AUTOMATING THE IRRIGATION PROCESS BY ANALYZING THE SOIL AND WEATHER CONDITION REPORT

Project report submitted in partial fulfilment of requirement for the degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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UNDER THE GUIDANCE OF

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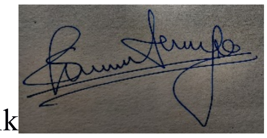
May 2021

DECLARATION

We hereby declare that the work reported in the B.Tech Project Report entitled **“Automating the irrigation process by analyzing the soil and weather condition report”** submitted at **Jaypee University of Information Technology, Waknaghat, India** is an authentic record of our workUnder the oversight of Dr. Salman RajuTalluri ,the work was finished.

Sahitya Bhalaik 
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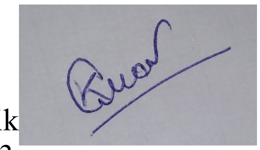
Karan Malik 
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Date: May,2021

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We express our sincere thanks to **Dr.Salman Raju Talluri**,**Department of Electronics & Communication Engineering, juit,** our project incharge,who guided us through the project also gave valuable suggestions and guidance for completing the project.He helped us to understand the intricate issues involved in project- making besides effectively presenting it.These intricacies would have been lost otherwise.Our project on the way of success only because of his guidance. Our thanks and appreciations also go to our colleague in developing the project and people who have willingly helped us out with their abilities. We are alsothankfultothe whole **ECE department** for providingusthetechnical support to carry out the projectwork,tolet us utilize all the necessary facilitiesoftheinstitute and guidance at each and everystepduringthe project work. We would like to expressourdeepest appreciation to all those who providedusthepossibility to complete this report.

Head of the Department/Project Coordinator

ABSTRACT

Water scarcity is a serious problem for ranchers in horticulture, so one of the water system frameworks using dribble water system that has been implemented is "Mechanized water system structure with parcel office for convincing water system of small scope ranches" (AISPF). In any case, this method has a few flaws that can be addressed, and here we are with a strategy called "Mechanized water system structure leveraging climate expectation for efficient use of water resource" (AISWP), which highlights the AISPF measure's shortcomings.The AISWP strategy enables us to make better use of available water assets by detecting moisture in the soil and for thatit is really anticipating the climate by detecting two boundaries temperature and stickiness, then handling of deliberate qualities through a calculation and delivering the water. It is an additional element of AISWP. Drip water system, moistness, and climate prediction are some of the catchphrases.

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LIST OF ABBREVATIONS

IRRG	Irrigate
IRRI	Irrigated
LED	Light Emitting Diode
AISWP	Automatic Irrigation System Using Weather Prediction
SMD	Soil Moisture Deficit

CHAPTER 1

INTRODUCTION

According to current studies, water is becoming increasingly difficult to come by globally, with more than 33% of the global population facing full water scarcity by 2025.

[1.1] SPECULATION

The semi-arid regions of Asia, the Middle East, and Sub-Saharan Africa are the most affected, with a significant number of people living below the poverty line in each. The current situation in India is also dire, with water scarcity affecting a large portion of the population and spreading rapidly. Furthermore, similar conditions exist in a number of other countries, necessitating the need for us to improvise how we use water. Water systems hasexisted as long as humans have been cultivating plants. Flood water method, man and cylinder technique, trickle water system, and shower water system are some of the unique water system procedures used. Water conveyance over the ranch can be lopsided as a result of flood and man and cylinder water system techniques.

