FARM AUTOMATION SYSTEM

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Abstract:

Farm Automation System is basically designed to facilitate Farmers who are farming as well as doing other job. Whenever farm irrigation requires, farmer has to take leave from job and if after reaching at farm, he come to know that power is not available then it result in to waste of time of a whole day with one day salary deduction. Solution of above problem is Farm Automation System.

Power availability information can be known using status sms. System automatically sends sms of Power turn ON/OFF to owner whenever Power turn ON/OFF.NXP Make P89V51RD2 microcontroller is used in this system. 16x2 LCD screen installed on system module will display status informationa. GSM modem is interfaced with microcontroller to send and receive sms. 3 Nos. of digital sensors used are canal water sensor, reservoir High/Low level sensor are interfaced using transistor to microcontroller. Soil moisture sensor gives analogue output which is converted in to digital using analogue to digital converter and given to microcontroller. 4 Nos. of relays are interfaced 2 nos. for Pump1 ON/OFF and 2 nos. for Pump2 ON/OFF. ULN2803 is used as relay driver to drive 4 nos. of relays. This system can be modified according to farmer's preferences by simply modifying its program.

This project provides exact solution for this problem. It uses the intelligence of microcontroller along with the powerful peripherals. It uses GSM network which is now a days available in most of the places. It also provides password protection facility to protect the system from unauthorized use. The system provides instant access along with uncommon voice interaction facility.

Keywords: GSM, Automated Irrigation, sensors

Introduction:

Agriculture provides the principal means of livelihood for over 58.4% of India's population. It contributes approximately one-fifth of total gross domestic product (GDP). Agriculture accounts for about 10 per cent of the total export earnings and provides raw material to a large number of industries. Low and volatile growth rates and the recent escalation of agrarian crisis in several parts of the Indian countryside, however, are a threat not only to national food security, but also to the economic well-being of the nation as a whole. India is Agro based nation.

Agriculture has always imparted a lions share in the economic development of country. It is necessary to improve the productivity and quality of agro based products. Technology will boost the development in agriculture.

The new age of technology has redefined communication. Most people nowadays have access to mobile phones and thus the world indeed has become a global village. At any given moment, any particular individual can be contacted with the mobile phone. But the application of mobile phone cannot just be restricted to sending SMS or starting conversations.

New innovations and ideas can be generated from it that can further enhance its capabilities. Technologies such as Infra-red, RF module, etc which has developed in recent years goes to show the very fact that improvements are in fact possible and these improvements have eased our life and the way we live. Remote management of several home and office appliances is a subject of growing interest and in recent years we have seen many systems providing such controls. These days, apart from supporting voice calls a mobile phone can be used to send text messages as well as multimedia messages (that may contain pictures, graphics, animations, etc). Sending written text messages is very popular among mobile phone users. Instant messaging, as it is also known, allows quick transmission of short messages that allow an individual to share ideas, opinions and other relevant information.

