

Design and Implementation of Smart Farm Protector from Wild Animals and Human Intruders Using LDR Powered by Solar Power

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ABSTRACT

Surveillance against vandalization plays a major role in many fields. It assists us to track a particular region and avoid theft. In the case of croplands or cultivated lands, monitoring is essential to inhibit unauthorized person from accessing to the territory along with safeguarding the region from wild animals. This project provides a smart solution to resolve this problem by using Raspberry pi. This method includes protection from theft and surveillance. To ensure protection this device differentiate between trespasser and an authorized person utilizing RFID. When such intrusions occur, camera installed in the entrance of the field captures an image of the intruder, field owner will automatically get an alert mail. Thus, ensures that only owner can enter the farmland. Each detectors and elements are connected to the Raspberry pi board. Here solar panel is used to provide the required power and hence reduces the cost. This project proposes a sustainable technological system as an end product that can be extremely valuable for farmers, as it avoids the damage to the harvest and improves agricultural production, also safeguards the territory from intruders and wild animals. In addition soil moist sensor is used to prevent over irrigation and hence saves water. Temperature and humidity of soil are continuously monitored and these readings are sent to owner to take action accordingly.

Keywords: LDR sensor, Raspberry pi, RFID module, Temperature sensor.

I. INTRODUCTION

Animal attacks are a common story in India nowadays. On account of increasing population, desertification has increased and this leads to food and water scarcity and shelter in forest sector. Elephants and other animals coming in search of food and contact with humans, have a negative effect in several ways like destruction of crops, devastating grain storages, water sources, homes and other valuables. Farming is the commercial mainstay yet due of animal interruption in farm areas, there will be tremendous loss of harvest. Conventional approaches adopted by farmers are inefficient as using electrical fence to safeguard farm and animal which attempts to get into the field stands electroshock which make animal to act in abnormally. It is unfeasible to employ guards to monitor the crops and prohibit wild animals. Considering safeguard of both human and animal is also crucial. So, animal tracking device is essential in agricultural regions. Defending farm lands from intruders and theft are also important as rural thefts are threatening the livelihoods of farmers which are most vulnerable.

To overcome this problem we have come up with this idea. Our proposed system is used to watch over the agricultural fields by employing raspberry pi and using the Radio Frequency Identification module (RFID). RFIDs are installed near the gates. When unauthorized person tries to enter, owner will be able to receive an email regarding the intrusion whereas gates will latch when an unauthorized person's RFID tag is scanned whereas gates will unlatch when an authorized person's RFID tag is scanned.

Hence, only owner is allowed to enter the farm land. When animals intrude the farm land the LDR sensor detects motion, the installed cameras records the video for five minutes. Immediately the alert message with the recorded video is automatically sent to authorize person through mail using system application. Thus, the owner can take respective actions. In addition soil moist sensor is used to prevent over irrigation and hence saves water. Continuous monitoring of soil temperature and humidity is also done using respective sensors. Thus helps the farmer to take precautions accordingly. All these detectors and elements are controlled and connected to Raspberry pi. Solar panels are used to generate the required power. Hence saves electricity. Thus, this project is cost effective, provides continuous monitoring and protection to the farm land.

II. LITERATURE SURVEY

- [1] In this paper, the omnipresent wired network device were used along with traditional methods to protect the farm from the wild animals. Operational amplifier circuits were imposed to provide an early warning about the intrusion of animals. The indication is available in the system but it sends the message only to the forest officer not to the living people in the farmland. This system does not utilize the advanced techniques to capture the image of the intruder to trace it later.
- [2] In this paper, system uses advanced technique like InternetofThings(IOT) for alerting the owner of that area about the intrusion. Wireless sensor network (WSN) includes Raspberry pi as a heart of the system, actuator, sensors to sense the movement of the animal and controller.
- [3] In this paper, surveillance security system is the highly reactive method which includes the GSM and sensor networks. PIR sensors are used to detect the human intrusion and it also triggers the alarm and automatically camera will get activated when intrusion is detected and simultaneously sends the message to the owner through GSM module. This surveillance system based upon embedded system.
- [4] In this paper, the system is designed in such a way that it studies and detects the behavior of an animal. When any intrusion occurs it triggers the alarm and it creates the sound that irritates the animal and wards them off. The system also alerts the owner of that area by sending a message through the GSM module. This system has a very accurate species identification so that it can detect the intrusion very rapidly.

