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SMART IOT BASED IRRIGATION SYSTEM

Akash Shankar Takawale [1], Mayur Ashok Kothavale [2], Swapnil Raosaheb Dhale [3], Dr.Anil L.Wanare[4]

U.G. Student, Department of Electronics & Telecommunication, JSPM's BSIOTR Wagholi, Pune ,Maharashtra, India[123]

Assistant Professor, Department of Electronics & Telecommunication, JSPM's BSIOTR Wagholi, Pune ,Maharashtra, India [4]

Abstract- A resource that all living species need is Water. It is therefore very precious and for enhancing agricultural productivity it is the critical input. Therefore expansion, of irrigation has been a key strategy in the development of agriculture in country. Today, farmers have several issues in agriculture due to lack of rains and scarcity of water. The main motto of this paper is to save time, money and power of farmer with an automatic irrigation system. Manual intervention is required for the traditional farmland techniques. Human intervention can be minimized with the automated technology of irrigation. By using soil moisture sensor levels of soil moisture can be checked. Whenever there is a change in humidity moisture in the soil this sensor senses the change and an -interrupt signal is passed to the microcontroller and depending on this the irrigation system works. The automated irrigation system provides a web interface to the user so that the user can monitor and control the system remotely i.e., can make the irrigation system ON and OFF remotely.

KEYWORDS: agriculture, farmer, sector, irrigation, manual, automatic, control, Atmega328P, soil moisture sensor, rain sensor, relay, water pump, cloud, BOLT.

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I INTRODUCTION

In our country Agriculture is major source of food production to the growing demand of human population. In agriculture, irrigation is an essential process that influences crop production. Generally, farmers visit their agriculture fields periodically to check motors to irrigate respective fields pump soil moisture level and based on requirement water. Farmer need to wait for certain period before switching off motor so that water is allowed to flow in sufficient quantity in respective fields. This irrigation method takes lot of time and effort particularly when a farmer need to irrigate multiple agriculture fields distributed in different geographical areas. Traditionally farmers will present in their fields to do irrigation process. But nowadays farmers need to manage their agricultural activity along with other occupations. Automation in irrigation system makes farmer work much easier. Sensor based automated irrigation system provides promising solution to farmers where presence of farmer in field is not compulsory. A small processor programmed for control a electromagnetic valve and also compare to electromagnetic valve operate motor to start watering. INDIAN farmers need cheap and simple user interface for controlling sensor based automated irrigation system. Now a day's internet is widely used. Using internet farmer know about the agriculture field irrigation status. This helps farmers to know the status of farm field watering direction through a message whether the farmer is far away from field know the status of water motor is ON or OFF and direction of watering.

The cloud control technology is developing with fast pace and entering each and every sector and drastically improving the condition of sector[1]. The cloud and IoT technology in recent year entered agriculture and by using these two technologies the farmer is increasing production and reducing cost. In this paper a system is discussed which uses both cloud and IoT technologies for controlling the irrigation system[2][3]. The system discussed comprises many elements for performing specific task. A BOLT IoT module is used for receiving

commands from user and transmitting data to cloud server for analysing, the BOLT module is connected with Atmega328P for controlling the system which is further connected with soil moisture sensor which send data regarding water contain of soil for controlling water pump and a rain sensor for sensing rain, if sensor senses rain then control unit stops the water pump for saving energy and saving crop from excess water. The BOLT module sends data to cloud and a graphical representation of sensed data is shown to user automatically.

II RELATED WORK

[1]Dr.D.Saraswathi, P.Manibharathy, R.Gokulnath, E.Sureshkumar, K.Karthikeyan., "Automation of Hydroponics Green House Farming using IOT", International Conference on System, Computation, Automation and Networking (ICSCA) ,July,2018

Recently, hydroponics refers to the art of growing plants in water (either saline) without soil (land). Nutrients for the plants are supplied to the roots in the form of solution that can be either in the form of static or flowing. Hydroponics can be cultivated both in green house and in glass house environment. The limitation in green house environment is to maintain the temperature, pressure, humidity value at a particular level. In addition to that, monitoring on PH value and electrical conductivity in hydroponics is another challenge that has to be monitored and maintained. Manual monitoring is in practice, which is a very trivial task; else, the plants may die out. This project, focuses on two tasks, the first one is to automate the green house environment monitoring. The subsequent is automation of PH level and electrical conductivity maintenance. IOT is used to transfer the retrieved data to the internet (mass storage) and mobile app is used to communicate the status to the user with internet to their mobile phones, so that monitoring & maintenance will be easier.

