

Review Paper on Automated Watering System Using IoT

Asrifa Rahman¹, Kitartha Koushik Hazarika²,Pranav Kumar³

¹Department of Information Technology, Kaziranga University, Jorhat, Assam-785006, India,

²Department of Information Technology, Kaziranga University, Jorhat, Assam-785006, India,

³Department of Computer Science and Engineering, Kaziranga University, Jorhat, Assam-785006, India,

Abstract -In daily operations like farming and gardening watering is the most needed for every task. No matter whatever weather it is, too dry, hot, cloudy or wet, you want to be able to control the amount of water that reaches your yards. Watering systems could be productively used to water plants when they need it but this physical procedure of watering needs two major exposure to be examine: when and how much to water. In order to replace physical ventures and making farmer's work trouble-free, we have create automatic watering system to water the plant growth by adding automated plant watering system to the garden and agricultural field, it will help all of the plants get to their fullest capability as well as preserving water. By using Wi-Fi-module and Soil Moisture Sensor, we have design a system that is perfect for every plant in the yard. For execution of automatic plant watering system, we have used Arduino. It is programmed to recognize moisture level of plants at specific occurrence of time. When Arduino reads value from moisture sensor it activates the solenoid valve as per to the required state.

1. Introduction

We all know that plants are very favorable to all human beings in many outlooks. Plants supports in charging the surrounding healthy by cleaning air naturally and give rise to oxygen. Numerous human beings warmth to have plants in their lawn. But due to advancement and lack of place many people used to grow plants in a mold, pot, and placed on the doorpost. These plants are depending on typical

upbringing- watering, and dispense the right amount of sun to endure life and growth. In busy schedule of everyday life, many time people forget to water their plants and because of these plants suffer much disorganization and eventually died. In addition, the earth's considerable problem in present day society is the poverty of water resources; agriculture is a challenging job to globe huge amounts of water. It is very necessary to make use of water resources in decent way. Thus, a system is needed, to hold this piece of work automatically. Automated plant watering system evaluates and calculates the existing plant and then provides necessary amount of water needed by that plant. It is reducing the excess water utilize as well as keeping plants well.

Based on the above backdrop, we belief that it is compulsory to implement the automated system which will take care of plants considering all the different features of home for system based on household purpose as well as larger landscape for the system based on agricultural farms and helps them to grow fit and well. We also think that technology can help people in fertilizing plants with automation. Therefore, our project aims to implement in a simple system using automatic watering. So, it will be effective to use an idea of automatic plant watering system which waters plants when they need it. To reduce manual activities for the human to watering plant, an idea of plant watering system is adopted. The method employed to monitor the soil moisture level continuously and to conclude whether watering is needed or not, and

how much water is needed in plant's soil. The pH level indicates the solubility of essential nutrients and the light intensity sensor tells us whether the plants are getting enough water or not. The systems send the data over the internet using a Wi-Fi module through which the user can monitor and decide the plants requirements based on the communicated data.

The term "IoT" stands for the Internet of things, can be defined as the interconnection between the individually identifiable embedded computing apparatus in the accessible internet infrastructure. The "IoT" connects various devices and transportations with the help of internet as well as electronic sensors.

2. Literature Review

Naveen Kumar S.K. Akshaya Kumar A [1] soil moisture sensors in agricultures is done according to the particular above Agriculture has been the most important practice from very beginning of the human civilization. It has seen many iterations of development in technology with time. A good agricultural practice is still an art. Environmental parameters such as soil moisture, temperature, humidity, pH, solar radiation etc. plays very important role in overall development of the plant. Temperature affects many of plant activities such as pollination, germination etc. It is observed that, at higher temperature, respiration rate increases that result in reduction of sugar contents of fruits and vegetables. Hence there is a need of efficient monitoring and control system.

MdTanvir Arafat Khan, MdRishad Ahmad [2] design and performance analysis of water pumping using solar PV the framework proposed in this paper Solar photovoltaic pumping offers a way out to the people of Bangladesh from the energy crisis. Numerous technological challenges were overcome through

engineering solutions and finally a representative model of system is built which can be implemented in the field. Upfront cost of the system in the rural areas but private companies, bank can come forward for a solution that can fit to rural people of Bangladesh.

Archana P, Priya R [3] design and implementation of automatic plant watering system. In present days especially farmers are facing major problems in watering their agriculture fields, it's because they have no proper idea about when the power is available so that they can pump water. Even after then they need to wait until the fields is properly watered, which makes them to stop doing other activities. Here is an idea which helps not only farmers even for watering the gardens also, which sense the soil moisture and switches the pump automatically when the power is on.

Anitson TT, Jaison Saji, Rahul Dubey and K. Saravanakumar [4] Smart Gardening System concept can be achieved by automation of gardening processes without the intervention of any human to monitor the plants or to water the plants. Sensors can be fixed to indication the water level, the amount of sunlight and the amount of water level and these parameters can be tweaked according to the type of crop or the plant. Every plant will require a particular amount of water level, and so automation is carried out depending on the type of plant. Automated gardening system helps in reducing human effort in watering and monitoring of plants. It also helps to control the environmental conditions such as soil moisture and temperature required for plants. User can monitor the plants using the mobile application and can utilize the sensor data to create climate recipes for different plants.

