Smart Irrigation System Using IoT (SISIoT)

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Abstract- India is predominantly a nation of agriculture. Among the majority of Indian households, agriculture is the most significant profession. It plays an important role in agricultural land growth. Agriculture accounts for about 20% of overall Gross domestic product and 15% of all exports in India. For agriculture, water is the primary tool. Irrigation is one means of providing energy, but water loss might in certain situations exist in significant amounts. We have therefore proposed the smart irrigation method utilizing IoT in this regard to conserve water and time. We use various sensor systems, like temperature, moisture, soil moisture sensors, which measure the different Soil Parameters and are irrigated automatically with the ON / OFF motor based on the Soil Moisture Value Property. Such sensed parameters and motor state are reflected in the android program.

Indexed Terms- IoT, Arduino Uno, sensor of temperature, sensor of soil moisture, and sensor of precipitation.

I. INTRODUCTION

Agriculture is India's main revenue stream and a significant contributor to the Indian economy. Technological involvement and its usefulness in the agro-sector in India must therefore be developed and developed. While the Indian Government has also introduced few initiatives to provide farmers with online and mobile messaging services relating to farm queries and Agri-seller information. The study reveals that agriculture accounts for 26% of Gross domestic product and provides employment to 65% of India's population. IoT transforms the farming environment and empowers farmers to address immense problems. Agriculture must address rising water shortages, restricted land access thus meeting the through needs of the world's population for consumption. These problems are tackled in modern creative IoT technologies and the increase in agricultural output

consistency, quantity, sustainability and performance. Indian economic foundation is forestry. Forestry. In today's environment, when we see increasing population increases in the nation, agriculture is increasingly important to satisfy the needs of the human race. Farming requires, however, irrigation even with more water every year than with rainfall, it is always necessary for farmers to find ways to save water while ensuring the optimum yield. Nevertheless, in the present age the farmers used irrigation technologies by manually regulating the irrigation cycle at frequent intervals.

The Internet of Things (IoT) is a computing network that can monitor its function via a mobile app. The Internet of Things (IoT) entails interconnecting items placed at different places that might be far away. The Internet of Things (IoT) is one example of network infrastructure that detects input from different devices and allows it possible to access the Network in order to share input. According to figures, agriculture utilizes 84% of worldwide usable freshwater supplies, and this number continues to be influential in terms of water use as populations are rising and food demand rises. Technical and technological approaches for the efficient use of water including economic, environmental, administrative and structural improvements are required immediately. Agricultural irrigation on the Internet is focused on the laws on crop water requirements. Through using Web technologies and sensor network technology, we will track wastewater and boost technological advances in irrigation. This may also be used to adjust the state of the device. The central processing unit often provides a communications device through which sensor data are gathered and transmitted to the user's machine. A higher communication device, such as a Wi-Fi module, is required to do this. The data converted into functional data and distributed to the customer by the main module processes. The consumer will show the details on a portable computer like a smartphone or laptop. Today, the scarcity of water is an enormous

agricultural issue. This project allows farmers to irrigate farmlands effectively with an integrated irrigation system based on soil moisture. The initial plan was targeted at mitigating unnecessary water inflows into the field. The temperature, moisture and humidity measurements are constantly monitored using sensors for temperature, humidity and humidity. The Android app continuously gathers data from the allocated IP address. The relay attached to the microcontroller controls the engine until the moisture values of the soil are exceeded. Android is a central four-choice menu guided application. That requires engine state attributes, oxygen, temperature and humidity. The motor state indicates the present condition of the generator.

II.   LITERATURE SURVEY

The subsequent steps include comprehension of existing practices, the comprehension of requirements and development of a framework for the system. The key work is carried out. This document places the sensor of soil moisture in the root zone of the plant and transmits data to android applications. Soil Moisture Sensor threshold value designed for the measurement of the amount of water in a microcontroller. On the app application, moisture values for the soil are seen. It aims to create an efficient irrigation system to allow the pumping engine to turn and disable when detecting the content of the Earth's dampness. In this post, just soil moisture value. Wireless sensors and Short Message Services (SMS) are the means of centralized control in farm greenhouses. In this post, we submit data through SMS, but the program suggested sends the mobile device values. This proposed paper is a remote irrigation device centered on Arduino that is planned for the farmer's plantation and that provides seeding water if soil moisture falls below the specified value. So, in this we did not realize how much soil humidity this new system can be addressed with an additional benefit of soil moisture and temperature on smartphone devices. The old generation of this paper with less memory microcontroller controls the device but the new system allows use of the user-friendly Arduino Uno board which helps to lower the programmes. "Microcontroller-based regulated irrigation system for plantation." "Soil moisture sensor-supported soil wireless device drip irrigation automation" is conducted using soil moisture values in