III. PROPOSED METHODOLOGY

In the proposed system, a Raspberry Pi board is used to which LDR and other sensors, RFID Module, gate, red lights, buzzer and Camera are connected. The whole system is powered by solar.

Fig.1 shows the concept in the form of Block diagram. Raspberry pi is a microprocessor which is the main component of the system which programs and controls the whole system.

RFIDs are used for ID recognition. Only owners will have unique RFIDs and hence only they are allowed to enter the farm providing security from trespassers.Camera is used to capture picture of intruder or animal that enters the farm

In addition, temperature and humidity sensor acquires the humidity and temperature of the soil and sends the owner information regarding it. Hence continuously monitors the soil and temperature.

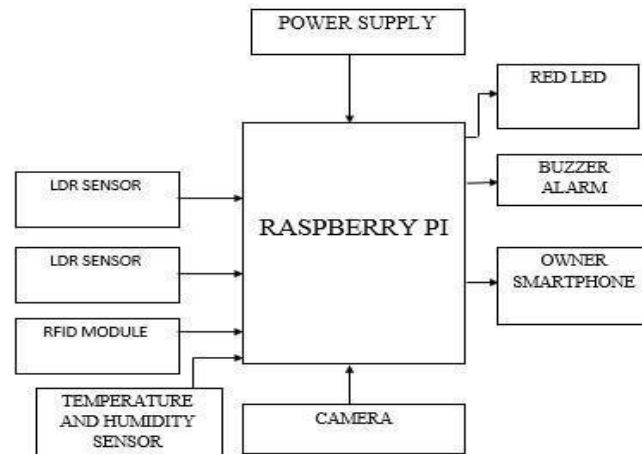


Fig1: Block diagram of the smart farm protector using LDR.

Fig 2 shows the flowchart of the farm protector. RFIDs are installed near the gates. When unauthorized person tries to enter without a valid RFID tag or an incorrect RFID tag, owner will be able to receive an email regarding the intrusion to his registered mail id and gates will remain closed. Whereas when an authorized person's RFID tag is scanned gates will unlatch automatically allowing the person to enter.

When an animal intrusion occurs, the LDR sensors detects the motion. Simultaneously it alerts the owner by sending mail to his/her registered mail and also threatens the animals by switching ON annoying red lights and sound in addition camera will be turned ON which captures image of the intruder or wild animal and this is stored in the system and the owner can validate regarding the intrusion according to the mail.

