REVIEW ON MICROCONTROLLER BASED MONITORING SYSTEM FOR AGRICULTURE

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Abstract - *In India agriculture plays important role. Many people work in farm but from past of year the yield of crops is decrease due to sudden change in atmosphere condition the in environment for that purpose the people move towards the modern technique used in their agriculture field. For improving yield of crop we use the advanced monitoring system in field and also the wireless module was examined against different types of sensing parameter are used for measuring the environment condition.*

*Key Words***:** *Agriculture, Humidity sensor, Microcontroller, Monitoring system, Temperature sensor, soil moisture sensor.*

1. INTRODUCTION

For development of country agriculture is important factor. For the total GDP India agriculture contribute 16.6 of its total an India as per the population cancel some kind of new technique implemented by former and in addition with fertilizer & pesticide & hybrid but although that various technique implement to archive yield rate but if not influence such and also the excessive use of a above technique if result reducing of tableland.

On the other hand, science and technology have modernized most of the sectors of human life. Automation has started nearly in every field. Workers are replaced by well trained robots. Rapid advancement and miniaturization of technology is becoming boon to the society. It can be said that science and technology has increased the basic needs to mobile, television and computer. Researchers from various countries have utilized the good's of science and technology to improve the yield. In proposed system, different agricultural parameters like soil moisture, humidity and temperature, are continuously monitored and collected data is given to microcontroller. Now microcontroller display the real time values of atmospheric condition on LCD (Liquid Crystal Display) which is placed inside the farm Simultaneously data is transferred to central unit via, wireless unit. Central unit analyzed the atmospheric condition and based on the analysis, watering to crop can be schedule with the help of relay circuitry, which controls the pump. It saves water to great extent as well as helps in maintaining the desire environment across the fields.

Agriculture is the basis of living for the population through the production of food and important raw materials. Moreover, agriculture continues to play an important role in providing large scale employment to the people. Growth of agriculture is considered necessary for development and for a country's transformation from a traditional to a modern economy and especially about India being well known for agricultural work. More than half of the workforce is related to the agriculture and its allied fields. Almost all the farmers are still depending on the traditional orthodox way of farming. It is being observe that the yield of crops, fruits have not been increasing. Even in some parts it is declining. Automation has been achieved; humans have been replaced by machines. Directly speaking, science and technology has proved its importance in those fields. Therefore there is need to grab the fruitfulness of science and technology in the field for higher yield and growth in agriculture. Most of the papers signifies the use of wireless sensors network which collects the data from different types of sensors and then send it to main server using wireless protocol. The collected data provides the information about different environmental factors which in terns helps to monitor the system. This paper provides the information related to previous work that had been done in the field of agriculture using the wireless sensor network over a period of past few years as well as the proposed system which is useful in monitoring as well as controlling the data which provides the flexibility. Also the wireless protocols that were used previously have limitation of short range which requires multi hopped networks.

A weather station is an instrument that measures and records meteorological parameters using sensors without intervention of humans. The measured parameters can be stored in a included data logger or can be transmitted to a remote location via a communication link. If the data is stored in a data logger, recorded data must be physically downloaded to a computer at a later time for further processing. Therefore, the communication system is an necessary element in an automated weather station. Today, computerized weather stations are available as viable products with variety of facilities and options. Although automated weather stations can be built and implemented in remote parts of Sri Lanka to bring down the cost of maintaining weather stations, until recently, not much

emphasis has been given for building and using such instruments locally.

Automated weather stations have been developed in universities by interfacing meteorological parameter monitoring sensors to microcomputer commercially available data loggers with communication devices or through serial and parallel ports to obtain hard copies of weather data Recently, the University of Colombo developed an automated weather station with USB communication facility and a built-in data logging facility. The system used wired communication to transfer data to the monitoring station through the computer's built-in USB interface.

2. OVERVIEW

Field of agriculture is under rapid advancement in terms of technology from past couple of decades. Farmers start to utilize various monitoring and controlled system in order to increase the yield. Different agricultural parameters like temperature, relative humidity, soil moisture, carbon dioxide, light detection, soil pH, *etc*. are monitored as well as controlled. Here it is review of some of these monitoring systems which can help the farmers to improve the yield. A precision irrigation system was developed. It focused on monitoring the soil moisture, estimating the Evapotranspiration (ET) and driving drip irrigation for large grape farms in India. Soil moisture plays an important role in growth of plant whereas ET helps in defining the irrigation scheduling. ET is a combination of two separate processes whereby water is lost from the soil surface and on other hand from the crop through transpiration. Irrigation scheduling is a process through which water lost by the plant through Evapotranspiration method is an excellent way to determine how much water to supply based on estimates of the amount of water lost from the crop. Hierarchical wireless sensor network was proposed.

