

A Framework for Water Management in the field Using Twilio

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Abstract- Nowadays automation is done in every field to minimize the human interaction and improve the effectiveness and efficient. Agriculture is one such field where it requires the usage of advanced technologies to help farmers to do things effectively. For effective production irrigation system is the key. The observation of water supply to farming must be done which can prompt legitimate water management. This should be possible with the utilization of innovation like IOT. Instead of manual observation of key parameters it will be effective if it is done by a portable application. The live parameters and status of gadgets can be checked on the versatile screen accessible in the framework. The checking of the information is furnished by utilizing Wi-Fi with the assistance of cell phone applications.

Index Terms—Automated irrigation System, Raspberry pi, Sensor controllers, IoT, Twilio.

I. INTRODUCTION

Water is a basic contribution to farming in almost the entirety of its viewpoints having a deciding impact on the inevitable yield. Great seeds and composts neglect to accomplish their maximum capacity if plants are not ideally watered. India is a nation with a significant horticultural division, and over 55% of the populace is subject to farming. India isn't a water-rich nation and is likewise attempted because of the negative effect of regular change, enormous wastage owing not completely to poor organization and distorted water esteeming game plans. Augmentation in masses and changing lifestyles has extended enthusiasm for water, (all things considered, for water framework) in both urban and nation regions. India has 18% of the hard and fast masses, having 4% of the world's new water, out of which 3/4th is utilized in developing. India gets a regular of 4,000 billion cubic meters of precipitation dependably. Regardless, just almost half of it is utilized in India's surface and groundwater bodies. An insufficiency of cut-off approach, nonappearance of pleasant structure, wrong water the managers have made a circumstance where just 19% of the water is utilized.

Objective: The observation of water supply to farming must be done which can prompt legitimate water the executives. This should be possible with the utilization of innovation like IOT. The observing of parameters should be possible on a portable application. The live parameters and status of gadgets can be checked on the versatile screen accessible in the framework. The checking of the gadgets is finished utilizing Wi-Fi with the assistance of cell phone applications.

II LITERATURE SURVEY

This system monitors and controls the irrigation based on IoT. It improved a great deal of value and amount of homestead yield by detecting encompassing temperature and moistness esteems with no human intercession. It uses wireless sensor unit nodes. Each node contains the values of humidity, temperature, soil and water level. Each node senses the data and transmits it to the master node through Zigbee. The cloud server maintains the information and performs decision making based on threshold values and sensed values. The decision is to be processed based on crop selection. [1]

Neamet et. al. explains about the keen water system framework utilizing remote sensor organizes on the web of things. The Telosb hub is utilized in sensors and observing applications for ultra-low force remote module. The nodes sense the information and will produce a packet. The middleware program is written in a python language that extracts data where the base stations send the packets to the PC through USB and the data is stored in a spreadsheet in the cloud server. Java application content is used for arranging a site in the cloud server to show the set-aside information presented in a spreadsheet. It can send a request to the electrical valve when the water level is dropped. [2]

Wireless sensor networks with GPRS based for continuously or periodically remote monitoring of temperature and humidity [12]. For collecting information from sensors in the agriculture fields low cost The ZigBee is used [13].

An automated irrigation system is developed based on the internet of things. It uses both hard and software to implement. It depends on the change of sensors. The Blynk application has involved in mobile to automate the process. It investigates the whole process of smart irrigation and identifies the dryness between 400 to 630 by using the soil sensor directly to save the bills and the water. The Arduino automatically water the plants by analyzing the real-time conditions. The data can be seen on the mobile as long as it has an internet connection. The data has to be saved in the Blynk server and has a validity of one year and the data changes every second. [3].

The system implemented the smart irrigation and remote farm monitoring system. In this, they improve the traditional methods of farming. It has been developed many systems to reduce the crop wastes and wastage of water in the fields. In this method compared to the traditional methods it uses less than 50% less water. There are some parameters are having to determining the irrigation of a crop like soil moisture and temperature etc., in this method they can use the Arduino to convert the analog data to digital data and GSM module they can use to communicate the farmers to the motor in the fields. By using this model they said that increase the productivity of the crop and reduce the wastage of the crop. In this model they can use the KNN algorithm would be used to predict the plant in a particular region based on the climatic conditions. [4]

The nitty-gritty review of the robotized water system framework in which they worked without manual intercession or negligible association. It keeps up a reconnaissance office for the activities the computerization of the frameworks like dribble, sprinkles, and surfaces might be utilizing robotized utilizing sensors and electrical things. The frameworks may diminish the inclusion of ranchers. The significant things in these frameworks are its unpredictability and costly, other than it requires the arrangement and its execution. Right now, utilize a huge zone and it tends to be isolated into little zones. It might be flooded independently and water releases might be observed and directed. It can likewise be straightforward. It tends to be actualized in utilizing dirt permeable pots or utilizing bottles. Right now, be understanding the attainability of versatile advances and alongside the remote sensors and GSM innovation. [5]

The use of drip irrigation system is an effective method where the water drops at the root in motion [10]. The automated irrigation system using infrared thermometers and remote canopy temperature for the cotton crop irrigation is efficient compared to manual system [11].

