

Technical Review on Controlling Of Environmental Parameters under Polyhouse Farming Using GSM

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Abstract: Agricultural field is playing a vital role in Indian economy. In this, irrigation mechanism is of key concern. Irrigation is the process of artificially supplying water to land where crops are cultivated. Our paper aims to control the wastage of water in the field and to find the exact field condition for farming. Traditionally natural rainfall, canal water and hand pumps were a major source of water supply for irrigation. But this method has led to severe drawbacks like under irrigation, over irrigation which in turn causes leaching and loss of nutrient content of soil. For the monitoring and controlling of the agriculture field, different types of sensor were used. Those are temperature, humidity, soil moisture, level sensor and light sensor. GSM technology is used for communication purpose to inform the end user about the exact field condition. We are using motor for soil module and level sensing applications.

Keywords: MODEM, PIC16F876A, RS232 converter (MAX232N) serial port, SMS, sensors.

I. Introduction

Irrigation is a scientific process of artificially supplying water to the land or soil that is being cultivated. The advances in the technologies related to wireless communication has led to the emergence of several engineering design to aid the human requirements. As we all know agriculture play a significant role in developing country like India and implementing mobile communication for facilitating farmers is the basic idea of our project. In dry areas or in case of inadequate rainfall, irrigation becomes difficult. SO it needs to be automated for proper yield and handled by remote for farmer safety and it is also beneficial for farmer. If the farmer is far from the agricultural land, he will not be noticed of current conditions. So, efficient water management plays an important role in the irrigated agricultural cropping systems.

A GSM based farm irrigation system has two major technologies, primary being the GSM and secondary is the controller or processor. This processor or controller works as a central core for functioning of the automated process after it has been initiated by the GSM based device and finally presents the output to the device. PIC16F876A microcontroller is used for designing the proposed system. This microcontroller continuously receives the data from sensor in the form codes. And after this, the data is displayed on the LCD. LCD is used for the display purpose of field condition. Here motor is also used. Once the motor is started, a constant monitoring on soil moisture and water level is done and once this moisture is reached to sufficient level, the motor is automatically turned off and for this the message is send to subscriber that the motor is turned off.

In this project we are using some sensors like level sensor, temperature sensor, humidity sensor and light sensor. Level sensor is used to monitor the soil condition. If the soil is dry means, it is harmful to plants. So it immediately release the water into the soil and make it wet. Temperature and humidity sensor is useful to monitor the weather condition. Water level sensor is use to monitor the water level.

II. Literature Review

Nilesh S. Bhaltadak, Hemant T. Ingale, S. K. Chaudhari (June 2015) [1] Irrigation is the process of artificially supplying water to land where crops are cultivated. Traditionally rainfall, canal water and hand pumps are major sources of water supply for irrigation. Automated irrigation system which automates the irrigation of land by combining various software and hardware for field irrigation. Here WSN is used to monitor the environmental condition, wireless sensor network (WSN) refers to a group of sensors for monitoring and recording the physical conditions of the environments and organizing the collected data at a central location. This paper gives detailed survey of various automated farm irrigation systems. GSM serves as an important part also it is responsible for controlling the irrigation facility and sends them to receiver through coded signal.

R.suresh, S.Gopinath, K.Govindaraju, T.Devika, N.Suthanthira Vanitha (February 2014) [2] The green house based modern agriculture industries are the recent requirement in every part of agriculture in India. In this technology, the humidity and temperature of plants are precisely controlled. Due to the variable atmospheric

conditions sometimes may vary from place to place in large farmhouse, which makes very difficult to maintain the uniformity at all the places in the farmhouse manually. The proposed system implemented GSM is used to report the detailed about irrigation. The report from the GSM is send through the android mobile. The keil software is used for simulated the result.

Prathyusha.K, G. Sowmya Bala , Dr. K. Sreenivasa Ravi (August 2013) [3] Agricultural sector is playing vital role in Indian economy, in which irrigation mechanism is of key concern. Our paper aims to find the exact field condition and to control the wastage of water in the field and to provide exact controlling of field by using the drip irrigation, atomizing the agricultural environment by using the components and building the necessary hardware. For the precisely monitoring and controlling of the agriculture filed, different types of sensors were used. To implement the proposed system ARM LPC2148 Microcontroller is used. The irrigation mechanism is monitored and controlled more efficiently by the proposed system, which is a real time feedback control system. GSM technology is used to inform the end user about the exact field condition. Actually this method of irrigation system has been proposed primarily to save resources, yield of crops and farm profitability.

