Intelligent Plant Irrigation System For Fire And Intruder Detection

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Abstract

In farming, irrigation plays an important role. Manual farming is time consuming and can be efficient only on a small scale. For efficient utility of time, resource and to obtain better means of irrigation, we implement an automatic plant irrigation system. This system uses fire sensing module that helps sense fire accidents, an intrusion detection module which is reliable, robust and efficient in monitoring living intruders, a soil humidity and water level sensing system to ensure adequate application of water on time using GSM, water level detection in the tank to prevent dry run of the motor. Flexible farming, conservation of resources, detection of fire and human intrusion detection are the main aim and advantages of this system.

Keywords— Microcontroller, GSM, Sensors, Irrigation system

I.   INTRODUCTION

Agriculture has been the backbone of our country since ages and irrigation plays a vital role. Many approaches have been practiced for decades like drip irrigation, sprinkler irrigation, bamboo irrigation, rope irrigation, in ground irrigation and so on. These systems have flaws which can be eliminated using this system. We use microcontroller, soil humidity sensor, water level sensor, fire sensor and thermal sensor. The outputs of these sensors are fed to the microcontroller to get the required output. The C language is used for programming microcontroller.

All these modules are assembled together and implemented as one module.

Overview of the proposed System

This system uses a PIR sensor (thermal sensor) - to sense intruders, IR sensor (fire sensor) – to sense fire accidents, soil, water, humidity sensor, water level sensor to sense the water level in the tank, water pump, GSM module which uses AT89C52 microcontroller to get input from the soil, water, humidity sensor and message the farmer via SMS about the water level in the soil and ask the farmer if irrigation can be done if required and a 16x2 LCD.

1.   The fire module detects fire accidents within approximately 2km range
2.   The thermal sensor uses body heat to detect any living being entering the farm trespassing the fence or boundary.
3.   The new automated system supplies water to the farm when need without the farmer or anybody's supervision automatically
4.   The water level sensor ensures the water level to be maintained above threshold value.

II.   LITERATURE SURVEY

The demand and the need of the farmer provide many problems, challenges to researchers and engineers. Many attempts have been carried out in order to meet the challenges. In view of gaining knowledge about the attempts made, a literature survey has been carried out.

Microcontroller based Irrigation system uses soil humidity and water level sensors to ensure adequate application of water on time and when needed. Farming flexibility, conservation of time and water, preservation of soil structure and nutrients and avoidance of land wastage due to erosion are all the farmer/user of this system stands to gain [1].

A temperature sensor and humidity sensor are connected to internal ports of micro controller via comparator, Whenever there is a change in temperature and humidity of the surroundings, these sensor senses the change in temperature and humidity and gives an interrupt signal to the micro-controller and thus the sprinkler is activated [2].

GSM based Automated irrigation system is a machine based system, which automates the irrigation of land by combining various software and hardware approaches together for field irrigation. GSM serves as an important part since it is responsible for controlling the irrigation facility and sends them to receive through coded signal. Our study concentrates on the comparison of various GSM approaches [3].

The key objective of this paper is to report on a developed indigenous low cost time based microcontroller based irrigation scheduler who performs user defined functions and outputs commands to derive appropriate actuators (relay, solenoid valves, motor). A soil moisture sensor was modeled, simulated and tested for archiving, with low-cost, accurate and reliable measurements. A low-cost high-performance and small temperature sensor is used, with the same PCB circuit it can

measure humidity also. The tipping bucket rain gauge is used to measure rainfall. After a pre-set amount of precipitation falls, the lever tips, dumping the collected water and sending an electrical signal. An anemometer is a device used for measuring wind speed, and is a common weather station instrument [4].

Wireless technology has now reached to every corner of the world. If such technology is added to the field for irrigating crops then it would be great for farmers as well as for other people too. It is a very tedious job for farmers to check the motor-pump by walking through long distances to the field to check whether any problem has occurred or not, such as burning or jamming of the motor. The solution to such problem is described in our paper [5].

This paper represents that how such things can be made possible with less cost and time by using Embedded and GSM technology. Farmers can control the motor pump in the field by sending messages and can also get informed if something hazardous occurs at the motor pump by getting messages. By this, the yield of crops can be more and farmer can earn more, so as the people. This system is developed using P89V51RD2 microcontroller and it is interfaced with motors, sensors and GSM. Also, Moisture sensors will help the user to know where the watering is required and will bypass the area or zone where sufficient soil.