[1.2] MOTIVATION

Water is passed through a pressurised pipe system to the sprinklers, spouts, flies, which splash the water into the air, causing it to tumble to the ground as a fake "downpour." Many yields are vulnerable to foliar damage when sprayed with saline waters, which is a disadvantage of sprinkler water systems. Sprinkler systems have a many disadvantages, including a high initial installation cost and a high maintenance cost. Plants are sprayed in a way that only the dirt closest to the roots develops gets wet, as opposed to the entire soil profile being wet by the surface and sprinkler water system. The applications of dribble water system water are more frequent (typically every 1-3 days) than with other methods, resulting in a genuinely great high dampness level in the soil in which plants can thrive. Dribble and sprinklers are becoming increasingly popular among cutting-edge miniature water system strategies. Dribble water system (DIM) and the sprinkler water system (SIM) techniques differenciate in a number of ways, including stream rate, pressure requirement and portability. However, the potential to significantly increase the efficiency in which water is used. SIM is used to sprinkle water into the air using spouts that break down into small water drops and fall on the field floor, whereas DIM focuses on supply of water legitimately to the root zone through an organisation of lines and producers. Faint has practically no water misfortunes through transport.

[1.3] HOW IT WORKS

The on-ranch water system effectiveness of a properly designed and oversaw trickle water system framework can be 0 high as 90%, compared to 35% to 40% proficiency in surface water system strategy. SIM, on the other hand, has a lower water set aside (to 70% effectiveness), and it supplies water to the entire yield area.

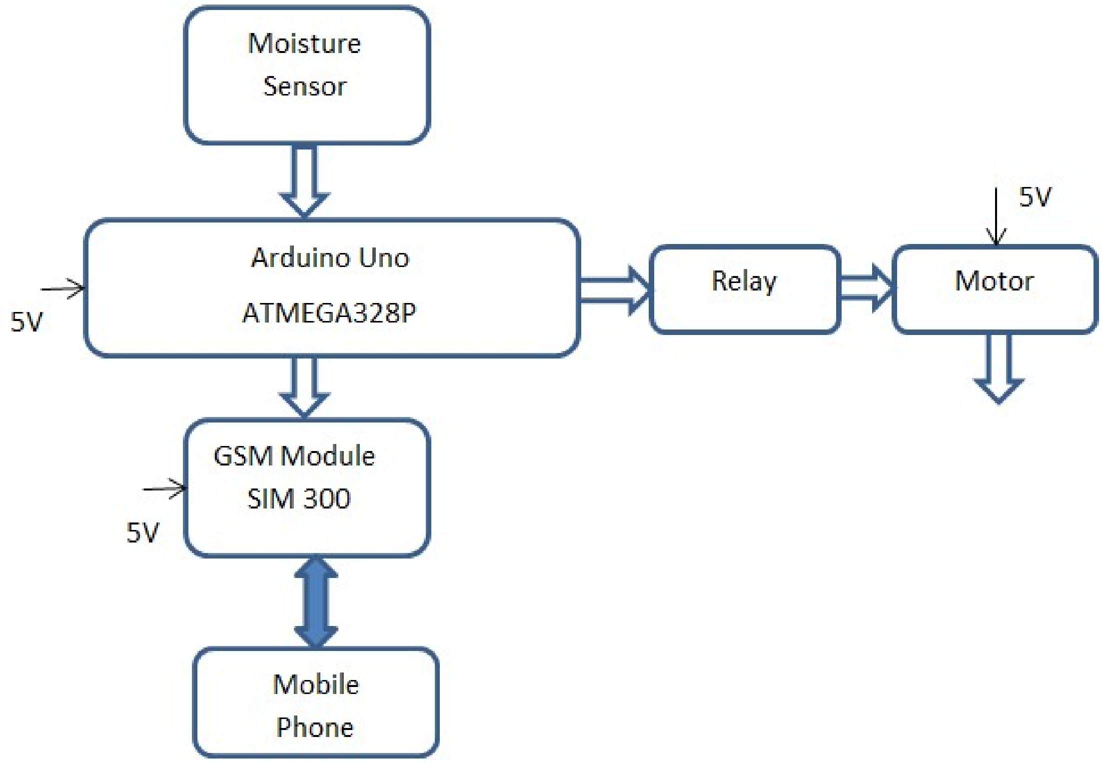

FIGURE1.1 BLOCK DIAGRAM

CHAPTER 2

REQUIREMENTS

[2.1] COMPONENTS USED

The following are the basic components to consider when creating a model:

