

Energy Efficiency for IoT based smart irrigation system in Agriculture

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(Introduction, Motivation,Abstract
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616Abstract—Abstract- The water irrigation system is used for minimize the amount of water for agriculture system. This project is to made water irrigation system based on Arduino microcontroller board. As the lack of fresh water and reduce farmers valuable time this project is very useful. So efficient water management makes an important role in irrigated agricultural system. This project is to design and develop a low cost system which is based on water irrigation system using Arduino board. The project used Arduino microcontroller board which is controller to the whole process of irrigation.

I. INTRODUCTION

Agriculture plays an important role for the development of a country. It uses a big amount of available fresh water resources worldwide and this percentage continues to be dominant in water consumption because of population growth and increased food demand. Scarcity of fresh water become a serious problem which our farmers are facing everyday. But there is a solution of this problem and that is agriculture by modernizing the current traditional methods of agriculture. [1] In the traditional system rain is only one way to the fresh water. But it is not the sufficient way to fields according to the moisture of the soil. As a result a proper IoT based modern irrigation system is the best way for agriculture and saving fresh water. [2] A modern irrigation system process is useful to reduce water for agriculture Crops which is a much require process. A irrigation system increase salinity with consequent build up of toxic salts on the soil surface in areas with high evaporation. To overcome these problem and to minimize the man power by smart irrigation system has been used. The newer irrigation system are also created

to minimize the limitation of traditional techniques. This modern techniques are been implemented in the irrigation system through small amounts of water supply to the part of the plant. The plant soil moisture stress is cure by providing proper amount of water resources. [3] The summary of the IoT based water irrigation system is like traditional system turn on the modern, smart irrigation system which require half of water resources. The purpose of the project is to save water and minimized the amount of labor forces. Continuously the status of sensors provide signal for taking necessary action to implementing the process and set the output of soil moisture sensors and provide water accordingly to the need or require of crops [2].

II. MOTIVATION

The project is providing automatic irrigation system that is switches a motor pump on or off by sensing moisture context of the soil through application of the Internet of Things (IoT). Arduino Microcontroller system is used to contrast this project. There are also used sensors where Arduino microcontrollers is programmed to receive the input signal of varying moisture condition of the soil through sensors. Once the receiver controller receive these signals, the output then relay on operating the water pump. The sensing arrangement is made up of two metallic rods inserted to the agricultural field which is required to be controlled [4] A smart irrigation system is very important for proper irrigation system and saving fresh water. There is some steps is need

for an automatic irrigation systems. The steps are given following:

1. The irrigation system must be easy and simple to install and configure because if the install system is not easy then it will not take human interaction. As a result the user will not want to use it in the irrigation system.
2. For saving fresh water .the water distribution of water at the right time by automatic irrigation to farm and nurseries.
3. Automated irrigation system use valves to turn motor on/off .Motor can be easily automated using controllers which reduce labor work.
4. To avoid unnecessary of overwatering at the wrong time of the day, this reduces saturated soils which will improve crop performance.

III. OBJECTIVES

The main objective of this project is to automate the process of irrigating the plants. The procedure reducing the labor and its a new matrix system which is highly accurate. So , it can analyze the amount of moisture in soil and give necessary water in soil .So its really efficient because it makes a proper way of irrigating the plants automatically without any human intervention.

By studying this process, following research question should examine

1. What are the instrument of this project and how many instrument we need to build this kind of smart irrigation system? And also is this user friendly?
2. Is this smart irrigation system can produce a big role for improving our agriculture system?
3. How our farmers can learn this projects procedure?
4. Is this system can be connected with any kind of communication devices ?

IV. REVIEW METHODOLOGY

For this research, different kinds of instrument needed. This section put a details description of this instrument and the procedure of this project.

A. ARDUINO UNO

The microcontrollers name is ARDUINO UNO. The UNO is microcontroller board based on ATMEGA 328P. It has 32 kb of flash memory for storing code .This board has 14 digital input and output, 6 analog inputs, 14 digital input, output pins .The UNO can be programmed with the ARDUINO software.

B. Sensors

1. Soil moisture sensor: This sensor is used to measure the moisture of the soil. When the moisture of the soil is low or high it gives signal to the digital pin. The digital pin is used to directly read current soil moisture value. Low soil moisture value is measured as 0v and high level is 5v.This voltage can be regulated with help of potentiometer.