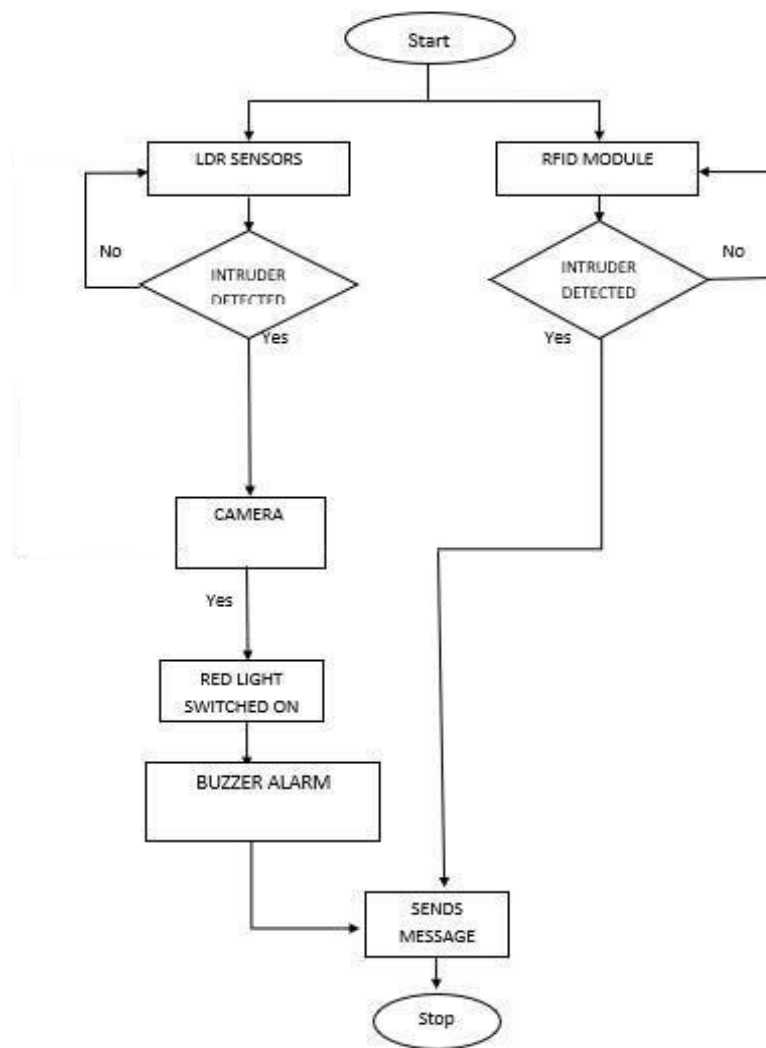


Fig2: Flow chart of surveillance system

IV. RESULTS

The existing real-time monitoring system mainly provides surveillance functionality. When animals intrude on the farmland, the LDR sensor detects motion and the installed camera records the video alerting the owner and threatens the animal using red lights and buzzer sounds. The owner can validate mail in the system. This ensures the complete safety of crops and protecting the farmers' loss. This system is very effective, accurate, adaptive, and also requires no human supervision.

V. CONCLUSION

Crop vandalization by wild animals is a major problem. It requires greatest attention and need to be addressed effectively. This paper aims to tackle this issue. Thus the designed farm protection and surveillance system is of low cost and also requires low power. The objective of this paper is to prevent the loss of crops and to protect the farmland from intruders or trespassers and wild animals which poses a major threat to the agricultural field. This system will be helpful to the farmers in protecting their plantation fields and back them up from financial burden and losses and also saves them from inefficient efforts that they endure for the protection of their farm.

REFERENCES

- [1] TV. Deshpande, "Design and Implementation of an Intelligent Security System for Farm Protection from Wild Animals" *International Journal of Science and Research (IJSR)* ISSN (Online): 2319-7064 Index **Copernicus** Value (2013): 6.14 | Impact Factor (2014): 5.611.
- [2] S. R. Chourey, P. A. Amalec et al, IETE Zonal Seminar "Recent Trends in Engineering & Technology"-2017 Special Issue of *International Journal of Electronics, Communication & Soft Computing Science and Engineering*, ISSN: 2277-9477.
- [3] M. Sathishkumar, S. Rajini "Smart Surveillance System Using PIR Sensor Network and GSM" *International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)* Volume 4 Issue 1, January 2015.] S. Sivagamasundari, S. Janani, "Home surveillance system based on GSM", *International journal of communications and engineering*, 2014, volume 06
- [4] Bindu D et al, *International Journal of Engineering, Basic sciences, Management & Social studies*, Volume 1, Issue 1, May 2017.
- [5] Krishnamurthy b et al, *International Journal of Latest Engineering Research and Applications (IJLERA)* ISSN: 2455-7137, Volume – 02, Issue – 05, May – 2017, PP – 128-135.
- [6] Kshama S. Bhise, *International Journal of Scientific & Engineering Research*, Volume 7, Issue 2, February-2016 ISSN 2229-5518.
- [7] DATA OBJECT CACHING SYSTEM FOR DATA AWARE NETWORKING, V. Sujatha Lakshmi, Dr. Y.K. Sundara Krishna, *International Journal Of Advance Research In Science And Engineering* <http://www.ijarse.com> IJARSE, Volume No. 10, Issue No. 02, February 2021 ISSN-2319-8354(E).
- [8] Srinivasa Reddy Gudibandi M. Tech Student, JNTUA, Anantapuramu, A.P, India, Mr. M. Amarnath, "Design of Smart Surveillance System using PIR and Ultrasonic Sensor", *International Journal & Magazine of Engineering, Technology, Management and Research*, November 2015.
- [9] A Mammeri, "Multi static radar for detection of wild animals" Christ Church University.