We have used the very concept to design a system that acts a platform to receive messages which in fact are commands sent to control different appliances and devices connected to the platform. We have designed a control system which is based on the GSM technology that effectively allows control from a remote area to the desired location. The application of our suggested system is immense in the ever changing technological world. It allows a greater degree of freedom to an individual whether it is controlling and monitoring of the agriculture equipment and system. The need to be physically present in order to control.
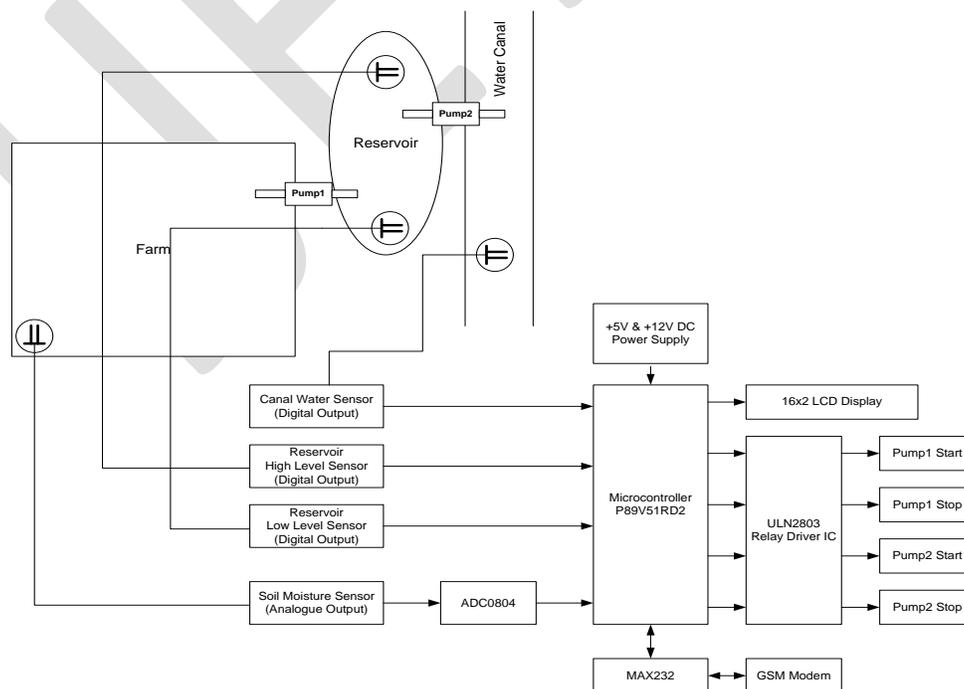
Problem Definition:

Agriculture is the primary economic activity in most Asian and African countries such as India, Kenya, Malaysia, etc. This sector of the economy faces many problems such as shortage of workers, scarcity of water, and insufficient electric power supply.

Present load shedding schemes followed by the electric utility providers have urban industry bias, leading to frequent shut downs of electric power supply to farmers. They get only about 6 to 8 hours of power supply per day, that too mainly during the night hours. Such a situation forces a farmer to sleepless nights, having to go at night to his farm and irrigate, resulting in reduced productivity in the agriculture sector.

Now days in most of the villages due to Load shading there is irregular electricity supply to water pump. In most of the cases the water pumps are 2 to 3 km away from the farm. Due to electricity failure a farmer must to go every time near to pump controller to turn ON/OFF the pump. This problem becomes most serious during night time. Also delay in the process of water pump switching causes wastage of electricity, water as well as time. Even if farmer is in his farm he has to go at a place of switching to on/off the pumping motor. Also during out of village farmer cannot know how many density of rain has been fallen in his farm.

Solution By This Project:

The goal of this project is to overcome above problem by implement following arrangement.

1.Pumping-motor ON/OFF with SMS or call:

The project is mainly used to control the on-off action of a motor in the field using microcontroller and GSM technology. Through our mobile we can switch on-off the motor by sending the respective SMS to the mobile NO. which SIM card is inserted in GSM modem. Thus the irrigation motor can be controlled through our mobile using GSM technology. When signal is received from GSM modem, it in response to signal makes the motor ON/OFF.

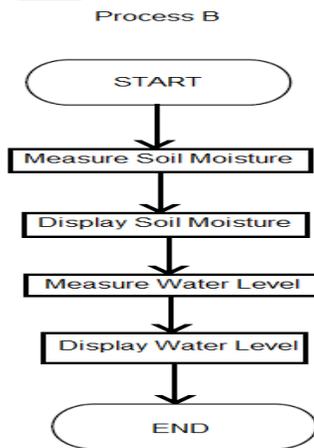2. To know moisture of soil using soil moisture sensor by SMS:

