



Design & Manufacturing of Smart Agri-scare Crow

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ABSTRACT

India being domains of agriculture; it needs some modernization in the agriculture land. The Indian 70 percentage of economic progress depends on the agriculture. The shield of the crop plays important role, upturn in the revenue increases the budget of the India. Intrusion of animals leads massive loss to yield production and eventually to the farmers. To avoid the entry of the animals the fencing technique has been used, it stimulating process for the hundred acres and it will be expensive and stressful. The purpose of this paper is to astonished such assaults by animals, an automated system to perceive the entrance of the animals is proposed. In village, Scarecrow is made by using the old cloths and sticks and give it to a scary look to scare the birds and animals to the crops of the farmers. A farmer put the smart scarecrow in the middle of the field to protect his crop from the birds and animals. We have perceived that smart scarecrow has certainly not movement when the birds are come in field. A smart farming scarecrow is a decoy or mannequin, frequently in the shape of a human. Humanoid scarecrows are typically dressed in old apparels and positioned in open fields to discourage birds from troubling and serving on freshly cast seed and growing crops. Scarecrows are used transversely the world via farmers, and are a notable symbol of farms and the countryside in widespread ethos. Equipment such as windmills have been engaged as scarecrows, but the utility lessens as animals become familiar with the structures. Farming contributes a major income to the Indian economy. It is an enormous concern to farmers when they are not here from their crops and exposing it to crops warning such as crow damaging the crops and theft. Farming has contributed to nearly up to 22% of a country.

Key words: Sensor, Flapping mechanism, Linear Motion, Buzzer, 360° Wi-Fi Camera.

INTRODUCTION

An automatic smart scarecrow is normally used by farmers to save the crops from the in the field. Smart scarecrow helps to the farmers to protect their crops by scaring to birds and animals. In village or in rural areas normal scarecrow is made by wearing the old cloths and unusable pots placed like head and the sticks as well as they give it to a scary look to scare the birds and animals to the protect crops of the farmers. Smart scarecrow is also used in gardens and at the airports. A scarecrow does not effective in the night to provide the security for the crops. So there is an option of using automatic smart scarecrow instead of using normal scarecrow. An automatic Smart scarecrow or Smart scarecrow is more efficient than a normal scarecrow. This automatic smart scarecrow gives all time security to the crops from the birds and animals. It is advantageous in both day and night. It works automatically. Automatic smart scarecrow is equipped with sensors, movable arms and alarming device. We have seen that smart scarecrow has no movement when the birds are come in field. In this project we are going to modify this smart scarecrow that when the birds come in the field, it will sense the coming of birds with the help of proximity IR sensor and movement of hand up and down with

the help of flapping mechanism and it will start beeping with the help of buzzer, the aim of the flapping mechanism is to convert the rotary motion of the motor into the linear motion of flapping hands. When the crank rotates, the connecting rods pushes the hand up and down. On the other hand, 360° wireless rotating camera is works in both modes either automatically or manually. It is depending on the farmer how he wants to used it. Additionally, it works day and night time. All electronic and electrical components are works by using battery power. It is charger by solar panel or electricity. Automatic smart scarecrow will help to scare the birds and the birds will be run away from the field and the crop of the field will become safe. It can also be used in garden.

LITERATURE SURVEY

Many types of research have been made to involve controlling birds by the use of sound alarms to scare them off. One of the research implemented the use of sound wave which is also a type of technique used to produce some kind of sound alarm which affects birds discouraging them from attacking the vineyard. In this system, the farmers can view their agriculture fields in their mobile phones, with the help of a camera. Infrared (IR) sensors are used to detect any movement into the farm. Once the sensor sence any movement the buzzer will beep high frequency sound as well our smart scarecrow will do up & down hand movement to scare birds and animals. IR detectors are safe and do not affect human and pet's health. These functions will scare birds & animals without hurting them. Advantages of the proposed system: Cost-efficient and easy to use. This system is accurate. It an eco-friendly system which will not harm the animal as well as the cultivated crops. Needs small power and voltage use in practical usage.

OBJECTIVE

- An automatic smart scarecrow is required to save the crops from the birds and animals as well as from thief. It is effective in both day and night.
- The aim of this project is to design an autonomous bird deterrent system that is effective. Here we show new innovation in field of agriculture and fabricate such type of scare crow that is smart in performing all the operations of Scarecrow
- It works automatically. Scarecrow is used in fields to save the crops and vegetables from birds and animals also it saves from thief.
- This scarecrow is also used in gardens to save the flowers and fruits. The need of this smart scarecrow is that it is very helpful in the night time.

