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Automated Smart Irrigation System using IoT

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ABSTRACT: With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increased in the number of users of internet over the past decade had made internet part and parcel of life and IoT is the latest and emerging internet technology. Internet of things is growing network of everyday object from industrial machine to consumer goods that can share information and complete task while you are busy with other activities. Automated smart irrigation system using IoT is a system which uses computer or mobile having Thingspeak cloud to see entire condition of the farm using IoT from anywhere around the world. It tends to save the water and human energy and increase the crop production. In this project we present IoT based Irrigation system that will watering of plant automatically depending on the value of sensors. Automatic irrigation scheduling consistently has shown to be valuable in water use efficiency with respect to manual irrigation based on direct soil water measurements. The aim of the implementation is to demonstrate that the automatic irrigation can be used to reduce water use. System once installed then it has low maintenance cost. It is very easy to use and to see the parameters provided by the sensors like temperature of soil, moisture of soil and pH of soil, these parameters can be easily realize and automatically controlled by Automated Smart Irrigation System Using IoT.

KEYWORDS-Automated, smart, IoT, ThingSpeak, esp32, Irrigation

I. INTRODUCTION

In the fast-paced world, human beings require everything to be automated. Our lifestyle demands everything is remote controlled. Apart from a few things man has made his life automated. In the world of developing advanced everything the life of human beings should be simpler. To make life simpler and fitting, we have made "AUTOMATED SMART IRRIGATION SYSTEM USING IOT". The continuous increasing demand of food requires rapid improvement in food production technology. In our country India, where the economy is mainly based on agriculture and farmer's work and the climatic conditions are isotropic, still, we are not able to make full use of agricultural resources. The main reason is the lack of rain & scarcity of land reservoir water.

Irrigation has always been an ancient practice that has evolved through so many stages over the years. Manual irrigation using buckets and watering cans, flood irrigation, drip irrigation, sprinkler irrigation were and are still being used today. The existing system has several limitations; leaching off of soil nutrients, erosion thanks to flooding, loss of water from plant surfaces through evaporation, water wastage which may end in water scarcity in drought areas, and production of unhealthy crops. This problem can be rectified if we use an automated irrigation control system in which the irrigation will take place only when there will be an acute requirement of water. Indian Agriculture depends on the monsoons, which depends on nature and not a reliable source of water, so there's a requirement for an automatic irrigation system in the country that can provide water to the farms according to their moisture, temperature, and soil types & fertilizers. For big farmland with horticulture activity, the solution will be an automated system. Water contained within the soil is named soil moisture. And it is very important for plant growth. Water-soluble fertilizer is often also applied with none wastage by this drip irrigation system.

II. HARDWARE IMPLEMENTATION AND OPERATION

We will use Capacitive Soil Moisture Sensor to measure moisture content present in the soil. Similarly to measure Air Temperature and Humidity, we prefer DHT11 Humidity Temperature Sensor. Using a 5V Power relay we will control the Water Pump. Whenever the sensor detects a low quantity of moisture in the soil, the motor turns on automatically. Hence, will automatically irrigate the field. Once the soil becomes wet, the motor turns off. You can monitor all this happening remotely via Thingspeak Server online from any part of the world. Using pH sensors provides critical feedback regarding soil nutrient deficiencies or the presence of unwanted chemicals.

