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Calculation of Torque and Development of Smart Agri Scarecrow

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Abstract: ***A Smart scarecrow is used to scare the birds and to the animals to store the crop withinside the fields. A farmer positioned the clever scarecrow withinside the center of the world to store plenty of his crop from the birds and animals. We have visible that clever scarecrow has no motion while the birds are to be had field. A clever scarecrow is a decoy or mannequin, frequently withinside the form of a human.***

Humanoid scarecrows are normally carrying antique garments and located in open fields to deter birds from worrying and feeding on lately forged seed and developing plants.

Scarecrows are used throughout the planet via way of means of farmers, and are a extraordinary image of farms and consequently the geographical region in famous culture. The not unusualplace shape of a clever scarecrow is a humanoid determine wearing antique garments and located in open fields to deter birds along with crows or sparrows from worrying and feeding on lately forged seed and developing plants. Machinery like windmills are employed as scarecrows, but the effectiveness lessens as animals grow to be conversant withinside the structures.

Farming contributes a first-rate earnings to the Malaysian economy. It is an huge difficulty to farmers as soon as they're a long way farfar from their plants and exposing it to plants' chance like crow unfavourable the plants and theft. Farming has contributed to almost as much as 22% of a country's.

Keywords: Sensor, Solar Panel, Buzzer, 360º Wi-Fi Camera.

I. INTRODUCTION

An automated clever scarecrow is typically utilized by farmers to shop the vegetation from the birds and animals within side the field. Smart scarecrow enables to the farmers to shop their vegetation with the aid of using scare of the birds and animals. In village, clever scarecrow is made with the aid of using the usage of the antique cloths and sticks and provide it to a frightening appearance to scare the birds and animals to the vegetation of the farmers. Smart scarecrow is moreover utilized in gardens and at the airports. A scarecrow would not powerful withinside the night time to deliver the protection for the vegetation. So there may be an alternative of the usage of automated clever scarecrow rather than the usage of regular scarecrow.

Automatic clever scarecrow also can be known as as clever scarecrow. An automated Smart scarecrow or Smart scarecrow is extra green than a regular scarecrow. Automatic clever scarecrow affords all time protection to the vegetation from the birds and animals. It is powerful in each day and night time. It works mechanically. Automatic clever scarecrow is prepared with sensors, movable palms and alarming device.

We have visible that clever scarecrow has no motion while the birds are to be had field. In our assignment we are becoming to regulate this clever scarecrow that after the birds are to be had the world, it will feel the imminent of birds with the help of PIR sensor and pass its hand up and down with the help of flapping mechanism and it will begin ringing with the help of buzzer, the purpose of the flapping mechanism is to transform the rotation of the motor into the linear movement of flapping hands. When the crank rotates, the connecting rod pushes the hand up and down.

On the opposite hand, 360º wi-fi rotating digital digicam is works in each modes both mechanically or manually. It is relying at the famer how he desires to use it. Additionally, it really works day and night time time. All digital and electric additives are works with the aid of using the usage of battery power. It is c harger with the aid of using sun panel or electricity. Automatic clever scarecrow will assist to scare the birds and consequently the refore the birds are going to be run far from the world and the crop of the world turns into safe. It also can be utilized in garde.