[2]Pooja Ghule; Mansi Kambli, "Web Based Environment Monitoring System Using IOT" International Conference on Trendsin Electronics and Informatics(ICOEI), Issue: 25 | April-2019

Nowadays people are very concerned about the environment because of the rapid changes in the environment which will harm to human health. Hence it is necessary to monitor environment where the people spend more time like at home, office, industry, any working area in real time and long term manner. Using internet of things we can control system as well as we can access system remotely using IoT. It first take information with help of different sensors and transfer sensors values on thing speak directly, from which can be accessed at anytime and anywhere. Literature survey is done on use of wireless sensors, Cloud and Internet of things, and connection between devices with sensors and network connection will read sensor value, which can be further monitored from the internet with the help of thing speak. Monitoring environment is done through website & controlled manually and automatically by detecting sensor values. We can controlled it manually through website and it can automatically controlled by sensing values. The main Objective design of cloud storage environment is used to store data and to process the data. Internet of things allows physical devices or things, which are not computer system, that only act very smartly, and makes collaborations decision which are beneficial for different applications. That application allow things to capture value of devices. They transfer "things from being passively computing" and makes an individually decisions in active manner and communicate and collaborate to form single difficult decision. IoT technologies of computing, embedded sensors, communication protocol and internet protocol for communication allow internet of things to provide significant which impose number of challenges and introduces standards which require to specialize and communication.

[3]SeungHoKim;JongMunJeong ; MinTaeHwang ; ChangSoonKang, "Development of an IoT-based atmospheric environment monitoring system" InternationalConferenceon Information and Communication Technology Convergence (ICTC), 20 Oct 2017

Recently, as the damage of air pollution due to fine dusts, etc. has been continuously increased, there is a growing need for a low-cost air quality monitoring system to observe air pollution information at public facilities or homes. In this paper, we propose an IoT (Internet of Things)-based atmospheric environment monitoring system that can effectively observe air pollution information without restriction of place or space. The proposed system consists of an atmospheric environment-measuring device and an atmospheric environment analyser, in which the system has been developed to be able to collect and analyze atmospheric environment measurement results in a server through an LTE communication network. The atmospheric environment information obtained from the development system was compared with the observation results provided by the National Ambient air quality Monitoring Information System (NAMIS).

III METHODOLOGY

In this system we are going to study detail block diagram of the proposed system with all its peripheral.

Operation:

- The term "IoT" stands for the internet of things, can be defined as the interconnection between the individually

identifiable embedded computing apparatus in the accessible internet infrastructure.

- The 'IoT' connects various devices and transportations with an help of internet as well as electronic sensors.
- In the agriculture field, sensors are used like soil moisture. The information received from the sensors is sent to the Database folder through the Android device. In the control section, the system is activated using the application, this is finished using the ON/OFF buttons in the application.
- In addition, this system is automatically activated when the soil moisture is low, the pump is switched ON based on the moisture content.
- The application has a feature like taking some time from the user and water the agriculture field when the time comes. In this system, there is a switch used to turn off the water supply if the system fails.
- Other parameters such as the moisture sensor demonstrate the threshold price and the level of water in the soil.
- Further, this project can be enhanced by designing this system for large acres of soil. In addition, this project can be incorporated to make sure the value of the soil and the expansion of harvest in each soil. The microcontroller and sensors are successfully interfaced and wireless communication is attained between varieties of nodes.
- In addition, further, this proposed system can be enhanced by adding up machine learning algorithms, which are capable to study and recognize the necessities of the crop; this would aid the agriculture field to be an automatic system. The inspections and outcomes tell us that this result can be executed for a lessening of water loss and decrease the labor necessary for a field.
- From the above information, finally, we can conclude that the hardware components of this system interfaces with all the sensors. The system is powered by a power source, and the system has been checked for watering an agriculture field.

Flow chart:

A flowchart is a graphic representation of a logic sequence, work or manufacturing process, organization chart, or similar formalized structure. The flowchart is a means to visually present the flow of data through an information processing systems.

