequently. The general movement is accounted for to the client utilizing portable application.IV. Procedure for Paper Submission.

A. 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.

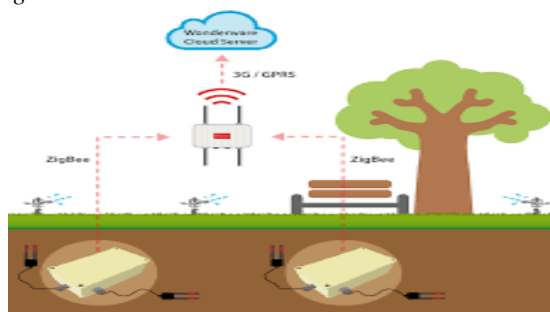
(iii)*System Implementation:* This part deals with an overview of the platform for which the system is developed for. It also talks about the parameters needed for running the system and provides a sample of code used, along with screen shots of the output.

(iv)*Conclusion:* This part concludes the report and discusses the possible enhancement that can be implemented in the future improve the quality.

B. Objective

Important reason of this is because of spontaneous utilization of Types of Irrigation water because of which a critical to surface water system squander that water is provided close to the root zone of sprinkler water system. The plants dribble by trickle because of which a vast amount of water is spared. At the present time, the ranchers have been the traditional water system strategies like overhead utilizing water system methods in India through manual control sprinklers, surge write nourishing frameworks.

C. Figures



Smart irrigation sample diagram



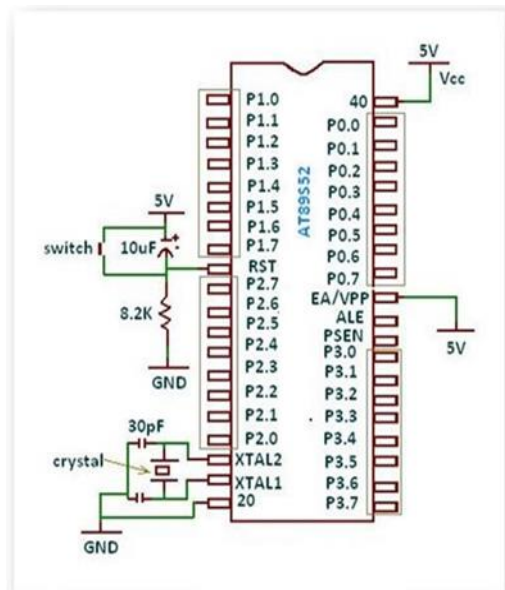
Scenario where necessary sunlight is obtained.

4. MODULE DISCREPTION

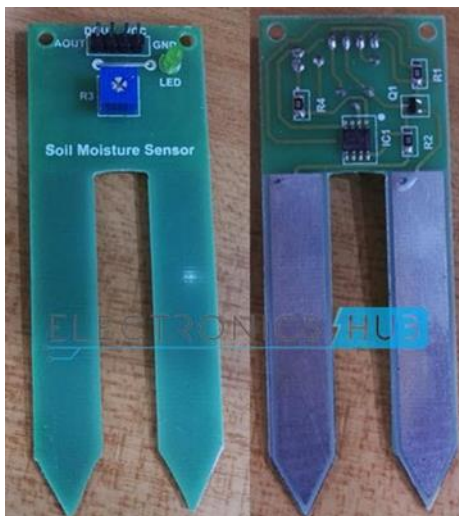
A. Microcontroller

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



Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric estimation of free soil moisture requires expelling, drying, and weighting of an illustration, soil moisture sensors measure the volumetric water content by suggestion by using some other property of the earth, for instance, electrical security, dielectric enduring, or correspondence with neutrons, as a middle person for the moisture content. The association between the think property and soil moisture must be balanced and may contrast dependent upon environmental elements, for instance, soil compose, temperature, or electric conductivity. Reflected microwave radiation is affected by the earth moisture and is used for remote recognizing in hydrology and cultivating. Advantageous test instruments can be used by agriculturists or plant authorities.

