

Smart Agriculture System Using IOT

Dr. Satya Ranjan Pattnaik – Associate Professor at Gandhi Institute For Technology, Department of Computer Science and Engineering (Affiliated to Biju Pattnaik University and Technology).

Animesh Giri – Student at Gandhi Institute For Technology, Department of Computer Science and Engineering (Affiliated to Biju Pattnaik University and Technology).

Animesh Senapati – Student at Gandhi Institute For Technology, Department of Computer Science and Engineering (Affiliated to Biju Pattnaik University and Technology).

Smruti Ranjan Mohanty – Student at Gandhi Institute For Technology, Department of Computer Science and Engineering (Affiliated to Biju Pattnaik University and Technology).

Abstract

This paper focuses on reducing the manual involvement of farmer in the field by using an automated agriculture system. So we have included IOT in our project and the coding required in it is done in the Arduino IDE platform. We have taken a microcontroller that is Node MCU and had connected all the sensors in it to operate respectively. We have set a particular value to which if the moisture content detects less than the motor will on automatically or else it will be off. It conserves the water and also manage the amount of water efficiently for plants. It results in reducing human labour, effort, and errors due to human negligence. The amount of moisture in the soil is measured using a moisture sensor. The pump mechanism is triggered when the moisture content of the soil falls below a specified level for the plant/crop, and the plant/crop is irrigated. On receiving the desired level of irrigation the pumping system is switched off automatically.

Keywords – IOT, Automated Irrigation, Save Water.

Introduction

The Agriculture Parameters are utilizing an IOT Technology and system availability that draw in these objects to assemble and deal information. "The IOT enables things selected recognized or potentially forced remotely crosswise over completed the process of existing configuration, manufacture open gateways for all the additional obvious merge of the substantial earth into PC based frameworks, in addition to acknowledging overhauled capacity, precision and cash interconnected favored stance. Precisely when IOT is extended with sensors and actuators, the improvement modify into an occasion of the all the extra wide category of electronic physical structures, which in like manner incorporates headways, for instance, clever grids, splendid homes, canny moving and smart urban groups. All is especially specific through its introduced figuring configuration anyway can interoperate within the current Internet establishment. Thus, one of the fundamental needs for harvesting a decent crop that can be a cause of additional types of nutrients, either nano or macro, for their correct growth is retaining an adequate water

in the soil. Every year, rain plays a vital role in determining the outcome of these crops and also the farmers. Overuse of ground water has resulted in a dramatic reduction in ground water levels during the previous 15 years.

As a result, it is imperative that we use each and every drop of water carefully so that future generations can benefit from it as well. Our project's name, AUTOMATIC IRRIGATION SYSTEM with Solar power, is a step toward implementing some novel engineering methodologies. This strategy will be a very good choice for middle farmers who struggle every year due to crop failures that occur every year. This technology's use has a lot of potential in the near future.

Literature Survey

IOT basically stands for Internet of Things and can be used all around to automate any electrical item. We can get all the data related to the items in our smartphones through internet. Making the irrigation system automatic will ease our daily process.

[1]. Seal, Binoy, *et al.* (2014) "Solar Based Automatic Irrigation System." International Journal of Research in Advent Technology 2.4. On the basis of LDR sensor data, the developed single axis solar tracker device orients the PV panel in accordance with the position of the sun. The irrigation pump can be controlled in a variety of ways.

[2]. Alex, G., & Janakiranimathi M. (2016). *et. al* Solar based plant irrigation system: A solar-powered autonomous irrigation system is proposed in this research.. Irrigation Scheduler monitors a number of variables, including humidity, temperature, and soil moisture. In this research, a novel type of solar panel, called a Spin Cell, is employed, which generates 20 times more current than typical flat panels, and the irrigation pump is controlled in two modes: automatic and GSM.

[3]. Shiraz Pasha, B. R., & Yogesha, D. B. (2014) *et. al* Microcontroller based automated irrigation system. The International Journal Of Engineering And Science (IJES). The Microcontroller-based Automated Irrigation System efficiently monitors and manages all drip irrigation system functions. The Microcontroller Based Automated Irrigation System is a useful instrument for exact soil moisture control in highly specialized greenhouse vegetable production, as well as a simple and precise irrigation approach. It also saves time, eliminates human mistake in adjusting available soil moisture levels, and maximizes net earnings.

[4]. Tusher, M. M. I., *et. al* (2019) Solar Based Automatic Irrigation System with GSM Module. The main components are an ATmega 2560 microprocessor, sensors, a GSM module, an LCD, and a solenoid valve. Finally, the pump has been set to operate based on the amount of water

required. As a result, it is possible to save a particular quantity of water and power, which has been calculated. The manual and automatic operation modes were also proven.