- The power of pushing the stream:The majority of products perform best when the pressure is between 20 and 40 pounds. The average family pressure is between 40 and 50 pounds.
- WaterSupply&Quality: Filtering the city and water for drip irrigation systems is easy. Water from ponds, ditches, and certain wells needs special sifting techniques. The type of channel required for your framework will be determined by the nature and source of water.
- Soil Type and Root Structure: The dirt form shows how a normal trickle of water can spread from a single point. Sandy soil necessitates closer producer dispersal because water travels quickly vertically but slowly on a level plane. Water can generally scatter uniformly in dirt soil, resulting in a strong dispersion pattern. With earth type soil, producers can be further isolated. A loamy soil can deliver a more even water permeation scattering. Deeply established plants can handle more extensive producer separating, while shallowly attached plants need to be watered progressively (low hole producers) with producers divided close to one another. Short cycles should be rehashed on mud soil or on a slope on a daily basis to get the best results. Applying water with higher hole producers on sandy soil aids in spreading the water on a level plane, as opposed to a low hole producer.
- Variations in height might create changes in water pressure inside the framework. For every 2.3 foot variation in height, the pressure varies by one pound. Weight-remunerating producers are designed to function in areas with significant height variations.
- Watering should be done on a regular basis. These cycles should be repeated at short intervals on dirt soil or slopes. to forestall overflow, disintegration and squandered water. In sandy soils, the strategy for utilizing moderate watering low yield producers is suggested. Clocks help avoidance of excessively dry or too-wet cycles that pressure plants which hinders the development. They additionally take into consideration watering at ideal occasionsfor example, early in the morning or late night.

- Watering isneeded forplants with various waterneedsand may consider their own wateringcircuits. Forexample, plantations that get watered week after weekneed an unexpected circuit in comparison to a nursery that will get wateredevery day. Plants that get dried spell lenient should be watered uniquely in contrast to plants requiring a great deal of water.