C. Water Pump

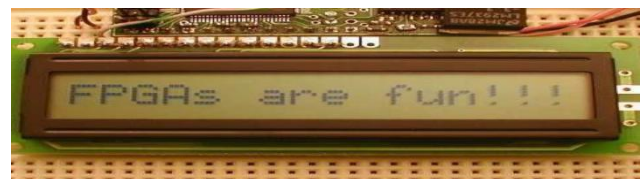


A little pump in addition to a driver. A driver is to give enough flow to the pump, my application needs a shower separate around one meter, so this pump is sufficient. In any case, on the off chance that you have to make a framework that needs an expansive shower go, you may require bigger pumps, or even

a pressurized gadget to make the shot significantly more remote, for example, the watering framework in a tea cultivate.

D. LCD(Liquid Crystal Display)

LCD board comprises of two designed glass boards in which precious stone is filled under vacuum. The thickness of glass shifts as indicated by end utilize. The vast majority of the LCD modules have glass thickness in the scope of 0.70 to 1.1mm.



A photo of a fluid precious stone display Normally these fluid gem atoms are set between glass plates to shape a winding stair case to contort the curve the light. Light entering the best plate turn 900 times previously entering the base plate. Consequently the LCDs are likewise called as optical switches. These LCD can't show any data specifically. These go about as an interface amongst hardware and gadgets circuit to give a visual yield. The qualities are shown in the 2x16 LCD modules subsequent to changing over appropriately. The fluid precious stone show (LCD), as the name recommends is an innovation in view of the utilization of fluid gem. It is a straightforward material however in the wake of applying voltage it ends up dark.

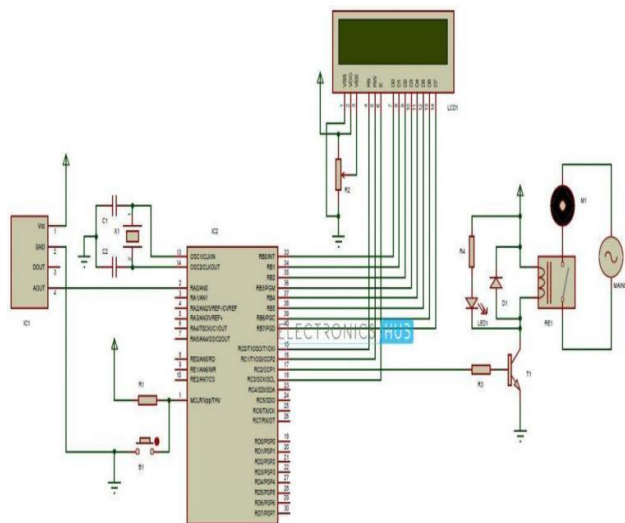
This property is the essential working rule of LCDs.

5. WORKING

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

The purpose of the errand is to control a motor in perspective of the soddenness in the soil. The layout of the circuit is according to the accompanying. PIC 16F877A is the standard getting ready IC. A 12 MHz valuable stone oscillator is related transversely finished OSC1 and OSC2 (Pins 13 and 14). The valuable stone is related with two 33pF capacitors. The Master Clear sticks is normally connected with Vcc by methods for a draw up resistor. An evade get is related with ground. This catch is used to reset the microcontroller. The yield of the soil sogginess sensor is given to RA0 (Pin 2) of the PIC microcontroller. A LCD is used to demonstrate the key messages. The data pins of the LCD are related with Port B of the PIC (Pins 33 – 40). The control pins of the LCD are related with the Port C. The affiliations are according to the accompanying: RS stick of LCD to RC0 (Pin 15) of PIC, RW to RC1 (Pin 16) and E to RC3 (Pin 18).

A LED is associated between the DC supply and the authority and gleams just when the engine is running.



B. Working of circuit

The likelihood of the errand is to complete a modified water framework system by distinguishing the clamminess of the dirt. The working of the circuit is according to the accompanying.