Heydari(2014) gives a summary over the water productivity and its efficient use for improved planning and effective use. The impact of rainfall and effectiveness of irrigation in agriculture sector is discussed by Gurjar and Sanjay Swami in 2019 [8]. Pumps are connected via a relay to automate watering the crops in order to reduce the farmers work [9]. The e-Agriculture application based on the framework consisting of KM-Knowledge base and Monitoring modules using ICT is used for giving information to the farmers for decision making and effective production [15].

III. PROPOSED ALGORITHM

The framework proposed a computerized water system utilizing Twilio. This framework contains MCP3208, soil dampness, temperature sensor, and raspberry pi. In this system, it can be operated the water motor through the web page without human intervention. By using Twilio send an alert message to the farmer regarding the water content in the field. Based upon the alert message farmer take an action on the field to control the water system for the crops.

Fig 1 represents the overall idea of the project. The sensors is associated with raspberry pi through MCP3208Ic and Twilio is associated with raspberry pi. The engine is constrained by the page by the qualities ON and OFF.

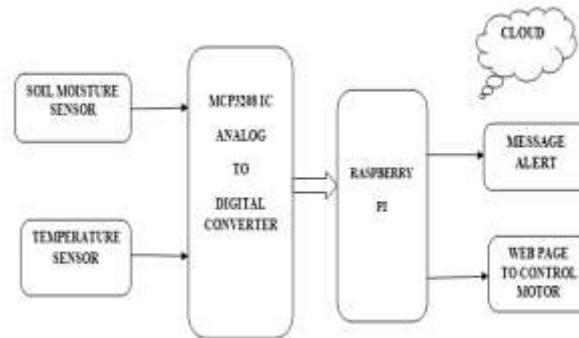


Figure 1. Block Diagram

COMPONENTS DESCRIPTION

1. Raspberry-Pi

It is one of the operating systems that run on a Linux platform and is used to communicate with the sensors. It is also used to write the codes to execute the system of the application which are implemented, it can be used to store the data which are produced by the sensors and it will be using full to connect the cloud and basic sensors that are installed in the project.

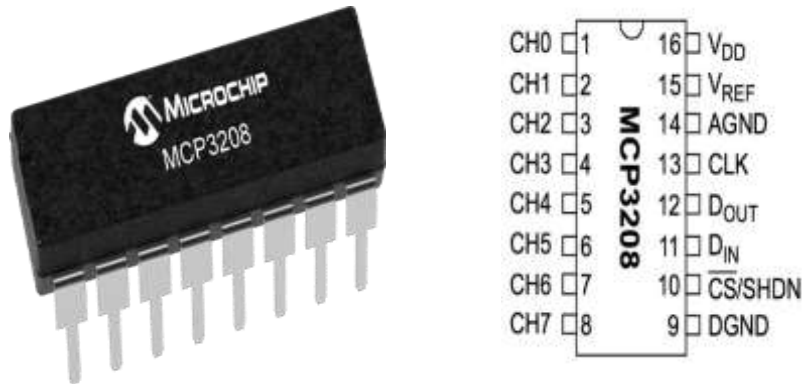
2. Soil Moisture Sensor

Dampness is the nearness of water noticeable all around. The measure of fume noticeable all around can have an impact on human solace what is more the same number of assembling forms in enterprises. The nearness of fume together impacts different physical, substance, and organic procedures. Condition live in ventures is indispensable because of it should have an impact on the business worth of the product thus the wellbeing and security of the work force. Henceforth, condition detecting is unrealistically significant, essentially among the administration frameworks for mechanical procedures and human solace.



Figure 2. Soil Moisture Sensor

Here we have a bowed to are utilizing a resistive type of condition identifier.



3. MCP3208IC

MCP3208 devices are dynamic estimation 12-piece Analog-to-Digital (A/D) Converters with on-board test and hold equipment. Differential Nonlinearity (DNL) is appeared at ± 1 LSB, while Integral Nonlinearity (INL) is offered in ± 1 LSB (MCP3208-B) and ± 2 LSB (MCP3208-C) varieties. The MCP3208 contraptions work over a sweeping voltage go (2.7V - 5.5V).

Figure 3. MCP3208

Low current structure licenses action with normal reinforcement and dynamic progressions of simply 500nA and 320 μ A, independently. The MCP3208 is offered in 16-pin PDIP and SOIC packs. The MCP3208 is programmable to give four pseudo-differential data sets or eight single-completed information sources. Correspondence with the contraptions is worked on using a direct successive interface great with the SPI show. The devices are fit for change paces of up to 100 kbps.