Problem Statement and Objectives

1. Problem Statement

Many parts of our country still lacks in proper flow of electricity all the time and unaware of new technologies and methodologies. Uneven distribution of rainfall also leads to lack in farming and thus due to improper yielding farmers are been bound to take negative steps. Hence they are needed to be educated about the new technologies and different ways through which they can improve their yieldings.

2. Objectives

- To reduce the wastage of water in deep percolation and seepage losses.
- To reduce the power consumption for irrigation.
- More than half part of our country is not properly supplied electricity, this technical methodology of irrigation will help in better production in those areas.
- Due to uneven and indeterminate distribution of rainfall that cause drought and farmer suicide which can be reduced up to a certain level by this project.

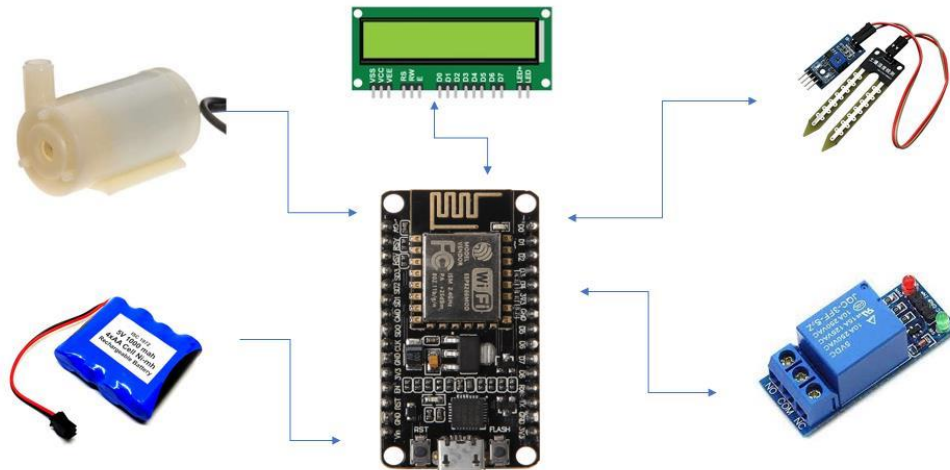
Proposed System

This system's functioning idea is straightforward and simple to implement because all of the components are wired to the microcontroller, when the power is turned on, the NodeMCU and all of the components turn on as well. The soil moisture sensor measures the moisture content of the soil and turns on the motor automatically if the moisture content is low. At the same time, information about the motor is presented on the LCD, as well as the moisture content value. Similarly, when the soil moisture sensor detects a high moisture content, the engine turns off automatically and information is shown on the LCD. Simultaneously, through the Blynk IoT application, we'd get all the information of what's going on in our mobile, such as whether the engine is on or off and how much soil moisture content there is. All of this is accomplished with the help of an ESP8266 wi-fi module that is connected to the internet and sends data to our phone. Because everything is done automatically over the internet, we can conclude that our project is built on IoT.

As a result, the automated system is functional. In the event of an automatic system failure, the pump can alternatively be operated by a switch, however this requires a trip to the field to turn

on the switch. After the watering is completed, the switch must be turned off once more. Aside from irrigating the area, the pump can also be utilised for other purposes by manually switching it on and off.

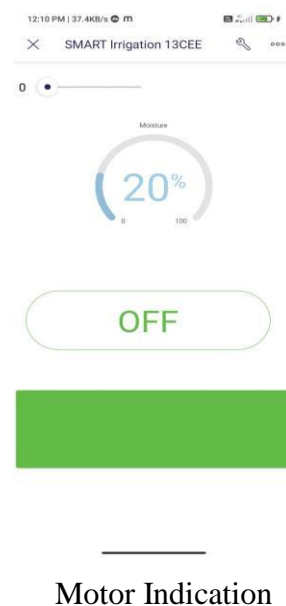
Architecture Diagram



Outputs



LCD Display



Conclusion

Farmers, in particular, are having severe difficulties watering their agricultural fields these days because they have no clue when the power will be available to pump water. They must wait until the land is properly watered even after that, which forces them to abandon other pursuits. Here's a concept that benefits not just farmers but also gardeners by sensing soil moisture and immediately switching on the pump when the power is turned on.

The main applications for this project are for farmers and gardeners who do not have abundant time to water their crops/plants. It also covers those farmers who are wasteful of water during irrigation. The project can be extended to greenhouses where manual management is far and few in between. The principle can be extended to create completely automated gardens and farmlands. Collective with the principle of rain water harvesting, it could lead to massive water savings if applied in the right way. In agriculture lands with severe shortage of rainfall, this model can be effectively applied to attain great results with most types of soil.

References

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