Yogesh G. Gawali, Devendra S. Chaudhari, Hitendra C. Chaudhari [5] A Review on Automated

Irrigation System using Wireless Sensor Network. Farming has been the most principle exercise from very origination of the human advancement. It has seen many renewals of evolution in automation with time. Conditional frameworks such as humidity, solar radiation, soil temperature, moisture, pH etc. take a very important role in overall development of the plant. Temperature affects many of plant activities such as pollination, germination etc. It is observed that, at higher temperature, respiration rate increases that result in reduction of sugar contents of fruits and vegetables. Hence there is a need of efficient monitoring and control system.

Aranyak Roy and Dr. Debasis Roy[6] Automatic Water Level Indicator The drinking water cataclysm is reaching distress section. It might very soon reach the essence of global disaster. The project is microcontroller based design which controls the water supply. There are sensors attending in each area which are not operated till water is existing on the area. Here is an idea which helps not only farmers even for watering the gardens also, which sense the soil moisture and switches the pump automatically when the power is on. In case when there is more than one indication for water essential then the microprocessor will prioritize the first go through indicator and spray the grassland correspondingly. Once the area gets dry sensors noticed the requisite till the sensors is shut off again.

3. Methodology

There are two utility constituent in this paper. They are moisture sensor and pump. Arduino board is organized using the Arduino IDE software. Humidity sensor is used to determine the soil moisture content. Pump is used to provide water to plants. Soil moisture and temperature pre-established range is set especially for certain plants requirement and according to that system is being

run. Microcontroller (ATmega328), is the brain of the method. Both humidity and temperature sensor is attached to the director's input pin. Pump and servo motor linked to the output pin. In case the soil moisture value is less than threshold system instinctively activate water pump on till sensor connects threshold and then sets off automatically.

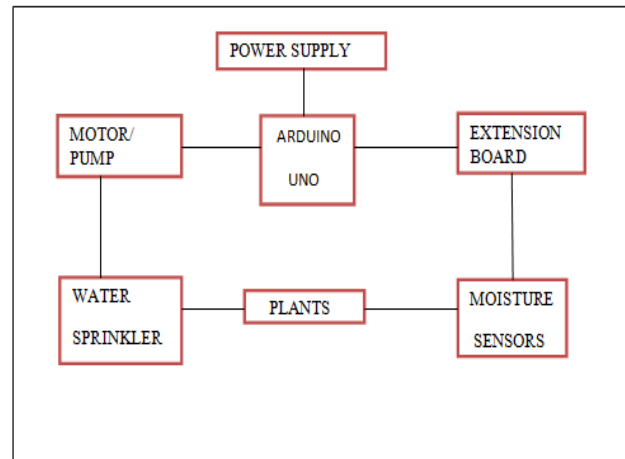


Figure 1:Block diagram of Automated Watering System

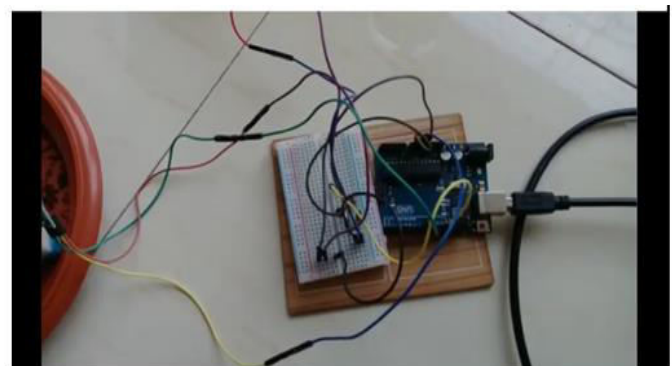


Figure 2:Real-time view of Automated Watering System

3.1. Components Used For Implementation of System

i) **Arduino Uno:**Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input / output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 16 MHz ceramic resonator, USB linked, power jack, ICSP plug, and a reset button. It holds everything needed to keep up the microcontroller; directly use the

USB cable or power it with an AC-to-DC adapter or battery is joined to a computer begins.

ii) Moisture Sensor: Soil moisture sensor calculates the soil water content. Soil moisture examine comprise of a wide variety of soil moisture sensors. Soil moisture sensor automations, regularly used are:

- Frequency domain sensor, like a capacitive sensor.
- Soil resistivity, the soil moisture sensors which can be placed into soil to compute the soil moisture content.
- Neutron moisture meter, quality of the use of water in the neutron moderator.

