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A SMART AGRICULTURE MONITORING AND CONTROLLING SYSTEM USING GSM

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ABSTRACT : In this project we propose a plant growth monitoring and controlling system has using embedded technology with sensors and AVR microcontrollers. It will control water flow by monitoring the humidity levels and surrounding temperature by sing various sensors. It helps to avoid wastage of unwanted water flow in farming and allows proper yield of crops and thereby reduce human labour.

INTRODUCTION

Agriculture is the cultivation of plants, animals, fish etc. for producing food vital for the maintenance of life on Earth. Agriculture dates its history back to thousands of years. Its development has been driven by different technologies and practices over the different ages. Agriculture employs over one-third of the global workforce. It is evident that there has been a constant decline in agriculture industry, for which the significant gap between the two entities of technical aspects and agricultural aspects. This paper aims at bridging this gap by using the technological advancements efficiently. GSM is a platform that is of open source nature and is one of the most used tools in electronics. It makes the concept of the interfacing of hardware software, very easy. It can be integrated with all type of sensors and process information.

GSM IN SMART AGRICULTURE

GSM (Global System for Mobile Communication) is an advanced telephony system that is capable of transmitting and receiving information without any loss. It digitizes and compresses data by time division multiple access where thesignals are transmitted over the same channel, with each independent time slot. GSM technology gives a smarter and an efficient way for better yield of crops. The parameters of a crop are determined using sensors like temperature, soil, humidity. These data are compared with pre-determined values and accordingly the crop condition is notified to the farmer remotely using GSM, thus reducing physical effort. This information about the crops is notified through a telephonic message to the farmer so that he or she can utilize his or her time on better

production units. The modern farmer is unable to identify how the various environment parameters like humidity and temperature affect their crop. The project aims at making agriculture smart using automation and GSM technologies. Using this system, the farmer may feel easy and comfortable to work on his land without any stress. Using GSM, the farmer will be able to monitor whenever he is unavailable to maintain his land. The highlighting features of this paper include smart monitoring with smart control based on real time field data and ATmega32A which is the heart of the system. Secondly temperature maintenance, humidity maintenance and other environmental parameters. And finally the recommendation to farmer for smart agriculture.

NEED FOR SUCH AN AUTOMATED CONTROL

- In today's world the need for automation has drastically increased in every field including Farming and Agriculture.
- Traditional method of taking care of fields and sites required many numbers of Labors and hours and hours of time.
- This amount of effort people put in is not coping up with the results being produced, which in fact is far less.
- Therefore, we need an automated control system which can judge the environment and other factors according to our need and can response and notify us whenever required.
- Also since it is equipped with a Bluetooth module it can work in areas without internet connectivity since it creates its own localized network for a short range which can be extended by using a different module.

EXISTING SYSTEM

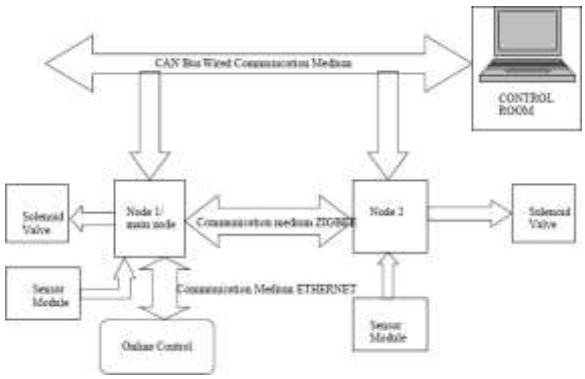
Our existing system proposes technological development in Wireless Sensor Networks made it possible to use in

monitoring and control of plant growth parameter in precision agriculture. In the Field bus concept, the data transfer is mainly controlled by hybrid system (wired and wireless) to automate the system performance and throughput. ZigBee protocols based on IEEE 802.15.4 for wireless system are used. The atmospheric conditions are monitored and controlled online by using Ethernet IEEE 802.3. Partial Root Zone Drying Process is implemented to save water. Also Controller Area Network (CAN) and Hybrid networks are used. It uses traditional communication system

Block diagram of the Existing system

SYSTEM MODEL DESCRIPTION

In this concept, the data transfer is mainly controlled by a suitable wired communication system, now can be replaced with the hybrid system (wired and wireless) to extract the benefits of both and to automate the system performance and throughput. ZigBee protocols based on IEEE 802.15.4 – 2003 for wireless system are used. The atmospheric conditions are monitored and controlled online by using Ethernet IEEE 802.3. Partial Root Zone Drying Process can be implemented to save water at the maximum extent. Online interaction can be made with the farmers by the consultant to give them the knowledge about this technique and implement it effectively in their farms to extract more yields withadvanced technology.