this paper irrigation method. It has been noted that no systems include all the integrated features in any of the articles; nevertheless, the suggested device incorporates all the features, for example 80 soil moisture values and also automated motor turn on / off with soil humidity values.

III.   HARDWARE REQUIREMENTS

- Arduino Uno
- Relay motor
- Soil moisture sensor
- Motor pump
- Jumper wires

1. Arduino Board
Arduino is a huge electronic programmable circuit which can quickly and hardly be incorporated into a wide variety of projects. It is fitted with a microcontroller and can compose a real-world sensing and control system. The Arduino is designed to communicate with a wide variety of items such as engines, LEDs and displays by reacting to sensors and inputs. Arduino is a very simple compiler for inventors who want to build interactive hardware projects thanks to its usability and affordability. As a suggestion for non-engineers, Massimo Banzi in Italy in 2005 suggested that Arduino would access the implementation of a low-cost simple hardware project.

2. Relay module
The Relay module is a different hardware device for remote travel. You may access computers over a network or across the Internet from a remote computer. Tools may be switched on or off remotely if Clock Watch Business orders are transmitted over a local or large network. The workplace or the planet may run machines, peri-videos or other controlled tools. The relay module may be used to identify and monitor multiple external devices in / off external conditions. A serial port is used to link the user interface. The relay module may be used to identify and monitor multiple external devices in / off external conditions. A serial port is used to link the user interface. The Relay module has two SPDT relays and a large input voltage spectrum optically isolated. They are done with clear field cables on the terminal blocks of the screw type. The feedback of the person LED

front panel and two relay lines are monitored. AC adapter is used to power the computer.

3. Soil moisture:

In irrigation areas and herb gardens, soil moisture plays an significant function. The plants rely on their development as nutrients in the soil. In order to increase the plant temperature, it is also necessary to supply water to plants. Through the cycle of transpiration, the temperature of the plant may be changed using water. And when developing in damp soil, plant root systems would also be best formed. High soil humidity can guide anaerobic environments to stimulate plant growth and soil pathogens. An overview of the soil moisture sensor, its operations and its applications will be provided in this article.

Pin configuration of soil moisture sensor
This sensor has 4pins
- Vcc for power supply
- A0 for output analog
- D0 pin is digital output
- GND pin is a ground

This module has a threshold value potentiometer and the LM393 comparator measures the magnitude of the threshold. The LED should turn on / off, according to the trigger value.

- Working Principle
This sensor uses the skill essentially to measure the soil's water content. The working and status of the water content in the soil can be reported as one per cent by installing this sensor in the soil.

- Specifications:
The specification of this sensor includes the following.
- 20mA functioning current
- The running voltage is 5V
- It has analog interface
- Functioning temperature is $10\,°C\!\sim\!30\,°C$

4. Motor pump
An AC engine is an electric motor powered by Associate in alternating current (AC). Figure 5 typically contains two basic sections of the AC engine: a fixed outside stator coil with AC coils to supply the rotating current; and an indoor rotor coupled with a

power wave to create a second rotating current. Figure 5 The rotor movement can often be rendered through permanent magnets, touching resistance, electrical DC or AC windings.

Specifications:

- noiseless
- maxi lift :45 to 105cm
- flow rate :80-120 L/H
- water outlet outside diameter: 7.5mm
- water outlet inlet diameter :4.7mm
- diameter :24mm
- height: 33mm
- material used: plastic
- continuous working of up to 500hr

5. Jumper Wire

A hopping wire is a short electrical wire which typically connects the components on a breadboard with a solid tip on either end (or only "tinn" at times, without it). Depending on the end of the two end tips or tips hole wire, there are several types of man, female, masculine, etc. They are special. In our project, which is linked to the sensor via MCU robots, we used male to female cable jumper. In the Breadboard for many links, some simple jumper wire was included. There are multiple jumpers in the picture below.