2. Ph Sensor: The ph value below 7 is said to be acidic and above 7 is said to be basic. It is used to measure acidity or alkalinity of water solution which is determined by the relative number of hydrogen or hydroxyl ions present. If temperature change respectively, than ph is the only solution.

3. Pressure Sensor: Pressure Sensor is mainly used for weather forecasting. This Pressure Sensor is used for measuring different kinds of Pressure .

4. PIR Sensor: It detects the motion of with the variation of infrared radiation. It can cover up 10 meters with an angel of 15 degree. PIR Sensor is same as outdoor light with the motion detector. It can reacts to movement made by objects that radiate heat .

5. WI FI Module: It is connected with the ESP8266 Wi-Fi module. It is a self-contained SOS (system on chip) with integrated TCP/ IP . This protocol stack can give any microcontroller access to any Wi-Fi network. ESP8266 can simply hooked up to Arduino device to get Wi-Fi ability. This module has a powerful enough on boarding process and high storage capacity.

6. GSM Module: GSM means Global System For Mobile Communication. It is developed by European Mobile Telecommunication. GSM is necessary for using 2G cellular network .GSM describes a digital, circuit switched network optimized for full duplex voice telephony and expanded to include data communication, packet data transfer via GPRS. GPRS means General Packet Radio Service. The longest distance for GSM is 35 km.

V. CURRENT PROGRESS

This research context carries a huge importance for vast agriculture sector. Agriculture is one of the basic foundations of human civilization. Therefore it can be said that this topic has originality and importance at same time.

A few research papers have been published on IoT Based

Block diagram:

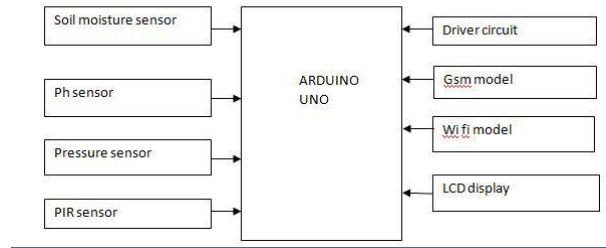


Fig. 1. Block Diagram

Smart Irrigation System. With those the research context Energy Efficiency for IoT Based smart Irrigation System is more relevant and unique. IoT based systems are made with sensors and electrical devices. Sensors receive data and store them into database. Then with that knowledge the whole system works. For instance a sensor will receive data from environment and the system will know when to water in the field. The system will water in the field when it is needed. When watering is not needed, the watering part of the system will remain off. So, energy consumption will be minimized.

It is high time we started thinking about this system. There are so many reasons why this system is needed in this time. Water is one of the biggest problems now and cultivation needs a huge amount of water. This system will help to reduce wastage of water as well as minimize the energy consumption.

VI. CONCLUSION

Technology has been developed a far. The application of technology is applied in many sectors. But it is not applied in agriculture vastly. So, this system will bring a revolutionary improvement in agriculture.

REFERENCES

- [1] <https://issuu.com/irjet/docs/irjet-v5i10319>
- [2] <https://issuu.com/ijtsrd.com/docs/55iotbasedsmartirrigationsyste>
- [3] <https://www.researchgate.net/publication/321854296ARDUINOBASEDMARTIRRIGATIONSYSTEMUSINGIOT>
- [4] SMAJTRLA, AG; KOO; RC (1 9 8 6)...Applied engineering agriculture
- [5] SCOTTMAC.KENZIE,.,The 8051 microcontroller, second edition,pertice hall inc,usa(1995)pp.81-94

TABLE I
CONTRIBUTION OF GROUP MEMBER

Contribution of Group Member
16-32231-2 , Tareq ,MD. Ikram SECTION:A Title,Abstract,Introduction,Motivation
16-32306-2, Islam,MD Mazharul Section: A Objectives , METHODOLOGY .
16-32482-2, Das,Dip Section: A Current progress, Conclusion .

TABLE II
PAPER REVIEWED BY TEAM MEMBERS

Paper Reviewed by team members
16-32231-2 , Tareq, MD. Ikram Reviewed papers: (3) [1,2,3] .
16-32306-2, Islam,MD Mazharul Reviewed papers: (2) [4,5] .
16-32482-2, Das,Dip .