Soil moisture sensors measure the water content in soil. A soil moisture probe is made up of multiple soil moisture sensors. After that as per moisture of soil GSM modem will send SMS to farmer so that farmer can on/off the pumping motor as per requirement
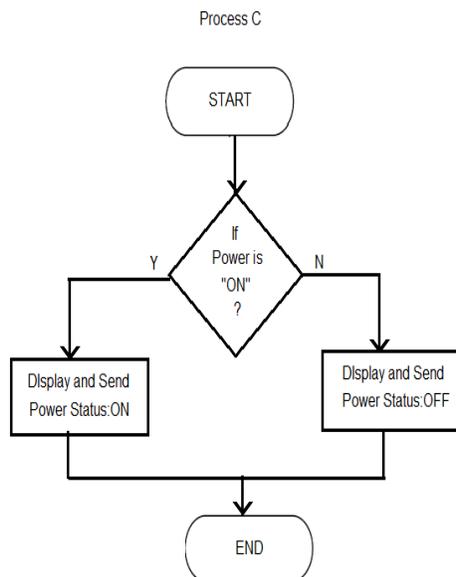
Software:-
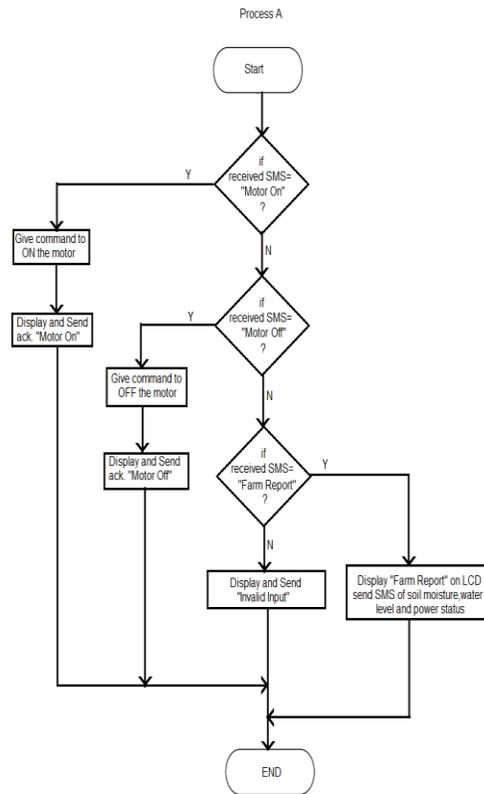
Process A

Process:A

Process B:

Process B

3 Process C:

Future improvements:-

The performance of the system can be further improved in terms of the operating speed, memory capacity, and instruction cycle period of the microcontroller by using other controllers such as AVRs and PICs. The number of channels can be increased to interface more number of sensors which is possible by using advanced versions of microcontrollers.

The future implications of the project are very great considering the amount of time and resources it saves.

The project we have undertaken can be used as a reference or as a base for realizing a scheme to be implemented in other projects of greater level such as weather forecasting, temperature updates, device synchronization, and farm security etc.

The project itself can be modified to achieve a complete Farm Automation System which will then create a platform for the user to interface between himself and his household.

Application of project:-

- This system is useful for farmers who have plenty of farm area so they need automation.
- This system is helpful for farmers who travels more and can't give proper attention to their farms.
- This project is useful to farmer to give water to farm in uniform amount.
- This system is also used for most of the farm by interfacing different sensor to the system to observe different parameters such as humidity, moisture, temperature, rain level etc.

Advantages of project:-

- This project controls the on-off action of the motor in the field.

- Low cost and easy to implement.

- Can cover maximum area in a field.

- Can control all equipment in farm from any place in the world.
- The system is more compact compared to the existing ones, hence is easily portable.
- Can be used for different plant species by making minor changes in the ambient environmental parameters.
- Labour saving.
- Provides a user-friendly interface hence will have a greater acceptance by the technologically unskilled workers.
- Frees the farmer for other tasks.

Conclusion:-

The project we have undertaken has helped us gain a better perspective on various aspects related to our course of study as well as practical knowledge of electronic equipments and communication. We became familiar with software analysis, designing, implementation, testing and maintenance concerned with our project.

A step-by-step approach in designing the microcontroller based system for measurement and control of the four essential parameters for plant growth. The results obtained from the measurement have shown that the system performance is quite reliable and accurate. The extensive capabilities of this system are what make it so interesting. From the convenience of a simple cell phone, a user is able to control and monitor virtually any equipment of farm. This makes it possible for users to control pumping motor from any location of world due to the use of GSM.

Acknowledgment:-

References:-

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