

# Automated Irrigation System Using IoT

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**Abstract:- Agriculture has a major participation in the earnings of Indian farmers and has brought a huge change in the day to day earnings of Indians. The evolution in the field of agriculture for the betterment of crops and a consistent delivery of produce is particularly expected. For the same suited conditions and appropriate moisture in the fields of crops prove to be a huge task. Mostly the watering of water beds is done using the age-old conventional methods of brook flows from one end to another. Such method of water supply can be improvised by using a programmable watering framework. This new system proposes a programmable watering framework system for the existing fields which intends to reduce human labour and reduction in usage of water hence resulting in an increase of produce. For constructing such a setup, an Arduino Kit is used connected with a Soil Moisture Sensor with a WiFi module. Proposed system's experimental setup connects the data through a cloud framework and then data is acquired over through a web portal. The data is then analysed by the IoT System and it provides appropriate recommendations.**

**Keywords:** *IoT, Agriculture, Automated Watering Framework.*

## I. INTRODUCTION

India is a nation that is largely dependent on agriculture for its revenue and nearly 70% of the population depends on horticulture. Agriculture has a major participation in the earnings of Indian farmers and has brought a huge change in the day to day earnings of Indian farmers. Although farmers make use of an extensive range of reasonable products for their soil in farming purposes, there is still a huge scope for additional yield of crops with the aid of innovation. The existing age-old methods of watering the crop beds can be improvised by using a programmable watering framework. This new system experimental paper a programmable watering framework system for the existing fields which intends to reduce human labour and reduction in usage of water hence resulting in an increase of produce. In the existing system there's a lack of computerization in the most critical parts of human life which intends to reduce the burden on the farmers and save time as well. Hence the experimental paper system is

planned to develop a better framework that helps the agriculturists to automatically enable a module for watering of crops based on the requirement of the moisture content of the soil. An earnest method of water system framework is developed using IoT as the structure using Arduino and Soil Moisture sensors. In the proposed setup, user buries a Soil Moisture sensor into the water bed which detects the current moisture level of the soil and notifies the user about it. With the help of a preloaded program, the system will run a test and check the amount of soil moisture required by the plant which are predefined in consideration of which plant the system is being used for. In case if the moisture level is less than what is needed by the plant, the system alerts the user and starts the flow of water on command from a submersible pump until the programmed threshold value is achieved. Hence the system makes sure that the crop meets its most favourable conditions to grow along with the right levels of moisture without any man power or water wastage. It hence improves the proficiency of usage of water, downsizes the cost of irrigation and provides an resourceful watering framework.

## II. LITERATURE SURVEY

Farmers make use of an extensive range of reasonable products for their soil in farming purposes, there is still a huge scope for additional yield of crops with the aid of innovation. The existing age-old methods of watering the crop beds can be improvised by using a programmable watering framework. This new system experimental paper a programmable watering framework system for the existing fields which intends to reduce human labour and reduction in usage of water hence resulting in an increase of produce.

In [1] an Automated Irrigation System Using a Wireless Sensor Network and GPRS Module was developed to optimize water use for agricultural crops. The system in consideration has a wireless network of soil-moisture and temperature sensors placed in the root of the plants in the soil. Additionally, the system consists a gateway unit handles acquired sensor information, triggers the actuators and transmits data to a web application.

Above system was called as A Remote Automated Irrigation System Using a Wireless Sensor Network and GPRS Module Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network developed in 2008 by Yunseop Kim; Robert G. Evans and William M. Iversen.

In [2] the further observations with Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network the design and instrumentation of variable irrigation, a sensor network, and software for live sensing and control of a site-specific precision linear-move irrigation system. Soil conditions were closely observed by sensor stations distributed across the field based on a

property map, and periodically sampled and the results were remotely transmitted to a base station. A system was designed to be remotely controlled by a controller that updates georeferenced location of sprinklers from a GPS and remotely communicates with a computer at the base station. Data signals from the sensor network to the base station were successfully transmitted using low-cost Bluetooth wireless radio communication.

Above system was called as Automated Irrigation System Using a Wireless Sensor Network and GPRS Module developed in the year 2013 by Joaquín Gutiérrez ; Juan Francisco Villa-Medina ; Alejandra Nieto-Garibay ; Miguel Ángel Porta-Gándara.

Author Name /Title
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Automated Irrigation System Using a Wireless Sensor Network and GPRS Module -2013 (Joaquín Gutiérrez , Juan Francisco Villa-Medina , Alejandra Nieto-Garibay , Miguel Ángel Porta-Gándara)
IoT Based Automated Irrigation System, -2018 (Dweepayan Mishra ; Arzeena Khan, Rajeev Tiwari, Shuchi Upadhyay)

### III. PROPOSED ALGORITHM

The probe used to measure the soil moisture is to be installed/inserted into the soil and then a flow of water is opened. The crop bed is capable of holding at least an inch or 2 ½ cms of water until the water gets absorbed into the crop bed.

