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SOLAR OPERATED FARM PROTECTION DEVICE

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ABSTRACT

Crops in farms are many times ravaged by local animals like buffaloes, cows, goats, birds, and fire etc. This leads to huge losses for the farmers. It is estimated that 30-40 percent of crops are destroyed annually due to attacks by wild animals in India. Elephants, pigs, boars and deer are the most common perpetrators of the destruction. This is a Automatic Battery charging system Using Solar cell. This system uses a light sensor(LDR) to activate alarm System during night to return the wild animals approaching near the field . In such a case the sensor signals (Signal from LDR) activates the alarm system and Lighting system made To scare the animals. The alarm also gives alert to the farmer to about animals if he is near to field. Therefore, the designed system is affordable and useful to the farmers. The designed system won't be harmful to animals and person , and it protects the farm areas. further implementation can be carried out according to the requirement of farm , Device can adjust and modified.

COMPONNATS : Solar Panel, Battery, BC 547 Transistor, Resistor ,Diode (1N400), Light Dependent Resistor(LDR), Horn Speaker, PIR Sensors, Arduino UNO, LED, Buzzer.

1. INTRODUCTION

India is an agrarian region. Agriculture has perpetually been India's most significant economic sector. While most of India's population is dependent on agriculture, the farmers still experience many issues. Due to overpopulation a deforestation occurs, water, food and shelter in forest areas are lacked by deforestation. Therefore, intrusion of animals in residential areas is being rising day by day which is being affecting the human life, property that creates conflict between human and animals. Agriculture is the backbone of the economy, however, would result in massive crop loss due to animal intrusion in agricultural land. Elephants and other animals being coming into contact with humans have a negative impact in the several ways, such as crop destruction, damage to food stores, water supply, homes and other properties, injury and human death. It is not possible for farmers to barricade entire fields or stay on field 24 hours and guard it. So we proposed to design a device for protection against this problems to make a solar operated farm protection device , it is very helpful to all farmers this device is not affected any animals or human being , no any other injury , it only create fear in animals for running opposite to farm while approaching near farm fields , that's why we are decided to do it and such implantation may be added . This device plays important role in farmers life , it encourages farmer for better farming, Therefore farmer can maximize their profit in market **.**

Objectives:-

- Providing safety to crops and develop fear in forest animals for not damaging crop .
- This device plays important role in farmers life , it encourages farmer for better farming.
- Therefore farmer can maximize their profit in market . Because of maximum production of crop in farm due to no damage.
- supplying human needs, enhancing the environment and natural resource base.
- increasing efficiency of resource use, improving economic viability of farming.

`2. LITERTURE SURVEY

The protection of crop fields as a major content and a complex problem in this paper. Over the years, the animals from the protected area [PAs] constantly invade the crop field and the protection of this crop field has become a major concern. The methods that are currently being used are unsuccessful, so they present a realistic method to scare them off, by developing a device that studies the animal's behavior , senses the animal and produces the specific sound that irritates the animal and also warns the designated individual by sending a message(Irritating Sound) Agriculture going to meet people's food requirements and supplying multiple industry raw materials. But there will be major crop loss due to animal intrusion in the agricultural lands. Wild animals are vulnerable to crops. And tracking the local presence of animals is very important. They proposed a system for shielding or protecting farms from wild animals..

3. CONSTRUCTION AND WORKING

Block Diagram Designing :-. The process of circuit design can cover systems ranging from complex electronic systems all the way down to the individual transistors within an integrated circuit. For simple circuits the design process can often be done by one person without needing a planned or structured design process, but for more complex designs, teams of designers following a systematic approach with intelligently guided computer simulation are becoming increasingly common. In integrated circuit design automation, the term "circuit design" often refers to the step of the design cycle which outputs the schematics of the integrated circuit. Typically this is the step between logic design and physical design. Formal circuit design usually involves a number of stages. Sometimes, a design specification is written after liaising with the customer. A technical proposal may be written to meet the requirements of the customer specification.

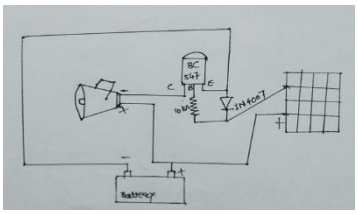

Fig 3.1 Block Diagram

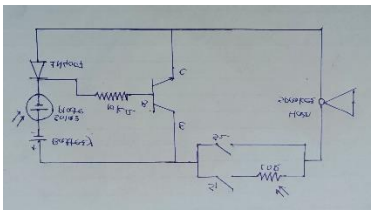

Fig 3.2 Circuit Diagram

Above circuit consists of various types of components in it like transistor, resistor, diode, battery, solar plate, etc. The process of circuit design begins with the specification, which states the functionality that the finished design must provide, but does not indicate how it is to be achieved . The initial specification is basically a technically detailed description of what the developer wants the finished circuit to achieve and can include a variety of electrical requirements, such as what signals the circuit will receive, what signals it must output, what power supplies are available and how much power it is permitted to consume.

Working:- The working procedure of device is so simple and easy to understand. In daytime the battery connected to circuit get charged and use in night, we provided both automatic and manual operation of device. Whenever switch 1 is turned on the device turned in automatic otherwise switch 2 is turned on it turned in manual mode and it also operate in daytime also. Whenever the device is not necessary to consumer they will turned of both the switches and whole device turned off .Automation reduces time, effort and cost, whilst reducing manual errors, giving your business more time to focus on your primary objectives. Repetitive tasks can be completed faster. Automating processes ensures high quality results as each task is performed identically, without human error.