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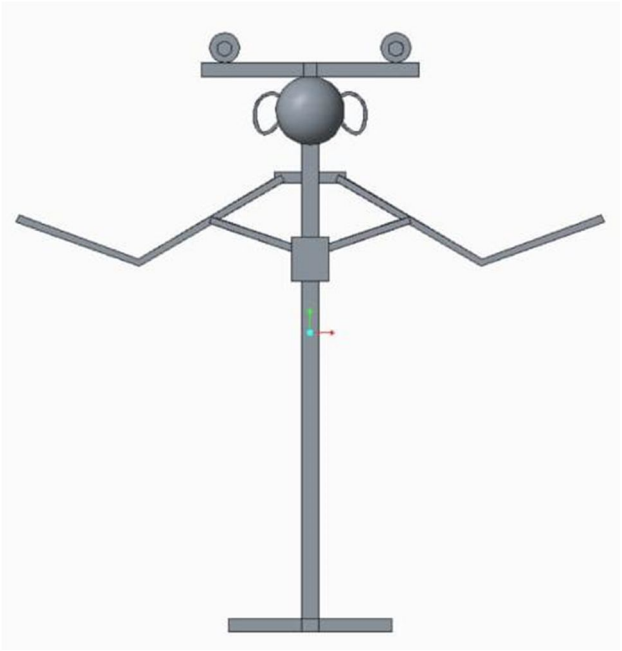
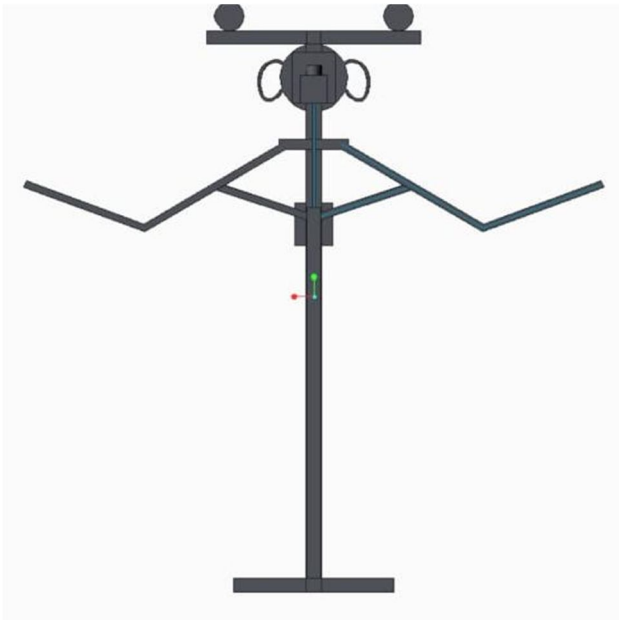
II. MODELING OF SMART AGRI SCARECROW

A. CAD Design

The CAD design of the scarecrow is made with the help of CATIA in 3D.



a) Front View



b) Rear view

c) Side View

d) Isometric View

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III. CALCULATION OF TORQUE

$P = \frac{2\pi NT}{60}$

Where,

P = Power = 50 watt

N = Speed = 20 rpm

T = Torque =?

$50 = \frac{2\pi \times 20 \times T}{60}$

$50 \times 60 = 2\pi \times 20 \times T$

$3000 = 40\pi \times T$

T = 23.87 Nm

IV. DEVELOPMENT OF SMART AGRI SCARECROW

Fig. Actual of Scarecrow

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V. 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.

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 a) Metal Pipes

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 b) 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 c) Nuts, bolts & screws

D. Thin Steel Box: -

Thin steel box is used to make faces of the smart scarecrow.

Fig d) Thin Steel Box

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1) Electrical and Electronics 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 a) 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 b) 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 c) Motor, Motor Driver

d) IR Sensor, Buzzer: IR 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 d) IR Sensor, Buzzer

e) Battery and Connecting Rod: 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 e) Battery and Connecting Rods

f) 360º 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 dwarfed in real time, allowing security officials to pan, tilt and zoom through the entire scene.

Fig. f) 360º 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 g) Charging Controller

VI. FUTURE SCOPE

A. An authorized person using RFID's.

1) We use in future solar and wind power together for power supply.

2) When such intrusions occur the cameras employed are turned ON which capture an image and start recording the video for some time which will be stored on the SD card as well as stored on cloud i.e. drop box, the land owner can then view the video on any smart device.

3) If the motion detection is due to an authorized person with a valid RFID, who is mostly a farm worker, his attendance gets recorded automatically.

4) We can design a IOT based application to provide an image and video feed to farmer on any smart device and farmer will be notified when there is an intrusion in the farm by animal along with additional information of humidity and temperature

VII. RESULT & CONCLUSION

A. 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.

B. 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.

C. The capabilities of technology have been shifting forward together with time and its intervention has been helpful. Applying technology in the agriculture sector has significantly enhanced the country's agriculture sector.