METHODOLOGY

This project has been divided into three parts and discussed as follows;

A. Electronic Circuit

The different mechanisms used in electronic circuit consist of following components:

- 1) Relay
- 2) Solar panel
- 3) 360° camera
- 4) Motor driver
- 5) DC Motor
- 6) Charging controller
- 7) Sensors
- 8) Buzzer
- 9) Battery
- 10) Connecting wires

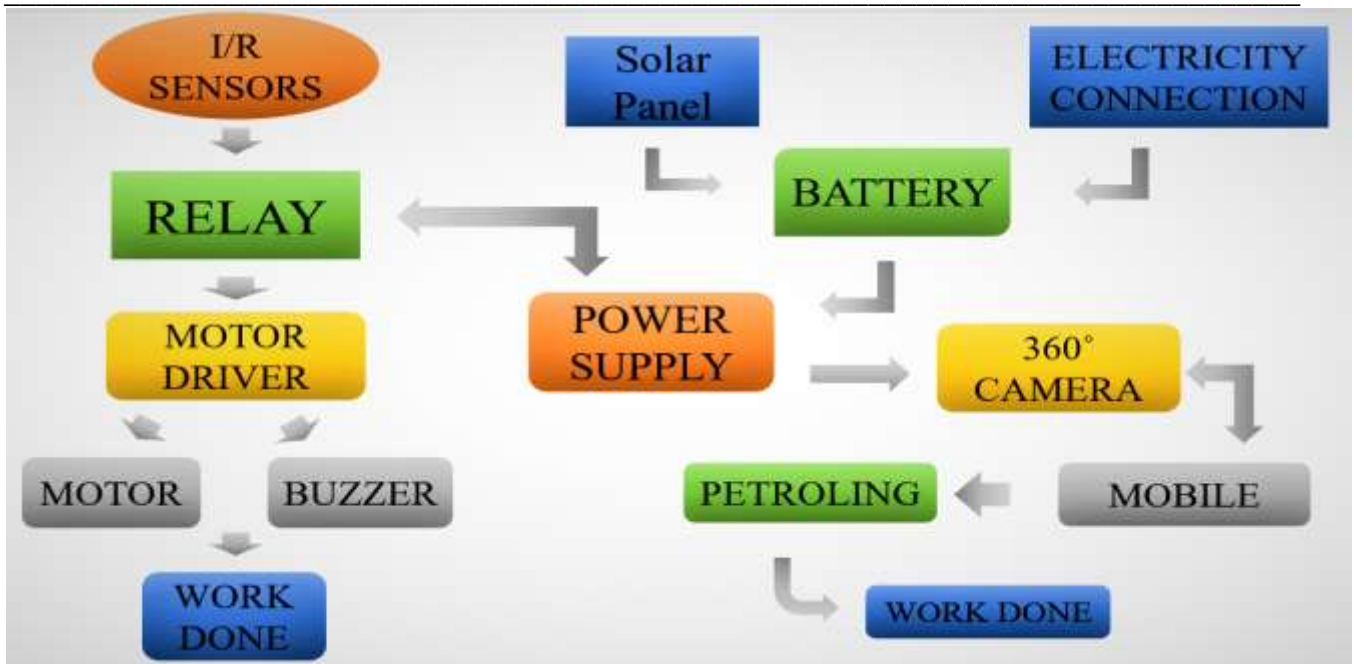


Fig. 1 Electronic circuit

B. Components

There are a lot of components used while we are making our project automatic smart scarecrow. We have explained our project components into two parts, one is mechanical components another is electrical and electronic components. Mechanical System Design

The different metal components used in fabrication of smart agri-scarecrow are discussed as follows-

a) Metal pipe:

We have used square hollow section mild steel pipe for making Scarecrow’s structure. Which provide strength to the structure of scarecrow



Fig. 2 Metal Pipe

b) Wood:

We have used solid wood and ply for making our project’s mechanism (Flapping mechanism). Solid wood is used to provide support to the mechanism, and ply is used to make flapping hands, crank and connecting rod.



Fig. 3 Wood

c) Nut and Bolts, Screws:

Nut and bolts, Screws are used to joint the components into the structure and mechanism, Nut and bolts are used for temporary joint in the flapping mechanism to easily flap the smart scarecrow arms upward and downwards. Screws are used for permanent joint of the structure and the mechanism.



