

Implementation of Hi-Tech Agricultural System

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Abstract— In this paper we have explained about the system which usually deals with intercropping, the main reason for inter cropping is that farmer cannot rely on single crop for his income. Some of these crops usually require different level moisture content for proper growth. So we have implemented automatic as well as manual mode of irrigation. The farm need to be secured from animals and intruders, so to provide security to the farm we have implemented electric fence which gives severe pulse of shocks to whosoever tries to trespass the farm. It also alerts the owner with SMS and a siren.

Key words: Hi-Tech Agricultural System

I. INTRODUCTION

In present world everything is automated, but there exists a few sectors where the automation is not implemented, one such field is agricultural sector. The reason for this is cost concerns involved in implementation. In recent times most people rely on agriculture as their main income. So utmost care must be taken to maintain the moisture content of the soil and secure the farm from animals and intruders, this becomes a tedious work for the farmers and increases their workload. It will be helpful for farmers if automation is brought to agricultural field. Here the work for the farmer is greatly reduced as the irrigation is done through embedded system. Maintaining the moisture level in the soil is key for successful yield, as there is a concept of intercropping in most of the farms, maintaining the different moisture level for different crops becomes much more complicated, this project tackles this issue with ease by implementation of soil moisture sensor, this sensor basically detects whether the soil is dry or wet, the threshold value is specified based on the moisture content best suitable for different crops, when the value sensed by sensor is within the value of threshold then it motor is turned off, if the value is above threshold then it is considered as low moisture content level and the motor is turned on. During some stages of cropping the crops require more water, so the manual intervention of farmer is required. So to prevent manual intervention we have employed a system wherein the farmer can control the motor by just sending the SMS from his mobile. Security is main area where the manual intervention is required, to prevent this the farm is secured with electric fence, this gives a short time severe pulses of shocks to scare the animals as well as intruders to keep them away from the farm, the circuit is powered by solar powered battery thus the farmer need not worry about the electricity used for the circuit. The farmer can control each and every aspect that is involved in his farm by just sending SMS from his mobile from any location.

II. MAIN FEATURES OF THIS PROJECT

- 1) Provision for farmers to grow two or more crops in the same agricultural plot
- 2) Automatic irrigation for plant depending on their required moisture level

- 3) Electric fence security is provided which is powered by solar panel.
- 4) Spotlight for night security.
- 5) Alerting the intruder with siren and informing through SMS.
- 6) Manual mode of controlling all the activities through SMS.
- 7) As all the activities can be controlled through Sms, Farmers need not worry about most Sophisticated automated systems available in market
- 8) It is cost effective and easily implemented.

III. PROPOSED SYSTEM

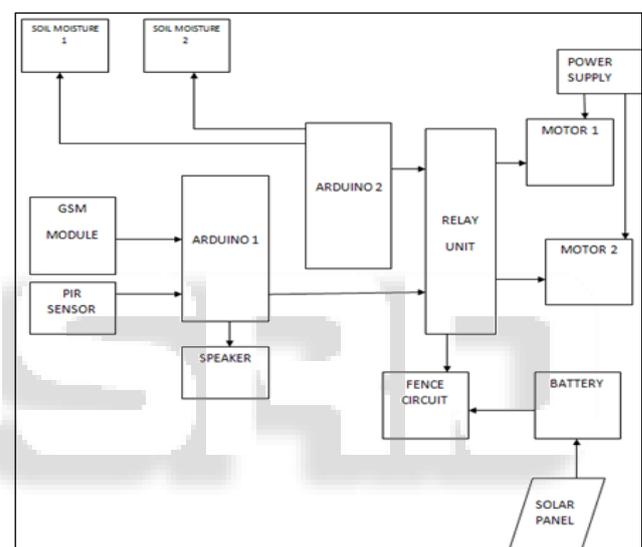


Fig. 1: Proposed Block Diagram

This automatic irrigation system was designed to continuously sense the moisture level of the soil. This proposed system activates the motor when the moisture content is low and switches it off when the required level of moisture is achieved. Soil moisture works on voltage which was computed by measuring the resistance between the moisture detector probes and matching them to output voltages of a comparator circuit. A submersible water pump was used to water the appropriate parts of the soil. The volume of water delivered to the soil can be adjusted by operator. When an animal or human comes in contact with the electric fence, they receive a short and safe electric shock. This fence acts as a barrier as any intruder avoid coming into contact with the fence once they experience shock. The fence circuit is powered by solar panel, solar panel is a photovoltaic panel. It is a packet interconnected assembly of solar cells, this can be used as a component to generate and supply electricity in commercial and residential application. This provides a 12vDC output of 183 Amps. This solar panel charges the battery of the fence. Adding battery will increase the runtime, and farmers need not worry about the electricity.

PIR sensor, or passive infrared sensor, is a type of sensor which is capable of detecting infrared light emitting

from objects within its field. The PIR sensor used here detects if there is any intrusion and alerts the owner by ringing the speaker.

As the whole system can be controlled through mobile by just sending the SMS, to establish this connection the between the mobile and Arduino the GSM Module is used, the fence, motors and the spot lights are all connected to relay, the Arduino is programmed in such a way that when a user sends a particular message (this also acts as a password for controlling certain system) particular programmed relay is set to on. As whole system works by just sending SMS from mobile, the farmer having the basic mobile operation knowledge can operate this system.

IV. METHODOLOGY

In this proposed system, two Arduinos are used where one Arduino is connected to GSM Module 900A and the other is connected to soil moisture sensor and both the Arduinos operate the relay unit. Soil moisture sensor detects the moisture content and if the soil is dry then the relay connected to motor is turned on and turned off when it reaches the required level. The other Arduino used is connected to GSM Module, if the the farmer wishes to control the motor manually, he can do so by sending SMS from mobile. The relay is connected to motors, electric fence and spotlight, the farmer can control all these function by sending a certain message which activates the relay.

A. Manual Messages Used To Control the Relay

- 1) ON1 – Turns on the Motor 1
- 2) ON2 – Turns on the Motor 2
- 3) FON – Turn on the Electric fence
- 4) LON – Turn on the Spot light
- 5) OFF1 – Turn off the Motor 1
- 6) OFF2 – Turn off the Motor 2
- 7) FOFF – Turn off the Electric Fence
- 8) LOFF – Turn off the light

All these messages that are sent from operators mobile can act as a password, it can also be changed as per user convenience.

V. CONCLUSION

Agriculture has been the backbone of human civilization since the man has started agricultural practice. Man has developed many ideas for supplying water to land. In present condition conservation of resources is most important thus optimum resource usage is important. Most agricultural process involves manual intervention, but by implementing proposed system the work on farmer is reduced. As every aspect needed for the farm like security as well as controlling the water supply can be controlled by sending SMS from users mobile, this system can be easily implemented, with the farmer knowing the basic operation of mobile this system can be easily controlled.

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