ARDUINO IDE:
Arduino IDE is an existing technology mostly for compiling and typing code in the Arduino module. It's an official Arduino device, which allows code building very easily, even though a normal individual without prior technological expertise will wet their feet during the study process. For operating systems like MAC, Windows, Linux and Java platform functions which feature integrated functions and controls that are fundamental in debugging, editing and compiling code in the environment, it is conveniently accessible. A range of modules required like Arduino Uno, Arduino Mega, Arduino Leonardo, etc. Every of them has a microprocessor circuit that is coded in code format and accepts the details. A Hex File would finally be created by a main code created on the IDE network, often known as a sketch, which is

transferred and submitted to the control board. The IDE system consisting primarily of two key parts: the editor and compiler in the first section of the application to write, then the arduino module to compile and upload it afterwards. The C and C++ languages are supported.

IV. IMPLEMENTATION

An IoT irrigation platform works at making cultivation simpler by utilizing automated application functions. After the sensors are connected to the device, the computer reads the soil quality of the soil and processes the detected data. The function generator is the system's outcome-maker. This regulates moisture and temperature. Initially you will set the humidity and the temperature point. If the perceived humidity amount is greater than the threshold. The only way to irrigate the perceived temperature benefit is to consider the user. That is because both plants can withstand moisture in the conditions of dry soil where the temperature is weak. The water used to irrigate will be conserved. Planning to send the land Text message to the consumer allows to remotely track the agricultural sector. The SMS provides alert and advice to the impacted mechanism.
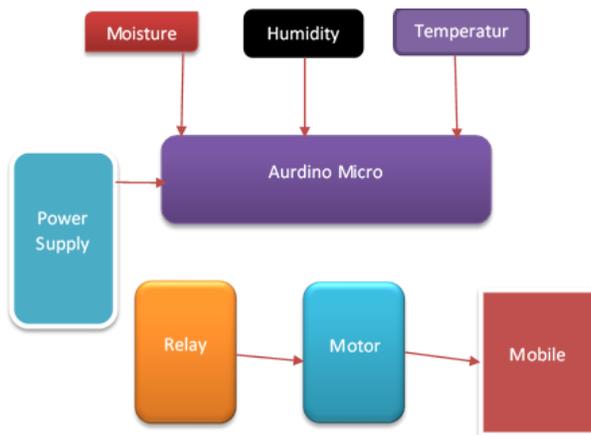

Figure 1: Block Diagram of IoT (SISIoT)

Figure 2: Flow Diagram of SISIoT

V. RESULTS AND DISCUSSIONS

The Arduino UNO R3 microcontroller is configured for automated plant watering to give interruption signals via the driver board. Application: The ground sensor is installed on the A0 pin of the Arduino module, which measures humidity of the soil. As soil moisture levels decrease, the sensor detects the moisture change, sending the microcontroller a signal such that it is possible to turn on the pump (motor). This word may be used for the automatic machine watering process. The circuit is composed of the Arduino UNO board, a moisture sensor for the dirt, a 6V engine generator, an L293D engine driver (IC1), an IC motor generator. The Arduino frame can be powered by a 5V to 9V wall wart, plug-in adaptor or solar panel. A separate 6V to 10V battery is needed for the pump motor.

Figure 3: Serial monitor

CONCLUSION

Intensive farming production, but also an vital sign of the future level of agricultural growth is needed for the introduction of agricultural network technology; it would be a further direction of agricultural progress. The practical implementation of the Internet of Things to a productive and healthy agriculture development has a significant influence on the effective usage of waters, after the installation of agricultural water irrigation system hardware and the evaluations and study of the network hierarchy resources, connectivity and related device design of agricultural water irrigation systems Such systems will be far more powerful, quicker and cheaper if they are to make further success in the field of IoT in the coming years.

In the future, the computer can be rendered as an intelligent machine where it will use advanced technology, including IoT, to predict the consumer behavior, weather conditions, harvest time, animal intruders in the field, and information connectivity in order to render the agricultural system autonomous of human activities, achieving efficiency and enormous yield.

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