The above mentioned papers can be improvised and made sophisticated by enhancing the system's features. The intelligent plant irrigation system for fire and intruder detection has fire detection and living beings intruder detection. The two additional features which are fire and intruder detection, sends the fire sensed and illegal barging of humans or any animals into fields automatically and sends the message to the farmer through GSM. This alerting message can help the farmer to take apart and preventive measures to prevent fire or to protect the crops in the field.

III. PROPOSED SYSTEM

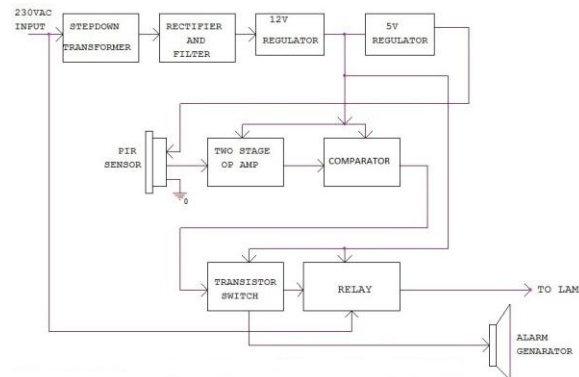Intelligent Plant Irrigation System For Fire And Intruder Detection.

The intelligent plant irrigation system for fire and intruder detection consists of a soil humidity sensor which senses moisture content in the soil, and if the dry condition or saturated condition prevails, the sensor sends corresponding signals to the microcontroller which then sends the information of the GSM module. The GSM module sends altering message to the farmer and irrigation infield is done by a control message from the farmer. The tank is embedded with a water level sensor which checks the level of water in the tank. If low, signals are sent through the microcontroller to turn on the pump. This also avoids dry run of the motor.

The fire module uses the IR sensor which detects the occurrence of any fire. Once a fire is detected, signals are sent to the GSM module and SMS is sent to the farmer to alert him about a fire accident if it has occurred and so the farmer can take preventive measures against it.Figure 1 shows circuit diagram of fire module.
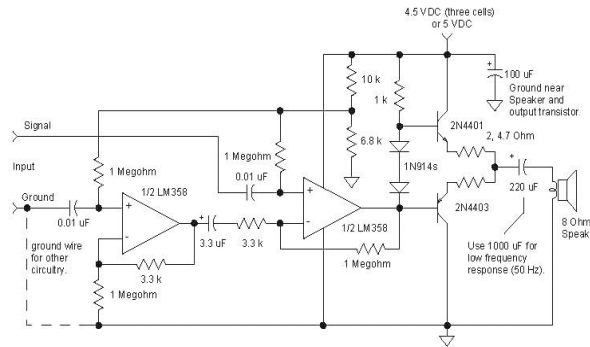
Figure 1. Fire detection module circuit diagram.

The system contains a PIR sensor which senses the thermal radiations of living beings (mammals).This is descripted in Figure2. These sensors are fixed for the purpose to check unauthorized barging into fields. These sensors detect the living object and passes the signal to the GSM module, which in turn sends a message to the farmer about the trespassing in his farm.

Figure 2. PIR Sensor Based Security System.

All the three sensing modules used to take up input signals and sends it to the GSM module to alert the farmer about the farm.Figure3 shows block diagram of working of all modules.
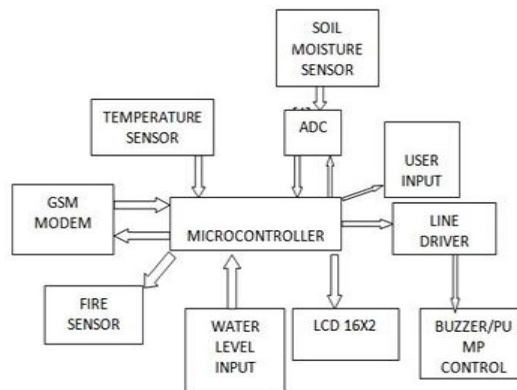
Figure 3.   Block diagram of intelligent plant irrigation system for fire and intrusion detection.

IV.   RESULT
Work is under progress.

V.   CONCLUSION
The system can work efficiently and reduces manual efforts. Using GSM the irrigation can be controlled from far away places also. The fire which can be detected helps prevent fire accidents thus saving the crops. The system can detect living beings intrusion that helps strict on thefts and animals destroying crops.

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