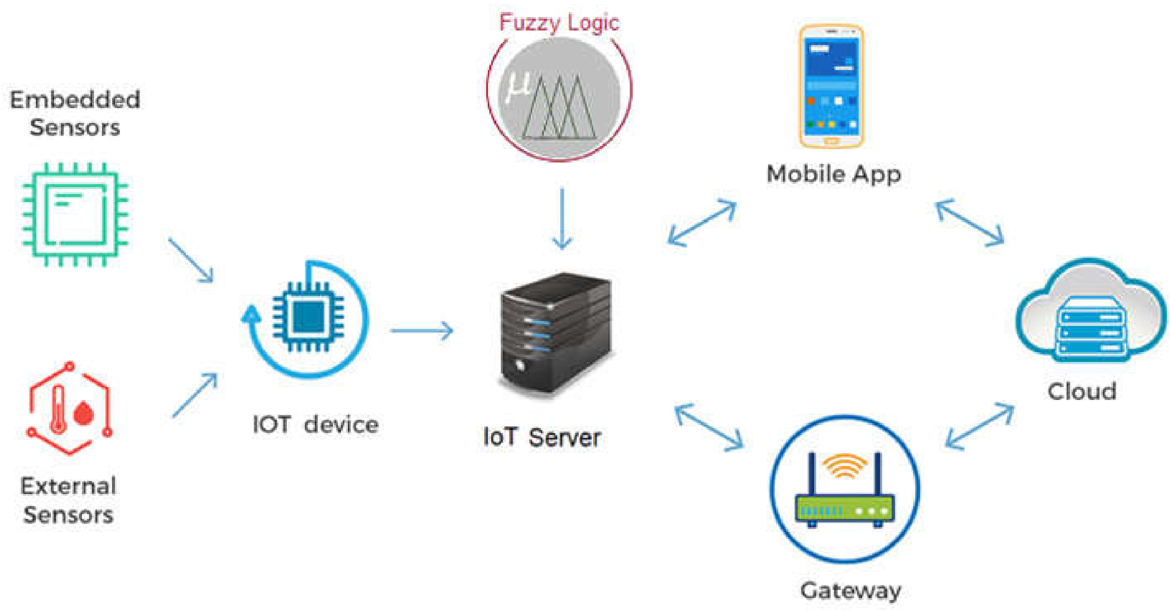

FIGURE 2.2 FLOW DIAGRAM

CHAPTER 3

TYPES OF IRIGATION SYSTEM

1.SOIL MOISTURE BASED IRRIGATION SYSTEM

It can sometimes be difficult to determine whether your plants are being watered properly or not. The soil moisture based controller makes its best use here by giving the right amount of water in their conditions. It shorts off on irrigation system when the ground is already wet , prevention over water and turns it back on when the soil is dried.

How it works?

A small charge is placed on the electrodes and electrical resistance through the sensor is measured. As water is used by plants or as the soil moisture decreases, water is drawn from the sensor and resistance increases. Conversely, as soil moisture increases, resistance decreases.

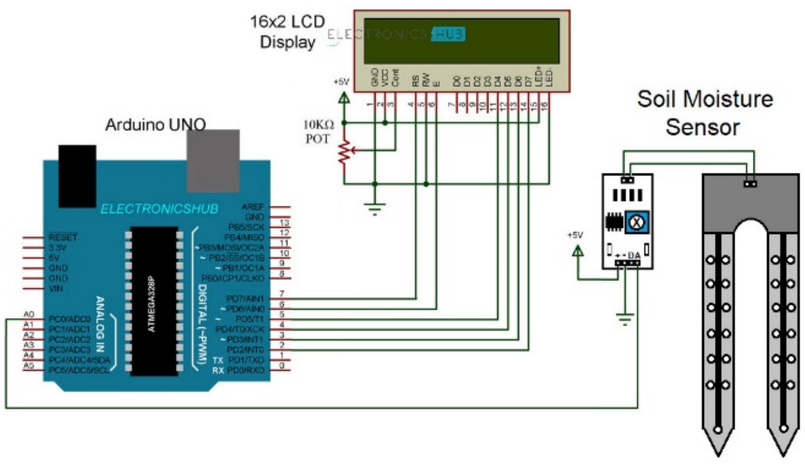

FIGURE 3.1 Soil moisture sensor

2.TIMER BASED IRRIGATION SYSTEM

- Dripper is an automatic drip irrigation system with automatic timer which controls requirement of water for plants.

- The battery boxed operator timer once set can take care of plant-watering automatically, equally and efficiently without any manpower.

How it works?

An automatic irrigation system does the operation of a system without requiring manual involvement of persons. Every irrigation system such as drip, sprinkler and surface gets automated with the help of electronic appliances and detectors such as computer, timers, sensors and other mechanical devices.

FIGURE 3.2 Time based irrigation

3. DRIP IRRIGATION SYSTEM

It is the most efficient water and nutrient delivery system for growing crops. It delivers water and nutrients directly to the plant's roots zone, in the right amounts, at the right time, so each plant gets exactly what it needs, when it needs it, to grow optimally.

How it works?

In drip irrigation places small drip emitters in close proximity to the crops root systems. This provides a much-improved efficiency and makes the system much more controllable compared to other methods. The emitters release water in a slow and steady fashion.

