SMART FENCE AND CROP GROWTH DETECTOR USING CANNY EDGE DETECTION

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Abstract—**Agriculture is that the foremost traditional activity over time. Since the beginning of it, agriculture has suffered many changes to reinforce productivity and quality of crops. Agriculture has been affected because of Animal intrusion and lack of Nutrition in Plants. Thus, subsequent step within the event of the agriculture domain was to propose the upper solutions for monitoring of the various parameters for better precision agriculture. Such a system would offer useful information on plant growth and soil properties that are a benefit for crops. This paper describes a possible solution for a more reliable Embedded based system for Agriculture to observe the Nutrition content within the agricultural field that have an instantaneous impact on crops and detecting Animal intrusion within the agricultural field by using Sobel Edge detection Method to hunt out What animal it's. Moreover, the monitoring system aims to manage agricultural issues related to animal intrusion and Crop Growth. Hence analyses the effect of the measured parameters on agriculture, helping the farmers to possess healthy crops.**

***Index Terms*—Nutrition; Animal Intrusion; Canny Edge detection; Embedded system**

I. INTRODUCTION

Agricultural techniques and practices play a significant role within the most important population countries like India, China where the planet of farmland, production value and thus the land yield per unit are but compared to the developed countries.Agriculture is that the first process of producing food, fiber and much of other desired products by the cultivation and raising of livestock . Agriculture is that the first source of livelihood for about quite 58% of India's population. Though agriculture is India's main occupation , farmers face many problems in growing a high quality crops. The agricultural land which is nearby forest areas are suffered mostly. Animals like Elephants, Leopard has been intruding within the agricultural land and destroying the crops which causes great loss for farmers financially. The folks that is nearby the land also can make some damage to crops, which is unknown by the owner of the land. In the proposed system , we use proximity sensor to detect the moments of animals and humans who comes almost the farm lands. so as to spot who is near by the farm land , when some detection happens , the camera will capture the image . to seek out what it's , Image Processing is completed . The Canny Edge Detection Method is employed to analyse and find who it's . If it's an individual , the buzzer will alarm to alert the person else if the animal is detected ,then the message is shipped to the forest department and therefore the owner of the land through GSM(Global System for Mobile Communication). This helps to guard the crops from wild animals. Another advantage is that normally when the soil lacks nutrition contentits hard to spot through our eye . Here we've used pH Sensor to analyse the nutrition content in soil. just in case of lack of nutrition within the soil , then the knowledge is shipped to the owner of the land. in order that he can grow quality crops. And also it helps us from using more fertilizer, which can damage the crops. Hence , protecting and growing the crops may be a vital area to be researched and worked on.

II. OBJECTIVE

The Objective of the mentioned project is given as follows :

- To create the smart fence using proximity sensor.
- To detect any intruders using Image Processing.
- Nutrition content in the soil is also determined.
- To protect the crops and improve the quality of the crops

III. WORKING METHODOLOGY

The smart fencing and crop growth detector system which detects the movement of animal and human near to the farm land. It also monitors the crop growth. In the first scenario when the intruders is on the other side of the fence and not inside the land the camera keeps on observing. In the second scenario when the intruders has entered the land the sensors detects and generates a signal which decide the movement. The movement and positioning of the camera is such that the intruders movement can be recorded. In the final scenario when the intruders has crossed the border, the camera captures and sends it to the next stage that is image processing. In this case the captured picture detects whether it is human or animal through edge detection method. An alert message along with the image is sent to the controller. The controller first sends analert via sound system to warn the intruder and send the alert message to the owner through GSM module. In case of is a animal, the alert message also send to the wildlife authorities. In case the captured picture detects whether it is human or animal through edge detection method. An alert the image is sent to the controller. The controller first sends an alert via sound system to warn the intruder and send the alert message to the owner through GSM module. In case of it is a animal, the alert message also send to the wildlife authorities alert via sound system to warn the intruder and send an alert message to the owner via GSM module. In case of it is a animal, the alert message also send to the wildlife authorities. Crop growth detector is by monitoring the pH of the soil. The fertility of the soil can also be detected. The measurement of soil acidity and pH value is determined. The pH value is defined as the quantity logarithmic of hydrogen ion activity. The ion activity of hydrogen is difficult to measure experimentally so the activity coefficient value is based on theoretical measurements. Therefore, the pH scale value is relative value. This is a relative standard value as a solution of the pH value which is determined based on the international agreements. The soil pH sometimes is called as pH meter. The pH meter continuously analyze the nutrients of the soil. If the soillacksanynutritionofthesoiltheGSMsendsnotification to the farmer and therefore the farmer can provide necessary nutrients to the soil for bettergrowth