iii) Water Pump: Water is used to carry out a particular task of artificially pumping. It can be monitored by an electronic microcontroller. It can be on 1 triggered by providing the indication and turned off as required. Artificial process is called Water Pumping Station. There are many variations of pumps. This project utilized a small pump attached to the H-bridge

iv) The Relay Module: Relay is an electrically control switch. Many relays for switching solenoid mechanism mechanically utilized, but can also be used for other principles of operation. Relays are widely used in early computers to telephones and perform logical functioning.

v) Water Level Sensors: Water sensor is a tool used in the observation of the water level for different applications. Water Level sensors are used to determine the level of materials that can flow. Such materials comprise slurries, granular material, liquids and powders. Level measurements can be done middle containers or it can be the level of a river.

vi) Arduino IDE Tool: Arduino open-source domain, you can easily write code and sync it to the 110 board. It runs on Windows, Mac OS X and Linux. Domain is written in Java, and according to the processing, AVC-GCC, as well as other open source software.

3.2 PROPOSED METHODOLOGY

i) Build System Relay: We create interrelations to the solid state relays, Arduino, and small fountain pump

system; Arduino permits the pump open or close automatically. A striped cut through the inner tube of the pump segment insulated wire, only half. Install the new cut wire; there are two output relays at both ends. We put on the bare electrical tape. Finally, the ground relay is attached to the Arduino ground and relay input to the Arduino digital pins.

ii) Build up System Reservoir: Submerged pump supplies a required amount of water needed by the plant in order to work correctly. To automate this process, we use a float valve, which you need to open whenever required; close the interrelation when the water level rises and water pipes. Drilling is high sufficient to make sure that the float valve chamber, enough to assist the width of the tank floats.

iii) Build System tubing and connect: Connection to plastic pipe feed pumps and drilling small holes through which water drops. All of the trunk circuit.

iv) Code: Automated watering system is programmed using Arduino IDE software. Arduino microcontroller look over soil moisture level, if low activating water pump on until sensor reaches sill. After this, the system will re-check the soil moisture between periodic intervals to perceive if you need more water. If the water is in the initial inspection, the systems wait 24 hours and replicate the procedure.

4. Result

From this project, we can access and control the moisture content of the soil of civilized land. According to soil moisture, water pumping motor turned on or off via the relay automatically. This saves water, while the water level can be acquired in a favored feature of the plant, thereby increasing productivity of crops. Servo motor from vegetation water uniformly dispersed in water, in order to ensure the maximum implementation of absorption through. Thus, there is minimal waste of water. The system also permits the delivery to the plant when needed based on the type of plant growth, soil

moisture. Using this sensor, we can check that the soil is wet or dry. If it is dry, the motor will automatically start pumping water.

Results of testing soil moisture sensor, the result of soil moisture used in standard cropping systems. The results are effected by the level of moisture or water content hold in the soil and the soil moist so the smaller value of distinct ADC readings on the sensor, and vice versa. Results of testing the water pump appeared that the water pumps work according to the plan that has been constructed. Although work on the pump voltage is in the range 208-211 volts AC value, Voltage is working on an Arduino pin is at a value of 4.8 volts that can activate a relay driver to perform activation on the water pump.

5. Conclusions

Automatic watering system using a microcontroller, moisture sensor and other electronic devices were been developed. It was perceived that the proposed methodology commands the moisture content of the soil of cultivated land. The motor automatically start pumping water if the soil is dry and need water and end when the moisture content of the soil is continued as required. This idea which helps to water not only the garden even for helping farmer also, In present days farmers are facing major problems in watering their agriculture fields, it's because they have no proper idea about when power is available so that they can pump water. Moreover an IOT device will be used to maintain whole system. Although it seems to be more demanding and challenging, there are many other possibilities like creating complex connections of plants of similar variety or so-called Internet of Plants. Also, utilize more than one indicator is different plan for an exploratory progress, but there are also numerous additional innovative and challenge-like scheme such as using solar power supply, timer for setting irrigation system etc. However, independently of the way used to

construct it, there is no doubt that this system can be very helpful in solving many problems, from those that seem harmless to those that are on the scale of the most important and most dangerous ones for human population. By means of this system, it is possible to control the amount of water released from the process of watering the plant. Although it can be very helpful for humanity in general, agriculturists, craftsmen, and botanists are the people who could have the biggest benefit of using this system.

References

- [1] S. V. Devika, SK. Khamuruddeen et al., "Arduino based automated plant watering system" in International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 10, October 2014.
- [2] Jonathan GanaKolo, "Design and Construction of an Automatic Power Changeover Switch" in AU Journal of Technology, 11(2): (Oct. 2007).
- [3] S. Darshna et al., "Smart Irrigation System" in IOSR Journal of Electronics and Communication Engineering (IOSR JECE), Volume 10, Issue 3, Ver. II (May -Jun.2015).
- [4] D. Mishra, A. Khan, R. Tiwary and S. Upadhyay, "Automated Irrigation System-IoT Based Approach", *3rd International Conference on Internet of Things: Smart Innovation and Usages (IoT-SIU)*, 23-24 Feb., 2018.