N.Priyanka, Aravind (Sept – Oct 2012) [4] Project is used to find exact field information and to provide instant across the field. This involves some sensors, LCD display, GSM and ARM processor. All the sensors will give analog output but our processor will accept only the digital data. So we have to connect all the sensors to the ADC channel pins which are in-built to the processor. LCD will be on field display purpose. GSM module will contains a Subscriber Identity Module (SIM) user can communicate with this SIM-Number. When the particular command activated or given by the user, immediately the corresponding sensor will activates and reads the present reading and immediately sends results to the same user mobile and displays in the LCD panel in the field. Immediately user will take the necessary action if required. Here we are using total seven sensors to monitor the field condition. Those are Temperature, Humidity, Soil moisture, Leaf sensor, PH sensor, Level sensor, Phase sensor. All these devices are connected to the ARM processor. GSM is used for communication purpose, with the help of AT (attention)-Commands we can communicate with the components. For soil module and level sensing applications we are using motors. One motor is used to store water and another is for releasing the stored water into the soil.

Indu Gautma, S.R.N. Reddy (June 2012) [5] In past few years controlling and monitoring the machines remotely has seen an interesting field of study among researchers. This paper mainly focuses on reviews in the field of remote monitoring and control, the technology used and their potential advantages. The paper proposes an innovative GSM/Bluetooth based remote controlled embedded system for irrigation.

Purnima, S.R.N Reddy (2012) [6] In past few years, automatic irrigation system has seen a rapid growth in terms of technology. At present cost-saving technology, labor-saving are the addressing key issues in irrigation. This paper gives a review of these systems based on existing technologies and also proposes an economical and generic automatic irrigation system based on wireless sensors with GSM-Bluetooth for irrigation system controller and remote monitoring system.

Kalyan Mohan Goli, Karthik Madidipatla, Thentu Sravani (2011) [7] Agriculture is a source of livelihood of majority Indians and has great impact on the economy of the country. In a country like India, where climatic conditions vary substantially and irrigation facilities are poor, sustainable agriculture practices that conserve resources and make a farmer's life easier are absolutely essential. This paper proposes a system that makes use of contemporary technologies- wireless sensor networks, GSM and SMS – to provide the farmer with the ability to handle the water level in the field remotely and in real time.

III. Proposed Methodology

The below figure is the block diagram of agricultural system. The device consists of GSM modem, microcontroller, motor starter, relays, memory and display.

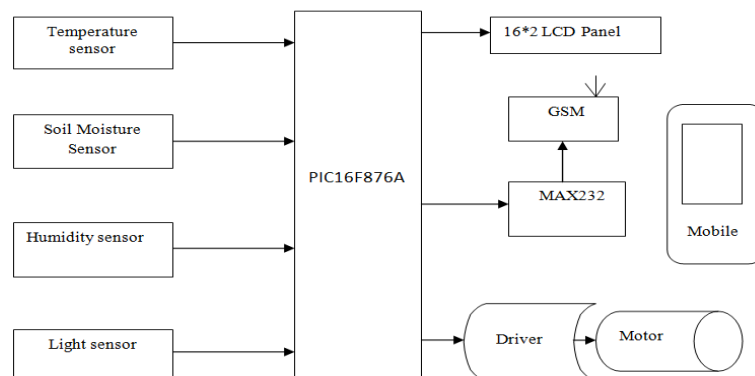


Fig 1 : Block Diagram of proposed system

The total circuit arrangement is shown in the above figure. Here we are using sensors, they are temperature sensor, soil moisture sensor, humidity sensor and light sensor. If the user wants to control some device in his house, he have to send the SMS indicating the operation of the device and then the system password, while the MODEM embedded with the system microcontroller receives SMS. The microcontroller will read SMS and check for the password user had sent with the SMS.

Hear the commands are sent to moter starter for irrigation in agricultural applications system through user mobile as data through SMS (short message service) providing a cost effective reliable far reaching access to user. The coded SMS is sent to the motor starter for irrigation in agricultural application base station controller that receives the message, decodes the message, initiates required automation operations and responds to the successful initiations by a reply to the user. Such a way the project works.

This project can be developed by us as a multipurpose project which can be used for controlling of lights and other electronic devices in home, offices etc. And for various time saving and manual effort preserving tasks that can be accomplished via SMS.

IV. Conclusion

The project is thus carried out using PIC16F core with the help of GSM technologies. This project finds application in domestic agricultural field. In civilian domain, this can be used to ensure faithful irrigation of farm field, since we have the option of finding out moisture level of soil in a particular area.

The project is a clear indication of a multipurpose control done via sms reducing the manual efforts and time required while paying individual attention for controlling each device. For farmers who need to switch on the water motors at night due to water supply problems with most of the Indian villages this system will surely be very helpful and reduces the risk of night visit to the farm, saves time and energy of the individual. The system requires less design and implementation cost. For handicapped people it may be really not entertaining to involve much in manual work and this system helps them to locate themselves in a place and operate the lights of their room, switch on the fan etc... Farmers can make use of this system for controlling motor, sprinklers, tanks and also several other devices necessarily operated in the agricultural lands. This is clearly presented in our video as how farmers will make use of our system. As our project turned out into a multipurpose project, we found many device control operations and applications existing out of it.

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