The main objective of the system is to develop wireless sensor In the previous section, review of the different agricultural system is presented and it is found that most of the systems are complex and costlier. So a simple and cost effective technique is proposed in this section. Block diagram of smart design of microcontroller based monitoring system for agriculture. It consists of sensing unit, LCD, relay, water pump and microcontroller. Sensing unit read the different atmospheric conditions. It consists of temperature sensor, relative humidity sensor and soil moisture sensor. The readings are given to microcontroller. Microcontroller will display these reading on LCD as well as transmit it through wireless module.

Similar wireless module will receive these different sensor readings and give it to computer via RS 232. Here wireless module is interfaced with the laptop using communication standard 232. Database is created which will store the different readings. Simultaneously it will also check for amount of water supplied to the field. If it exceeds from

certain reference level then it operates the relay circuitry to switch the motor pump.

It is used to measure the present moisture level of soil. Moisture sensor is self made bridge of resisters and capacitors. As approximate model of earth is capacitive type, here, two aluminum foils are used which act as capacitive plates and soil acts as dielectric medium. As the water level or moisture level increases, it will increase the electrical conductivity of medium thereby reducing the voltage across the plant

A graphical user interface (GUI) is developed for the ease of farmers. As soon as user logged in into the system, will be directed to actual main display window of the system where the real time values of temperature, soil moisture and relative humidity are displayed continuously. Once the present statuses of moisture level exceed the set moisture level then it will command the microcontroller through wireless unit to operate the relay.
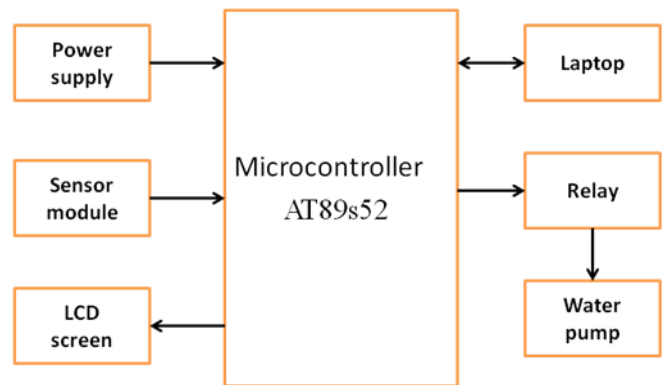

Fig. 1: Block Diagram Of Microcontroller Based Monitoring System For Agriculture

3. WORKING

It consists of sensing unit, LCD, relay, water pump and microcontroller. Sensing unit reads the different atmospheric condition. Its consists of temperature sensor, relative humidity sensor and soil moisture sensor. The readings are given to microcontroller. Microcontroller will display these reading on LCD as well as transmit it through wireless module. Similar wireless module will receive these different reading and give it to computer via RS 232. Here wireless module is interfaced with the laptop using communication standard 232. Database is created which will store he different reading. simultaneously it will also check for amount for water supplied to the field. If it exceeds from certain reference level then it operate the relay circuitry to switch the motor pump.

Wireless module is used to transfer the real time values of temperature, relative humidity and soil moisture to the central unit laptop. The wireless module used in CC2500. Same module is used at receiver section. This module is then tested for different conditions like varying the distance

between transmitter and receiver section, introducing different obstacles like wall, metal body, magnet, *etc*. Here only temperature sensor reading is transmitted. After observing the values at receiver section, it is found that there is no difference in the values received at receiver section except the amount of delay in receiving the data. Relation between Transmitter and shows the experimental and mathematical result for soil moisture sensor where voltage is plotted against the moisture values for vivid temperature values. It is found that there is little variations in experimental and mathematical results. Experimental analysis shows that the voltage across soil moisture sensor varies little with changing temperature value.

4. CONCLUSION

Monitoring system was developed for monitoring different parameter of environment, like soil moisture, humidity, and temperature. This value can be transmitted wirelessly by using central unit via microcontroller. It was found that the little change in environment the reading of sensor was change and motor pump will operate and maintain atmospheric condition.

Actual implementation of the system requires around 3 such a module in one area. That complete task and their communication can be challenging task. so system worked well in saving the water and monitored the environment across the field to maintain the desire atmospheric condition required for proper crop growth.

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