- The sampled soil is let be under sunlight for 24 Hours to be under suitable conditions to be dry enough.
- The data of particular moisture value is observed after 24 hours and with a 20% variance from the moisture value and particular value of threshold for that crop is set. After achieving that threshold value, the probes for measure the soil moisture are set to read the moisture levels after a fixed period of time. The data from that is then gathered and analysed in comparison to the

threshold data set earlier. Once the system receives the data, it has 2 courses of actions:

**Case 1: [4] If the new assessed moisture value is higher than the threshold value.** When the newly assessed moisture value of the soil read through the probe is higher than the threshold value, then the flow of water is terminated and the procedure is switched to Case 2 until after every certain period of time values are read and compared. This entire process is repeated until Case 2 is attained.

**Case 2: [4] If the new assessed moisture value is lower than the threshold value.** When the newly assessed moisture value of the soil read through the probe is lower than the threshold value, then the system neglects reading the values for a complete cycle. An alert is sent to the IoT system to start the submersible water pump (OFF State to ON State). Once the pump is turned on the system lets the water to start flowing in that particular crop bed.

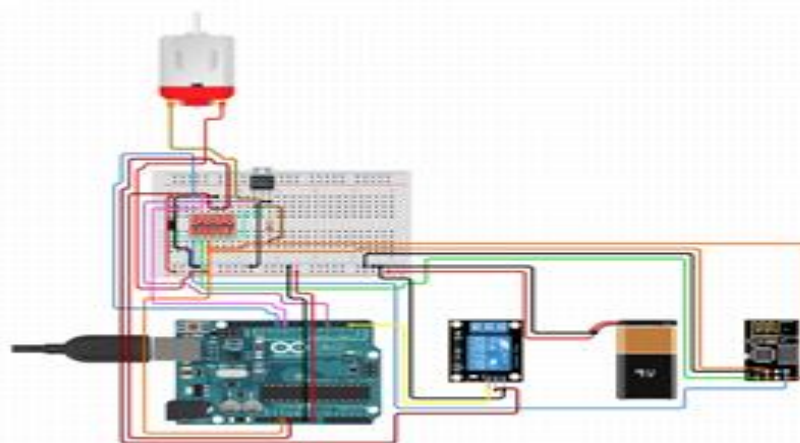


Fig 1:- IoT Interface For Proposed System

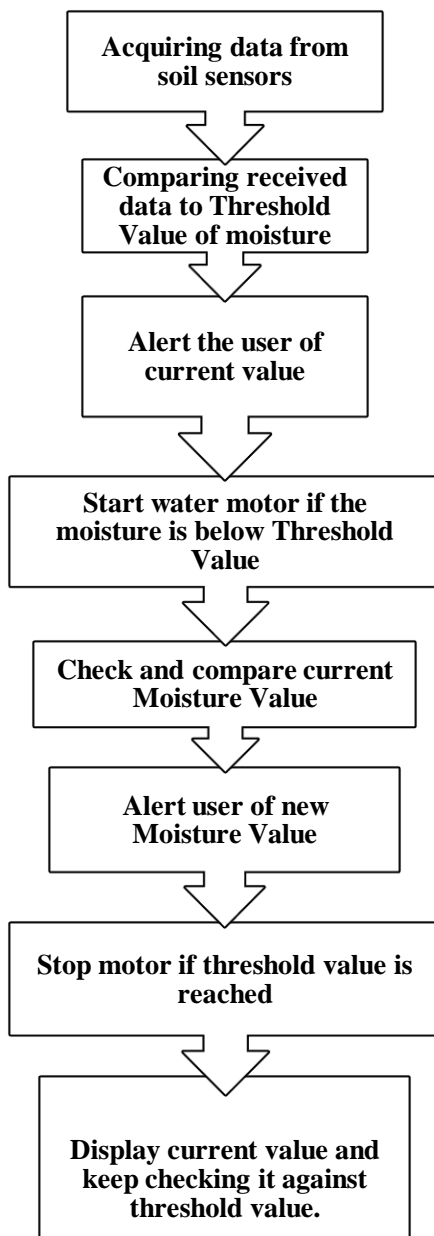


Fig 2:- Overview of Proposed System

### SUMMARY

The experimental setup can be modified based on the specific requirements of the crops and needs very minimal maintenance. The flexible arrangement of programmable watering system allows it to be amplified to a larger scale for green house and/or open fields. Additionally, extensive applications such as Temperature Monitoring and Compost Yield can be implemented as well. The remote two-way management of the system lays out the importance of conservation of the natural resources and favour the usage of these types of irrigation models.

Since the system checks the moisture levels of the soil in the crop bed and generate data based on moisture levels through probes, irrigation-based decisions are managed easily by the system automatically. It enables the system to start the water pump and divert the water flow from the

pump motor for irrigation. Proposed experimental system can irrigate the crop bed and field using lesser quantities of water. The cultivation of crops can prove to be more sustainable since the favourable moisture levels are maintained hence resulting in better crop yields.

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