Fig. 4 Nuts, bolts & screws

d) Thin steel sheet:

Thin steel sheet is used to make faces of smart scarecrow.



Fig. 5 Thin steel sheet

ELECTRICAL AND ELECTRONIC SYSTEM DESIGN:

The different electronic and electrical components used in fabrication of smart scarecrow are discussed as follows-

a) Relay

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations.



Fig. 6 Relay

b) Solar panel

Solar panels can be used to generate large amounts of electricity, and this process can take place both at solar and industrial scales. A key benefit of solar panels is that they can be used in providing electricity in remote areas as well, provided there is enough solar energy at that place.



Fig. 7 Solar panel

c) Motor, Motor Driver

Motor driver is used to control the motor directions and motor (DC Gear motor 12v) is used to drive the flapping mechanism



Fig. 8 Motor, Motor driver

d) PIR Sensor, Buzzer

PIR Sensor is used to detect the motion of the birds and animals. Alarm is used for produce noise to scare the birds and animals.



Fig. 9 PIR Sensor, Buzzer

e) Battery, Connecting Wires

12v Battery is used to give power supply to the Arduino and Motor driver. Connecting wires are used to connect all the electrical connections.



Fig. 10 Battery, Connecting Wires

f) 360° Wireless Camera

360-degree surveillance cameras use a fisheye lens to record the entire scene and events, allowing for total situational awareness with no blind spots. The footage captured is then dewarped in real time, allowing security officials to pan, tilt and zoom through the entire scene.



Fig. 11 360° Wireless Camera

g) Charging controller

A charge controller or charge regulator is basically a voltage and/or current regulator to keep batteries from overcharging. It regulates the voltage and current coming from the solar panels going to the battery.



Fig. 12 Charging controller

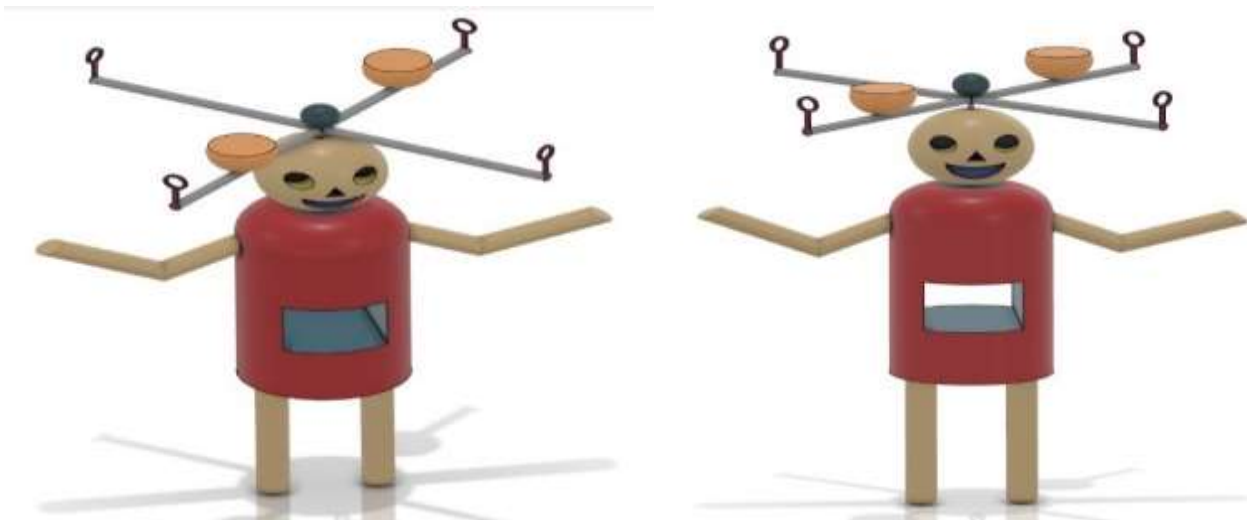
CAD MODEL

Fig. 13 CAD Model

WORKING

In this project the equipment used is 12 volt 7AMP battery, charged by 14-watt solar panel or by electricity connection. The DC motor is of 12 volt 5AMP connected to battery. In this 100-rpm DC motor is used to avoid vibrations. The working principle is like when any bird & animal is come in front of IR sensors & if IR sensor sense any movement then buzzer will beep high frequency sound which is nearly 150 dB & while beeping, scarecrow will do hand movement in up

& down position. The movement of hand will last for 10- 12 sec. The flapping mechanism is used to do hand movement. The flapping mechanism is explaining as follows-

- **Flapping mechanism**

The aim of the flapping mechanism is to convert the rotary motion of the motor into the linear motion of flapping hands when the crank rotates, the connecting rods pushes the hand up and down.