4. Temperature Sensor(LM35)

The LM35 right now a prize over direct temperature sensors tag in $^{\circ}$ Kelvin in light of the fact that the customer isn't required to figure a bigger than the regular predictable voltage from its respect get profitable Centigrade scaling. The LM35 need not waste time with any external organization or slicing to convey customary accuracy of $\pm 1/4^{\circ}$ C at temperature and $\pm 3/4^{\circ}$ C over a full -55 to $+150^{\circ}$ C temperature contrast. The low worth is ensured by cutting and regulation at the water level. The LM35 arrangement is available pre-packed in tight TO-46 electronic transistor bundles

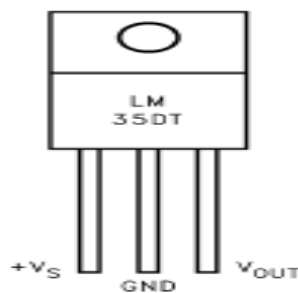


Figure 4. Temperature sensor (LM35 DT)

5. Twilio cloud

Twilio might be a cloud correspondences stage as a help (CPaaS) organization fundamentally situated in the port of section, California. Twilio grants programming bundle designers automatically to frame and get telephone calls, send and get instant messages, and perform distinctive correspondence capacities exploitation it is net assistance Apis.*Twilio utilizes Amazon net Services to have media transmission framework and supply property among HTTP and in this way general society exchanged phone to organize. Twilio pursues a gathering of study style standards to prepare for astonishing blackouts and got acclaim for remaining on-line all through the across the board Amazon net Services blackout in Gregorian schedule month 2011.

IV. Experiment and Result

In this system having different types of components are soil moisture and temperature sensors to measure the humidity and temperature in the field. The soil moisture sensor measures the water content in the soil. If GPIO.input of 26 is equal to 1 then it will give the alert message to farmer mobile number which is registered on twilio as "WATER CONTENT IS ENOUGH SWITCH ON THE MOTOR ".

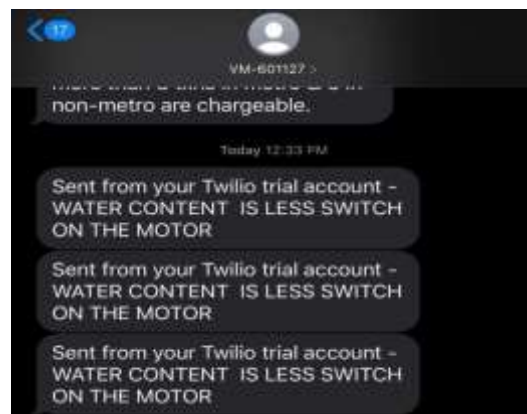


Figure 5. Snapshot of the output

If GPIO. input of 26 is equal to 0 then it will give the alert message to the farmer mobile number and its give alert to the farmer and then Operate to the motor .it gives the message to the mobile "WATER CONTENT IS ENOUGH SWITCH OFF THE MOTOR "

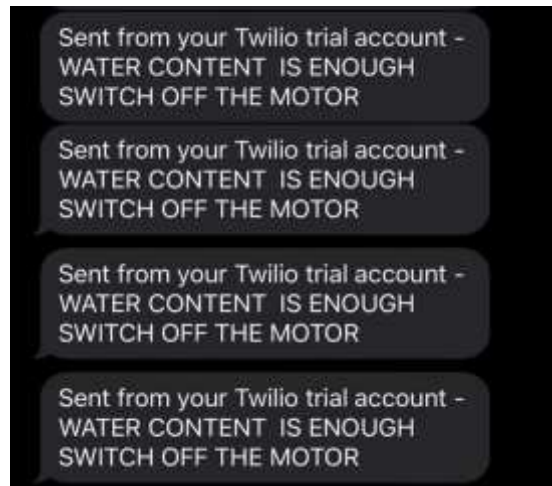


Figure 6. Snapshot of output

The foundation of an automated water framework system is done. It is found that the system works properly and the water is passed to the plants as and when required. On the off chance that the dirt is dry, an alarm message is sent "WATER CONTENT IS LESS SWITCH ON THE MOTOR" to the versatile and through the content water engine turns over which prompts water to the stream. On the off chance that the dirt is wet, an alarm message is sent "WATER CONTENT IS ENOUGH SWITCH OFF THE MOTOR" to the portable and through the content water engine is killed and water stream stop.

This framework utilizes raspberry pi and Twilio cloud. These applications work absolutely on wifi. To interface the application and the ace robot we require a wifi module.



Figure 7. Project setup

IV. CONCLUSION

This framework has effectively built up as a robotized water system by investigating water level substances in the field. It monitors the change in water level with no manual mediation. The essential objective of this venture is to help ranchers who need more water for agribusiness purposes. It is because of the uneven supply of power. The

sensors measure the temperature and moisture content of plants and result in the alert message as ON and OFF based on the water content in the field. The system features a customer service to operate from anywhere and cheap components as well as the scalability and cost-effectiveness. It may be further extended as operable and flexible to every user.

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