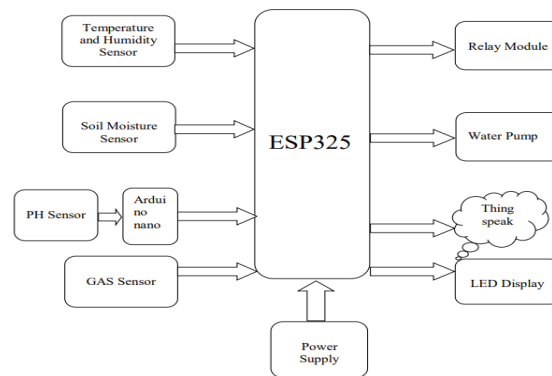
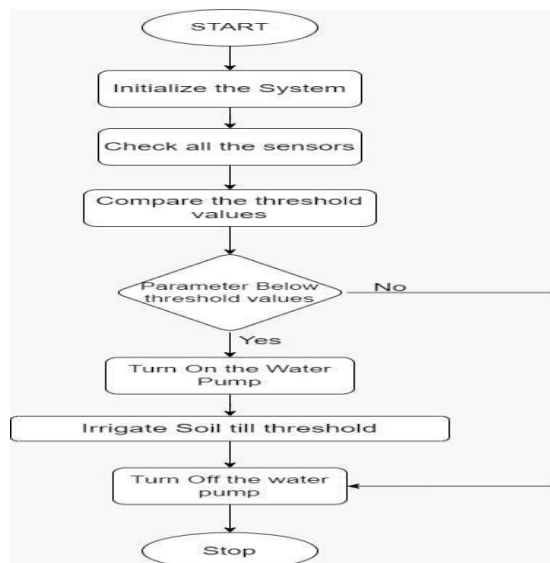


Fig.1 :Block Diagram

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2.1 Flowchart



2.2 Software Description

Arduino IDE Tool

Arduino is an open source electronics platform based on simple to use hardware and software. Arduino easily read the inputs like light on a sensor, mode of buttons or a message and convert it into an output like activating a motor, glow an LED etc. This software makes it easy to type code and upload it to the board. Arduino IDE supports C, C++ and JAVA programming languages. Arduino programs can be divided in three different parts i.e Structure, Values and Functions. Massimo Banzi has developed arduino software in 2005.

Fritzing

Fritzing is an open-source CAD software used for the design of electronics circuit or hardware, to support designers and artists ready to move from experimenting with a prototype to building a more permanent circuit. It was developed at the University of Applied Sciences Potsdam.

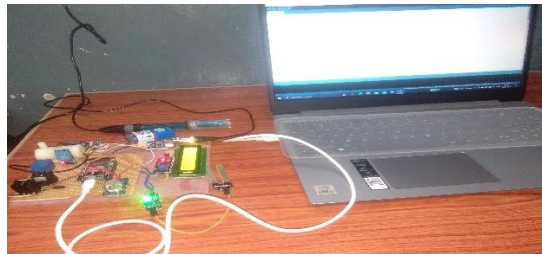
Server

Thingspeak:

Thingspeak is an IoT inquiring platform service. Thingspeak allows you to collection, visualize and analyze live data streams in the cloud. You can send data to Thingspeak from your devices, create instant visualization of live data, and send alert messages.



2.3 Model of system



III.RESULT & CONCLUSION

This project is proposed to supports aggressive water management for the agricultural land. Microcontroller in the system promises about increase in systemslife by reducing the power consumption resulting in lower power consumption Automated irrigation system has a huge demand and future scope too. It is time saving, led to removal of human error in adjusting available soil moisture levels and to maximize their net profits in accordance to factors like sales, quality and growth of their product. The application of agriculture networking technology is need of the modern agricultural development, but

also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features,.functionality and the corresponding software architecture of precision agriculture water irrigation systems Actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production. With more advancement in the field of IoT expected inthe coming years, these systems can be more efficient, much faster and less costlier.In the Future, this system can be made as an intelligent system, where in the systempredicts user actions, rainfall pattern, time to harvest, animal intruder in the field and communicating the information through advanced technology like IoMT can be implemented so that agricultural system can be made independent of human operation and in turn quality and huge quantity yield can be obtained.

IV. FUTURE WORK

Day by day, the field of electronics is blooming and have caused great impact on human beings. The project which is to be implemented is an automated irrigation method and has a huge scope for future development. The project can be extendedto greenhouses where manual supervision is far and few in between. The principlecan be extended to create fully automated gardens and farmlands. Combined with the principle of rain water harvesting, it could lead to huge water savings if appliedin the right manner. In agricultural lands with severe shortage of rainfall, this modelcan be successfully applied to achieve great results with most types of soil. By developing a Smart Wireless Sensor and by using upcoming techniques a farmer can increase his profit by solving different problems that are faced by the farmer inhis routine life. And also to involve Arduino–Controller with a video capturing byusing an MMS facility about the crop position and at the same time sending video to the farmer.

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