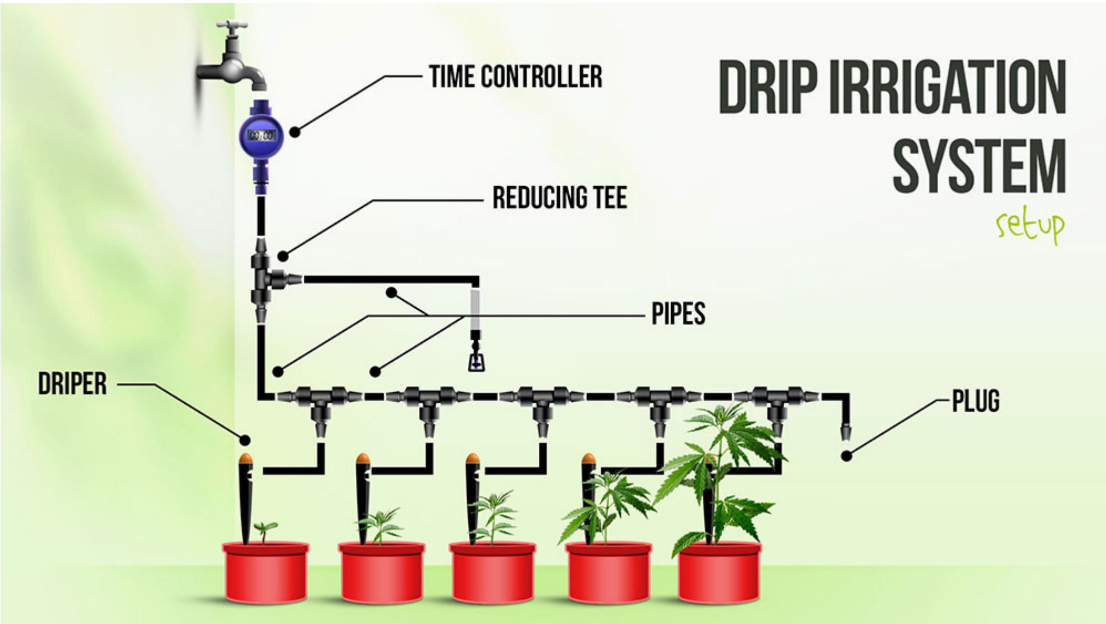

FIGURE 3.3 Drip irrigation

4. SPRINKLER IRRIGATION

Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air through sprinklers so that it breaks up into small water drops which fall to the ground.

How it works?

A sprinkler system usually consists of the following components a pump unit tubings, sprinkler head and other accessories such as valves, bends, plugs and risers.

Pumping Unit: Sprinkler irrigation systems distribute water by spraying it over the fields.