DRAWBACKS

- Not energy saving and data fusion, directions are left for future research.
- Failure of any particular part or device is not informed and has to betested manually.
- Different soil nutrient sensors are not used.
- Provides only precision values that is not accurate and is not costefficient.
- The investment in electric power supply is expensive.
- The technique can achieve convenient wireless connection only within ashort-distance.
- Does not support several water levels and uses old techniques

PROPOSED SYSTEM

To enhance the productivity of the crop there by supporting both farmer and nation we proposed a Smart Agriculture Monitoring system which operates based on GSM network and sensors .They monitor the humidity levels and surrounding temperature and controls the water flow accordingly. The controller activates the relay driver unit when the message is received through GSM and pumps motor by using relay switches. This design can be used for alarming the user via SMS if the moisture level and temperature goes beyond threshold value.

MODEL DIAGRAM

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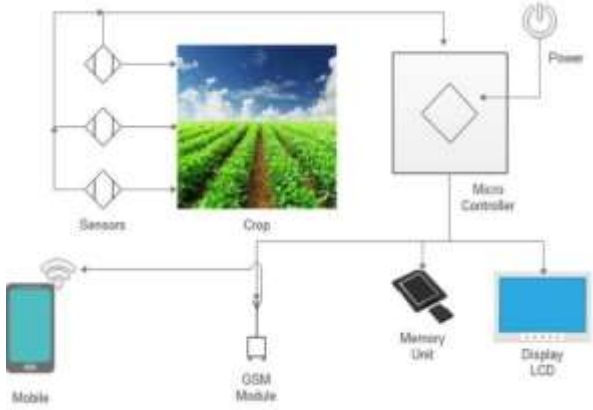

WORKING PRINCIPLE

Smart agriculture plant growth monitoring using GSM and sensor is a project which aims to help the farmers by giving information about the plant growth easily. In this the working is as follows. The system consists of LM35 temperature sensor and soil moisture sensor, the voltage from these sensors is red by the ADC channel and so the analog data is converted to digital form in the program. Then the load is given to the power supply and then to the development board. To measure water level in the field we have float sensor. Both the tanks are separated and for one of the tank four sensors are used for its automated control An overhead tank is used to identify the low level and full level. These to level can also be sensed in the sump. The main aim is to have full level water in the overhead tank, when the tank is low level the pump will be automatically OFF. The pump should not be turned ON when there is no water in the sump. The water level in the sump can be sensed if it is working below the low level. Therefore the pump will be turned ON and the water will be filled in the overhead tank, when it reaches the top level the motor will be switched ON automatically. The motor will be switched on automatically even
if does not reach the full level and if the sump level goes below the low level. Totally this plant monitoring system acts a two separate system, one is for refilling and controlling and other is for plant watering. A solenoid valve is used for plant watering function. Aim of this system is to control the watering of the plants in the field, to check the condition of the tank, co continuous monitoring to get the information on the condition of the plants and to control it through the mobile phone. If there is no water in the tank the message will be automatically send to your phone using the GSM technology in this system.

In some cases like having extra water in the tank or when the sensor fails to work or when the frequency which is set is not sufficient we can control it manually through the ON/OFF switch present in the system. We can operate this plant monitoring system from anywhere at any time through a mobile phone by sending SMS or making a call. Sometimes network problems may arise in this case we can use manual ON/OFF switch.

Now for example let us take the moisture level as 25% in this condition it will be detected that there is no water in the tank or will be dry therefore the valve will be ON automatically, if the moisture level of 25% is increased then the water level reaches the top and the valve will be OFF. In this system we use 230 volt power supply, 12 volt step

down transformer and a bridge rectifier. When these values are supplied to an input regulator the input voltage will be fluctuated. Here we need a constant DC for the operation of the relay and microcontroller. When a logic 1 or 0 is given then the relay turns ON/OFF. The communication to the sim i.e. GSM can be established

ESTABLISHMENT BETWEEN GSM AND MOBILE PHONE

SYSTEM ARCHITECHURE

CONCLUSION

This project proposed an agriculture monitoring system using GSM technology and AVR microcontroller. The proposed system was implemented and then installed for plants to monitor the environmental conditions like temperature and humidity and also to control the water flow. By using this system it is easy for the farmers to control the field through GSM technology i.e. a communication link can be established easily by activating the system through amessage or a phone call from a normal mobile phone from any place at any time. This system can monitor and control the field continuously and accurately which will reduce the human labour. For future developments it can be enhanced by developing this system for large acres of land. Functionalities like scheduled manual override can be added, camera monitoring, live streaming of plant ,we could also use wowz a streaming engine which uses RTSP and RTMP Also the system can be integrated to check the quality of the soil and the growth of crop in each soil. Through the field tests, it was successfully verified that the proposed system can be used in plant or agriculture monitoring.

EXPERIMENTAL SETUP

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