Iot Based Agriculture Field Monitoring and Irrigation Automation

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Abstract- **The main Aim of the project is to monitoring of agriculture field by utilizing IOT Real-Time Automation of Agriculture for Social Modernization of Agricultural System. Now-a-days it has great attention. Efficient management of water is a main concern of several cropping systems in semi-arid and arid areas. Distributed in field sensor-based irrigation systems offer a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving water. Among the important things that may come to the farmers interest is how to control the use of natural sources and natural environment which agriculture depend on.**

Therefore, this problem has captured farmers interest to implement agro-environmental remote monitoring method in their agriculture industries. This can be implemented in various situations such as in monitoring qualities of soil and water design and instrumentation of variable rate irrigation, a wireless sensor network, and software for real time in-field sensing and control of a site-specific precision linear-move irrigation system is discussed here. Here the crop field area can be monitored without human interaction. We presented the utilization of the sensors in paddy crop field area, and sensor applications, WSN and the results are implemented in this paper. We can also store all the details in the cloud and can be monitored and controlled using IOT.

Index Terms- **Real time monitoring, efficient water Management, wireless sensor network, irrigation system.**

I. INTRODUCTION

Agriculture plays major role in the economy of the country. More than 70% of Indian population relies on agriculture for their sustenance. As the contribution of agriculture to Gross Domestic product is declining nowadays, we are in urge to increase crop productivity with efficient and effective water usage. In agriculture irrigation is the important factor as the monsoon rainfalls are unpredictable and uncertain. Agriculture in the face of water scarcity has been a big challenge. There exists a demand for colossal technical knowledge to make irrigation systems more efficient.

There are varieties of traditional irrigation systems that have been followed from the past. For instance, in flow irrigation the water resources like tanks or reservoirs are placed at great heights. The water starts to flow automatically down the channel when it is connected to the tank or reservoir. This type of irrigation is mostly used in plain areas. The other type of irrigation is lift irrigation where the fields are at higher level than the water resources. The land is irrigated by lifting water from wells, tanks, canals, rivers using pumps. Nowadays the ground water is also pumped to irrigate the land. Well water irrigation, tank water irrigation, inundation irrigation, furrow irrigation, basin base irrigation are other traditional methods which has been followed from the past.

To improve traditional methods, there has been many systems developed using advanced technologies that help to reduce crop wastes, prevent excessive and scarce watering to crops and thereby increase the crop yield. There are many modern irrigation systems developed so far. One such method is drip irrigation that is used to save both water and fertilizer. Primitive drip irrigation has been used since ancient times. In this method water and fertilizer in the form of water droplets are dripped directly to the root of the plants periodically. The design for water application varies according to the crop type.

When compared to traditional method it uses 30-50% less water. The other method is pot irrigation which is more suitable for areas having scanty rainfall. The

pitchers used here are fixed to the ground up to the neck. The holes are made in pitchers which make the water to percolate around the soil and keep the soil moist for the plants.

This method is successful in areas where flow irrigation cannot be used. The other method includes sprinkler method which is similar to that of natural rainfall. The water is distributed through a system of pipes and then it is spread into air using sprinkler so that it breaks up into small water droplets that fall into the ground. The pumps supply should be designed in such a way that there should be uniform application of water on the soil surface.

There are some parameters to determine irrigation of crops. Evapo-transpiration (ET) is a technique in which of moisture from the earth is transferred to the atmosphere by evaporation of water and transpiration from plants. It depends on climatic changes.ET controllers can be used to schedule irrigation. It has been proved that using ET method the water savings is up to 47%. Soil moisture and temperature of the field are the most essential parameters. The electromagnetic sensors are used to detect soil moisture. This method saves 53% of water compared to sprinkler irrigation. These sensors are used to create wireless sensor networks Wireless Sensor networks are used to monitor crops and to automate irrigation. The wireless sensor nodes continuously senses the crop field and send it to the coordinator node where decision making is done to automate irrigation based on the field conditions.

These are some methods that have been used so far to improve irrigation system, decrease crop wastage and increase crop productivity. In this work the system is developed using sensors to monitor crop-field and automate irrigation system. The system is tested and gave good results. The wireless transmission of sensor data from field to the coordinator, storing it in a database, controlling field from mobile application and irrigation control are worked very well. The water usage is 90% more efficient than any other traditional and other modern irrigation methods.

II.PROPOSED SYSTEM

This project "Remote GSM module monitoring and wind mill system control" Efficient water management is a major concern in many cropping systems in semiarid areas. Temperature sensor, level sensor, pH sensor connected with ATMEL. Microcontroller transmits the data's using Global system for mobile communications Modem, this project offered stable remote access to field conditions and real-time control and monitoring of the variable-rate irrigation controller.