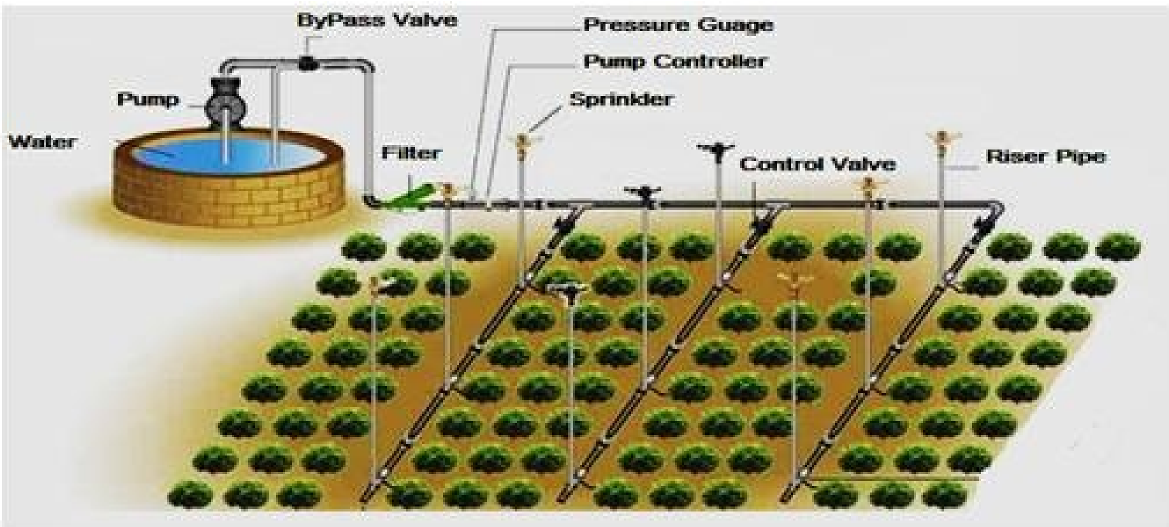

FIGURE 3.4 Sprinkler irrigation

CHAPTER 4

RESULT AND ANALYSIS

[3.1] Result AndAnalysis

Tahar Boutraa and his colleagues investigated the suitability of an automated water system framework using wheat crops, concluding thatthe wheat plants that were inundated as a result of this had better photosynthetic rates than wheat plants that were physically flooded. In this paper, we looked at the first studies of salt water trickling changes caused by harsh water disturbances, providing hypothetical and specialised assistance for the turn of events and use of water assets, as well as salt desert biological systems of recovery and reproduction. For farmers claiming a little field in bonedry territories or remote places with few water resources and electricity, discussed the design and activity of a trickling water system framework utilising a dribble tape and force from a sun orientated cell were reachable and efficient, especially for newly planted sugarcane.

Furthermore, the intended framework was very easy to relocate and use in other sugarcane fields, which saved money on the framework. In any event, the structure needed to be kept filled up with water on a regular basis while a sugarcane field was trickle flooded.

In actuality, drip irrigation, portable organisation, and fluffy strategy are the three main attractions. It first defines the dribbling water system and how the flexible arrangement constrains it. The adaptable company maintains the customer refreshed and in control of the framework from afar.Fluffy regulator are used to measures the constant data and calculates the amount of water necessary. Zhiwei Zheng has clarified to change guideline for the nursery tomato's harvest coefficient in the development time frame, which provides a substantial foundation for the inquiry and calculation of the tomato's water need.

Displays a component for controlling the moisture material of produced land soil. Water syphoning engine switched on or off in response to soil wetness, as indicated by the transfer. It saves water while allowing the water level to be controlled in a preferred area of the plant, increasing yield profitability.
The trickling water system technique is used in AISPF, the land is partitioned into smaller units and dampness sensors are placed in isolated territories to quantify the dampness content in the areas and watering the homestead as needed. However, there is a key issue that isnot considered in AISPF, and that is the climate at that specific location. If the ranch has been

watered without regard for the weather prediction, and it begins to rain heavily within a short period of time, the sand may become completely absorbed, perhaps harming the plants.

Weather Prediction (Aiswp) Algorithm Robotized Irrigation System. The following are the means linked with our convention:

[3.2] CHALLENGES

- Sensors, such as a dampness sensor embedded in the soil, a temperature sensor, or a moisture sensor, detect current conditions and communicate data to the information procurement framework.
- This data will be compiled using some code that will aid in the climate forecast, and the result will be sent to the microcontroller.
- The microcontroller starts doing the following operations based on the information it has received:
- The dampness sensor reading for a certain harvest is not exactly a fundamental value called SMD (Soil Moisture Deficit), the engine associated with that specific region of the land is turned on.
- The weather forecast predicts a sunny day, the syphon engine and solenoid valves will be activated until the dampness sensor makes to the set point value.
- The climate forecast indicates that the chance of rain is less than 50%, the engine will on and the solenoid valves will be opened until the dampness sensor reads that the estimated dampness content is between 20% and 50%, allowing us to keep a safe distance from the harvest.
- The engine is not be started and the solenoid valves isnot tobe opened if the forecast is practically certain that it will rain, that is, if the chance is greater than 50%.

For every 60 minutes, the cycle repeats again. The control circle of each location for various estimations of m, where m is the sensor estimated esteem.

CHAPTER 5

CONCLUSION

[5.1]CONCLUSION

We can obviously see that this mechanised water system architecture, which not only allows water to be flexibly reliant on moisture in the soil, but also considers climate conditions, has made water consumption more efficient. More work is needed to conduct these kinds of studies in order to make water use more efficient by adopting programmed water system frameworks.The smart irrigation system is feasible and cost effective for optimizing water resources for agricultural production.This type of irrigation system allows cultivation in places with water scarcity.It shows that the use of water can be diminished.It is important for a farmer to visualize his agricultural land moisture content on daily basis.

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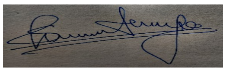
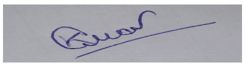
171007  171013 

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