The moisture sensor is implanted in the dirt. Dependent upon the idea of the sensor, it must be installed near the basic establishments of the plant. The dirt clamminess sensor measures the conductivity of the dirt. Wet soil will be more conductive than dry soil. The dirt moistness sensor module has a comparator in it. The voltage from the prongs and the predefined voltage are taken a gander at and the yield of the comparator is high exactly when the dirt condition is dry. This yield from the dirt clamminess sensor is given to the basic data stick (Pin 2 – RA0) of the microcontroller. The microcontroller constantly screens the basic information stick. Right when the moistness in the dirt is over the point of confinement, the microcontroller demonstrates a message saying the same and the motor is off. Exactly when the yield from the dirt sogginess sensor is high i.e. the soddenness of the dirt is less. This will trigger the microcontroller and introductions a fitting message on the LCD and the yield of the microcontroller, which is related with the base of the transistor is high. When the transistor is turned on, the hand-off twist gets engaged and turns on the motor. The LED is moreover turned on and goes about as a marker.

C. Applications

The circuit can be utilized to gauge the loss of dampness in the

soil after some time because of dissipation and admission. Limits water squander and enhances plant development. The circuit is intended to work consequently and subsequently, there is no requirement for any human intercession. The undertaking is planned for little gardens and private condition. By utilizing propelled soil dampness sensor, a similar circuit can be extended to substantial farming fields.

6. CONCLUSION

The basic applications for this undertaking are for to water their yields/plants. It moreover covers those farmers who are wasteful of water in the midst of water framework. The errand can be connected with nurseries where manual supervision is far and few in the center. The preclude can be come to make totally motorized porch nurseries and farmlands. Joined with the run of rain Acknowledgment water gathering, it could incite gigantic water speculation stores if associated in the right way. In cultivating grounds with outrageous insufficiency of precipitation, this model can be adequately associated with achieve magnificent results with most sorts of soil.

REFERENCES

- [1] Joaquín Gutiérrez, Juan Francisco Villa-Medina, Alejandra NietoGaribay, and Miguel Ángel Porta- Gándara “Automated Irrigation System Using a Wireless Sensor Network and GPRS Module ” IEEE 2013.
- [2] Samy Sadeky, Ayoub Al-Hamadiy, Bernd Michaelisy, Usama Sayedz, “ An Acoustic Method for Soil Moisture Measurement ”, IEEE 2004.
- [3] Thomas J. Jackson, Fellow, IEEE, Michael H. Cosh, Rajat Bindlish, Senior Member, IEEE, Patric J. Starks, David D. Bosch, Mark Seyfried, David C. Goodrich, Mary Susan Moran, Senior Member, IEEE, and Jinyang Du ,“Validation of Advanced Microwave Scanning Radiometer Soil Moisture Products”, IEEE 2010.
- [4] Jia Uddin, S.M. Taslim Reza, Qader Newaz, Jamal Uddin, Touhidul Islam, and Jong-Myon Kim, “Automated Irrigation System Using Solar Power” ©2012 IEEE.
- [5] Ms. Sweta S. Patil, Prof. Mrs. A.V. Malvijay, “Review for ARM based agriculture field monitoring system”, International Journal of Scientific and Research Publications, Volume 4, Issue 2, February 2014.
- [6] Zhang Feng Yulin University Yulin University tfnew21@sina.com, “ Research on water-saving irrigation automatic control system based on Internet of things Institute of Information Technology”, 2011 IEEE.
- [7] Awati J.S., Patil V.S., “Automatic Irrigation Control by using wireless sensor networks”, Journal of Exclusive Management Science - June 2012-Vol 1 Issue 6.
- [8] Rashid Hussain, JL Sahgal, Anshulgangwar, Md.Riyaj , “Control of Irrigation Automatically By Using Wireless Sensor Network”, International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3, Issue-1, March 2013.
- [9] Shaohua Wan, “Research on the Model for Crop Water Requirements in Wireless Sensor Networks”, 2012 International Conference on Management of e-Commerce and e-Government.