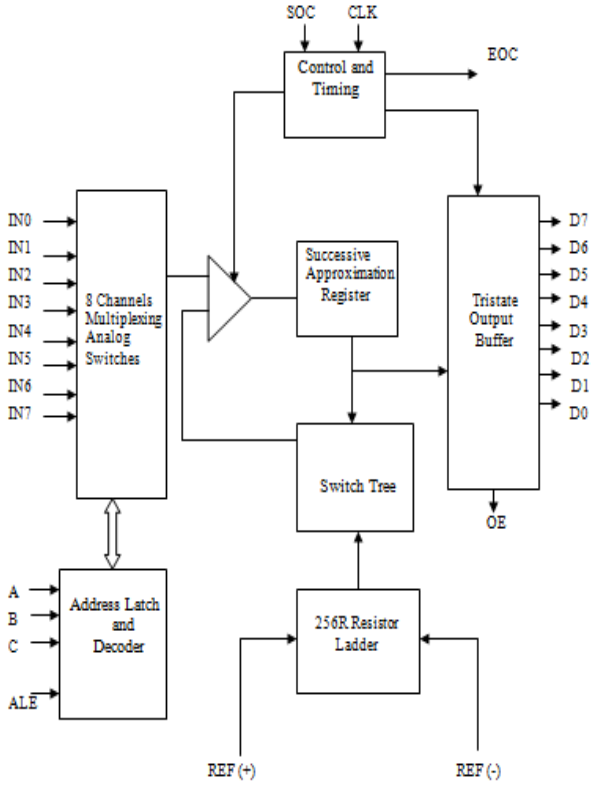


Fig 1. Proposed System

A microcontroller is a compact micro computer designed to govern the operation of embedded systems in motor vehicles, robots, office machines, complex medical devices, mobile radio transceivers, vending machines, home appliances, and various other devices.

The ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique.

A temperature sensor is a device, typically, a thermocouple or RTD, which provides for temperature measurement through an electrical signal. A thermocouple (T/C) is made from two dissimilar metals that generate electrical voltage in direct proportion to changes in temperature.

A humidity sensor (or hygrometer) senses, measures and reports the relative humidity in the air. It therefore measures both moisture and air temperature. Relative humidity is the ratio of actual moisture in the air to the highest amount of moisture that can be held at that air temperature.

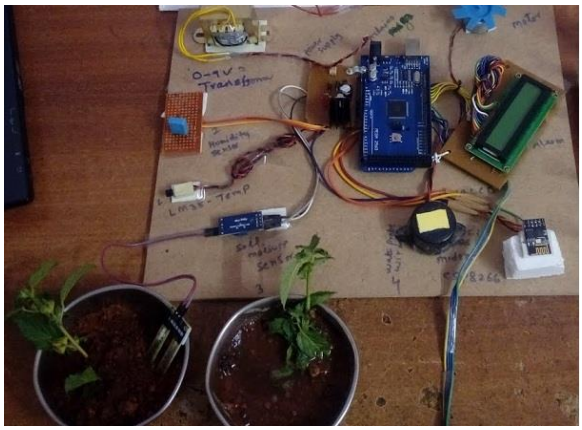
Soil moisture sensor is a sensor which senses the moisture content of the soil. The sensor has both the analog and the digital output. The digital output is fixed and the analog output threshold can be varied. It works on the principle of open and short circuit. The output is high or low indicated by the LED. When the soil is dry, the current will not pass through it and so it will act as open circuit. Hence the output is said to be maximum.

When the soil is wet, the current will pass from one terminal to the other and the circuit is said to be short and the output will be zero. The sensor is platinum coated to make the efficiency high. The range of sensing is also high. It is anti-rust and so the sensor has long life which will afford the farmer at a minimum cost.

The AT89S52 is a low-power, high-performance CMOS 8- bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory pro-grammars. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-many embedded control applications.

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic; hence the probability of error is reduced. The data is highly secured and it not only solves the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management.

III. RESULTS



IV. CONCLUSION

The automated irrigation system has been designed and implemented in this paper. The system developed is beneficial and works in cost effective manner. It reduces the water consumption to a greater extent. It needs minimal maintenance The power consumption has been reduced very much. The system can be used in green houses. The System is very useful in areas where water scarcity is a major problem. The crop productivity increases and the wastage of crops is very much reduced using this irrigation system. The developed system is more helpful and gives more feasible results. The extension work is the prediction of crop water requirement using data mining algorithms in which we are currently progressing. The prediction helps to supply the right amount of water to the crops.

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