D. The tradition of setting up scarecrows is deeply rooted and has a significant symbolic meaning that is exceptionally extensive. The scarecrow used to be associated with the sphere of fertility and yield, but its figure was also linked to the veneration of the dead.

E. Enhanced the country's agriculture sector.

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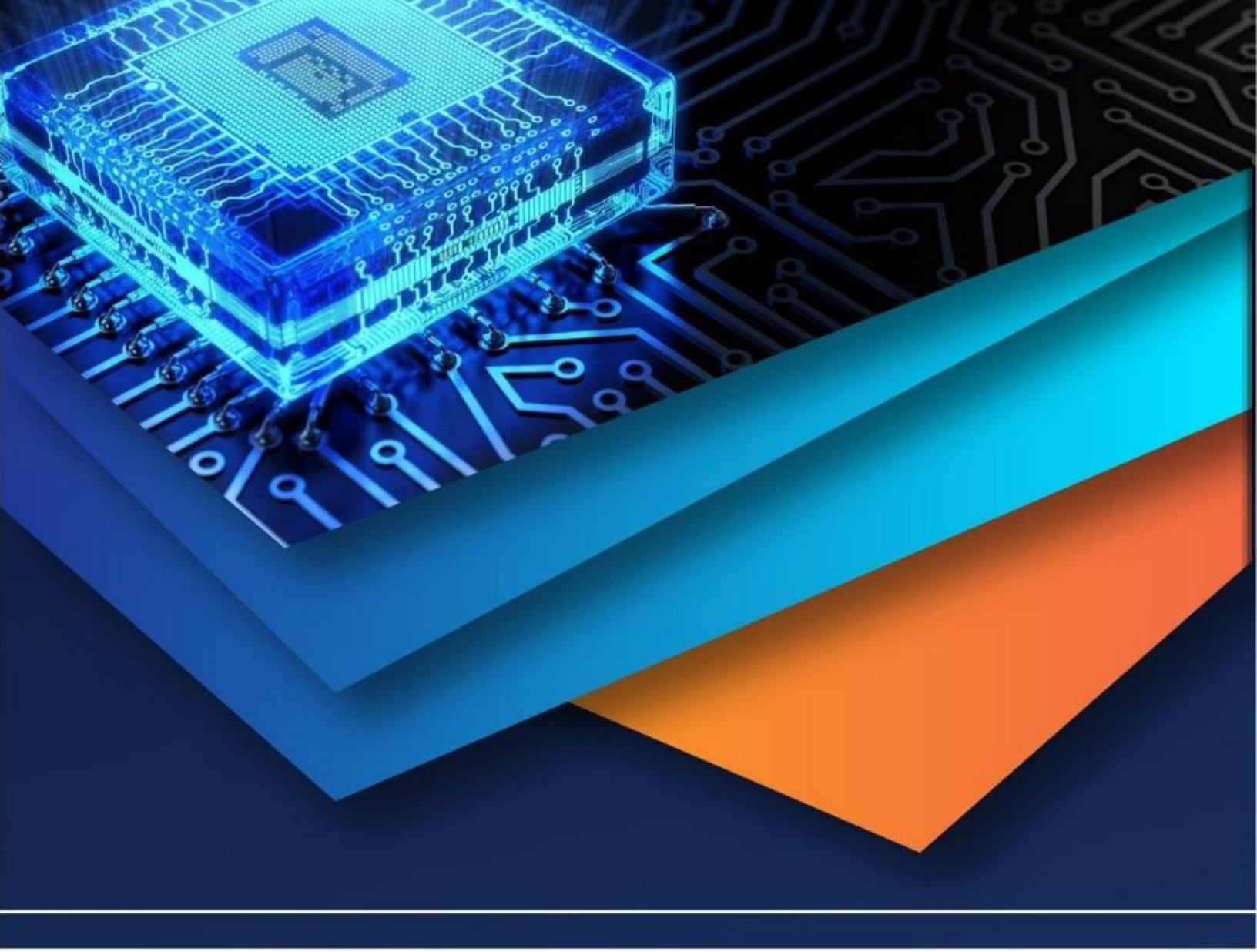

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