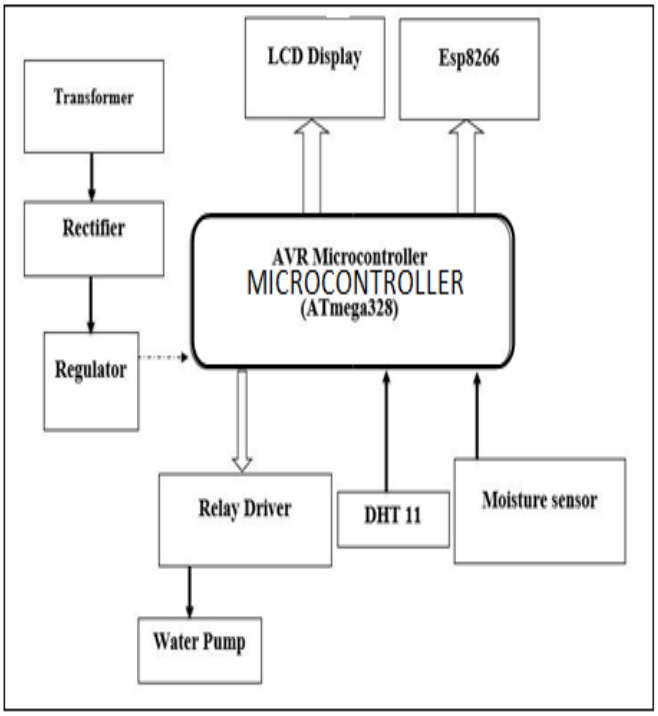

Fig 2. System Architecture

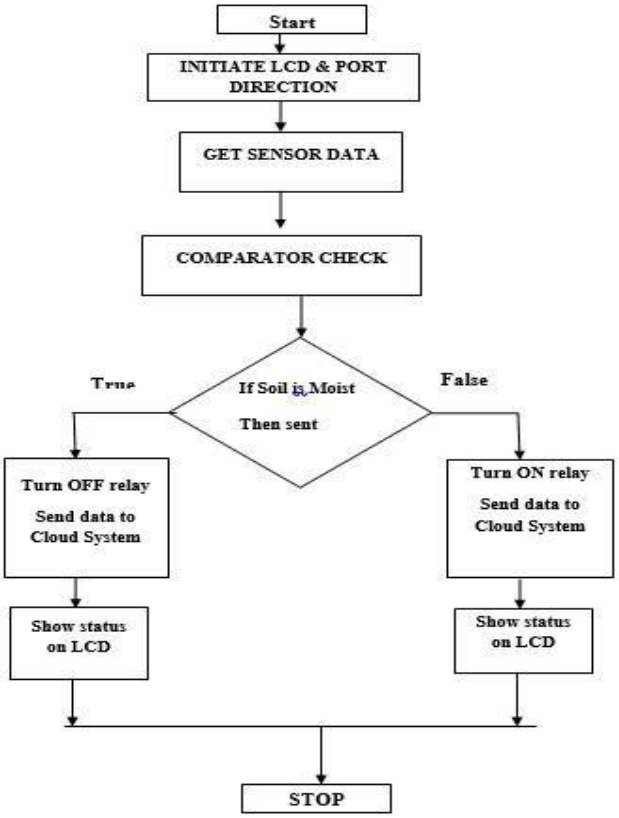

Fig. 3 Flow Chart Of System

IV EXPERIMENTAL RESULTS

Result:

In this project, we have designed a smart IOT Irrigation system, which works properly to control and monitor the water pump as per changing the requirement of water in soil and controlling the turning ON/OFF of the electrical devices using mobile phone device.

Applications:

- It can be implemented in modern irrigation systems
- IOT projects

Advantages:

- Water Conservation.
- Low cost.
- Real time data is captured.
- Increase productivity.
- Reduce soil erosion and nutrients leaching..

V CONCLUSION

In this project, we present a prototype for automatic controlling an irrigation system. Here prototypes includes sensor node and control node. The sensor node is deployed in irrigation field for sensing soil moisture value and the sensed data is sent to controller node. On receiving sensor value the controller node checks it with required soil moisture value. When soil moisture in irrigation field is not up to the required level then the motor is switched on to irrigate associated agriculture field and alert message is send to registered mobile phone. The experimental results show that the prototype is capable for automatic controlling the experimental results show that the prototype is capable for automatic controlling of irrigation motor based on the feedback of soil moisture sensor. This system is used in a remote area and there are various benefits for the farmers. By using the automatic irrigation system it optimizes the usage of water by reducing wastage and reduce the human intervention for farmers. It saves energy also as it automatic controlling the system. So there are the system is OFF when the field is wet and automatically start when the field id dry. It is implemented in all type of irrigation system (channel, sprinkler, drip). In addition, we present less number of sensor nodes to use in a large area of field so the cost of the system also decrease. Moreover, power consumption of the wireless network devices are also less and the system perform a long time function.

REFERENCES

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