Fig.3.3 Front and Back View of Module

4. ARDUINO OPERATION

PIR Sensors :- PIR Sensor can detect animal/human movement in a requirement range. PIR is made of a pyroelectric sensor, which is able to detect different levels of infrared radiation. The detector itself does not emit any energy but passively receives it. Passive infrared alarms classified infrared detector and alarm control sections. The most widely used infrared detector is a pyroelectric detector. It uses as a sensor for converting human infrared radiation into electricity.

Fig.4.1 PIR Sensors

Arduino UNO : Arduino is an open source electronics creation platform , which is based on free, flexible and easy to use hardware and software for creators and developers. This platform allows you to create different types of single-board microcomputers to which the community of creators can give different types of use. Free hardware are devices whose specifications and diagrams are publicly accessible. Arduino can be used to create standalone elements, connecting to devices, and interacting with both hardware and software. It helps us both to control an element, for example a motor that raises or lowers a blind based on the existing light is a room, thanks to a light sensor connected to the Arduino, or to read the information from a source, such as It can be a keyboard or a web page, and convert the information into an action such as turning on a light and writing what you type on a display.

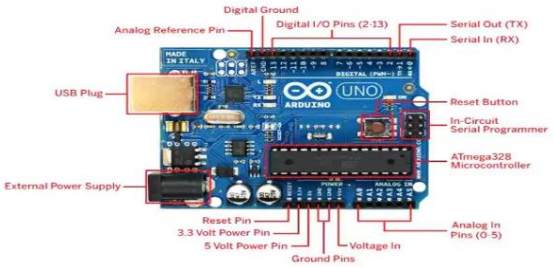

Fig 4.2 Arduino UNO

Working of Arduino : The main idea of the circuit is to provide security. This is based on PIR sensor with an IC that produces siren. The PIR sensor detects the IR radiations emitted from the Animals and it produces a digital output. This digital output is applied to the Arduino UNO. Based on the digital signal from the PIR Sensor, Arduino UNO then triggers the siren . Thus it produces the sound when any Animals is detected. In this above Figure we can see that the two Pir sensors are connected to the input pins of Arduino. In Arduino we can add the one code in C-language and in Arduino output pins attached by Buzzer and LED. In that system firstly pir sensors Sens the motion and send the input to the Arduino then it catch the signals and start the processing and send the signals to the Light and Buzzer. whenever PIR Sens the any motion of animals then light and buzzer activated and Buzzer will create sound and light will glow.

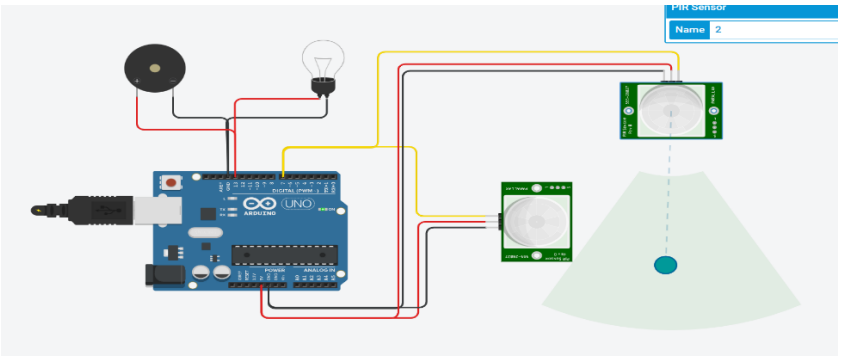

Fig 4.3 Working of Arduino

5. ADVANTAGES, DISADVANTAGES AND APPLICATION

Advantages :-

1. It is automatic as well as manually operated.
2. No efforts and extra setup required for battery charging.
3. Device does not harm or danger to human being and animals.
4. It protect farm by producing irritating sound and it saves time of farmer, and farmer does not require to barricade all the time.

Disadvantages:-

1. In Rainy season due to rain sometimes carbon rusting can be formed at contact terminals of device,
2. Due to clouds in rainy season sometimes battery does not charge properly.

Application :-

1. It is used to protect the crops of farmer, from forest as well as domestic animals like cows, buffaloes, pig, deer, monkeys, etc.
2. Mostly due to this farmer can improve the overall efficiency of farm products and also improve economical growth.
3. Provide security to area where device is installed.

6. CONCLUSION

In this project, we presented a cost-efficient solar-powered agricultural system to enhance agricultural production by using circuitry with energy harvesting capabilities. The circuit were equipped with LDR, Resistor, diode, transistor along with a battery charging circuit with solar panel. The charging circuit was capable of connecting a solar panel to the overall circuit in order to provide energy harvesting capabilities to recharge the battery and could obtain the remaining voltage level across the battery. Through the use of experiments in a controlled environment, we were able to demonstrate how using an energy harvesting device can greatly extend the lifetime of circuit. In addition, the experimental results also demonstrated the possibilities of the system and how it was able to save agricultural crop. Experimental results demonstrated how the proposed system could be used for agricultural applications. Overall, circuit that consisted of LDR, Resistor, transistor, battery , and charging circuit could provide a reliable and robust solution for agriculture.

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