IV. PROPOSED SYSTEM

The basic working principle of the project is to create a smart fence for security purpose. This project also includes animal intruder systemusing image processing to avoid crop damage and the growth of the crop also monitored using the pH meter and soil moisture sensor. Thus the proposed system is composed of three module

V. WORKING PRINCIPLE

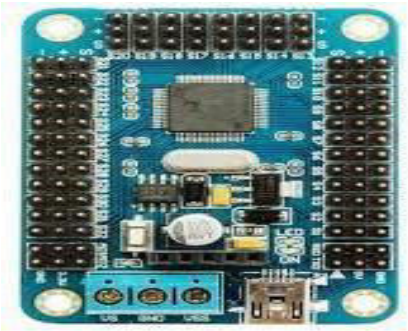
The inductive proximity sensor detects magnetic loss due to eddy current that are generated on a to eddy current that are generated on a conductive surface by an external magnetic field. An AC magnetic flux is generated on the detection coil and changes within the impedance thanks to eddy currents generated on a metallic object are detected. In UART serial communication, the data is transmitted asynchronously. Image processing perform some operations on a picture , so as to urge an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image output may be image or characteristics / features associated with the image. pH sensor depends upon the exchange of the glass membrane decreases with the continuous decrease in the performance of the probe. pH sensor depends upon the exchange of ions from sample solution to the inner solution (pH 7 buffer) of the glass electode through the glass membrane. The porosity of the glass membrane decreases the performance of the probe. The soil moisture sensor uses the capacitance to live dielectric permittivity of the encompassing medium. In soil, dielectric permittivity may be a function of the water content. The sensor creates a voltage proportional to the (Time Division Multiple Access), FDMA(Frequency Division Multiple Access), and Frequency Hopping. Initially, GSM uses two frequency bands of 25MHz width : 890 to 915 MHz frequency band for up – link and 935 to 960 MHz frequency for down – link . Later on, two 75 MH z band were added.

VI. HARDWARE DESCRIPTION

The hardware components used in the projects are described
below :

A. Micro Controller

ATmega32 is a low power CMOS 8 – bit microcontroller based on the AVR enhanced RISC architecture. AVR can execute 1 million instructions per second if cycle frequency is 1MHZ. One 16 – bit timer/counter with separate prescaler, compare mode and capture mode.



d. IRSENSOR

An IR Sensor is an electronic device that measures and deflects infrared radiation in its surrounding environment. IR is invisible to the human eye, as its wavelength is longer than that of

e. pHSENSOR

A pH Sensor is one among the foremost essential tools that's typically used for water measurements. this sort of sensor is in a position to live the quantity of alkalinity and acidity in water and other solutions.

f. GSM

GSM is a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network.

VII. CONCLUSION

When intruders enter into the agriculture field, the sensor board detects the intruder and transmits a detection message to the sink. For transmitting the detection message each of the node chooses one of its neighbour node as next hop, considering received signal strength and residual energy of the neighbour node. This prototype ensures the farmer about the detection of the intruder in his field by sending SMS or generating alarm. Thus, here we have provided a low – cost and energy efficient complete solution for intruder detection. In future, we have planned to develop the intrusion detection system for agricultural field using learning automata. By doing so, the system can learn by itself, in order to detect intrusion in the agricultural field in an energy efficient manner. We envision to develop an agricultural monitoring system that monitors the conditions of the crops and provide the security from theft.

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VIII. FUTURE SCOPE

Compared to the previous fencing systems, this fencing system using proximity sensor gives a wider range of accessibility and increased invulnerability to the external agents.Infuture,wecandesignthissystemforuseoflarger scale.Aswiththepassingtimethetechnologyisconstantly improving, the system can be equipped with more advanced and sophisticated hardware. The proximity sensor, object detection mechanism and response mechanism if made using state – of – art technology, can make the working of the proposed system even more accurate and time – saving. This paper is limited for crop detecting and give alert to farmer to provide sufficient nutrient manually. In future it can be expanded as automatic provision nutrient to the soil for better growth and it will be moreefficient.

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