The flapping mechanism consists of crank, connecting rod, flapping arm, support structure, nut and bolts. Crank is joint with one end of connecting rod and second end of connecting is joint with flapping bar, when crank rotates the crank push the connecting rod and connecting rod push the flapping rod up and down. The flapping mechanism used in automatic smart scarecrow is shown in fig. 1.

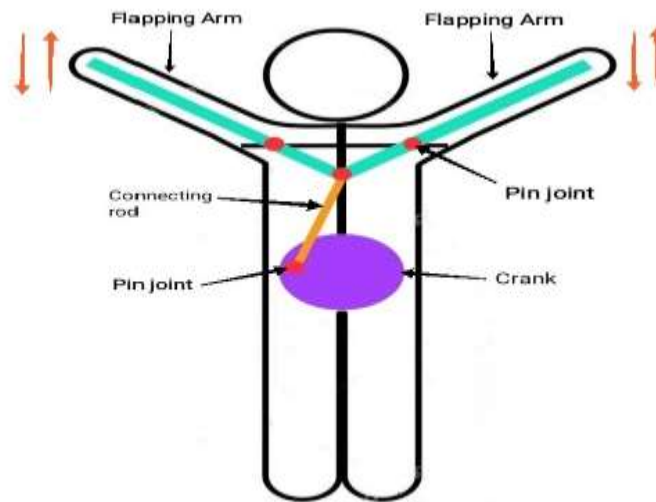


Fig. 14 Flapping Mechanism

- **Working of Hand/Buzzer movement -**

The working of buzzer and hand movement is carried using the DC motor which run continuously by using electric power. The function of this system is takes places as shown in below fig.a and works in this way. Firstly, IR sensors sense anything comes near to sensor and then it transfers the signals to relay. The relay is on by using battery power and then it transfers signal to buzzer and DC motor. Buzzer will produce noise to scares birds and animals simultaneously hand movement occurs by using DC motor. Hence the work is done and farmer will save the crops.

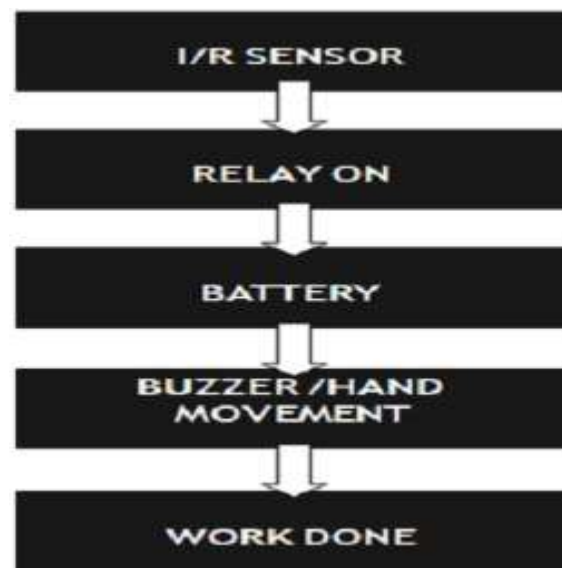


Fig. 15 Working of buzzer/hand movement

- **Working of wireless camera:**



Fig. 16 Working of wireless camera

The working of wireless camera is carried using 360° rotating camera which works continuously in both day and night. The function of this system is takes places as shown in below fig. b and works in this way. Firstly, wireless camera detects the animals, birds or human beings. It transfers the signals on the mobile of famers. Then famers will alert and comes in the farm for petroling and see what happens in the farm. Wireless camera works in both modes either automatically or manually. And at the night time it is very helpful.

CONCLUSION

- An automatic smart scarecrow effective in the day & night to provide the security for the crops. So there is an option of using automatic smart scarecrow instead of using normal scarecrow.
- An automatic smart scarecrow is more efficient than a normal scarecrow. Automatic smart scarecrow provides all time security to the crops from the birds and animals as well as from thief. Automatic smart scarecrow is equipped with sensors, movable arms, 360° rotating camera and alarming device.

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