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CROP Protection from Fauna Agricultural Farm Areas

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Abstract: India is an agricultural Country and it is an important field for cultivation of crops / grains, as food is the need of human being the cultivation of food in agriculture land should be protected from any damage being caused to the growth of plants/grains. A system is to be designed which will protect the farm field from fauna/ birds which enter the farm field to destroy the crops which are ready to yield. For this, a is fence to be constructed around agricultural land and this fence should be supplied by solar energy which we call solar fence, so that whenever an animal touches the field should receive a short pulse which will not harmful for them but it is to only threaten them to stay away from field and an ultrasonic bird repel which transmit ultrasonic wave so that birds do not enter the field and destroy grains. By developing such system it will helpful for farmers.

I. INTRODUCTION

Due to over population it takes place deforestation takes place which results in shortage of food, water and shelter in forest areas. So, Animals interference in residential areas is growing day by day Which disturbs human life and property causes human animal conflict as per nature's law every single living creature on this earth has key role in eco-system. Agriculture is the strength of the economy but because of animal interference in agricultural lands, there will be massive loss of crops.

Elephants and Other animals coming in to contact with humans, impact harmfully in various means such as by damage of crops, damaging grain stores, water supplies, houses and other resources, injuring and death of humans. Farmers in India face serious fears from damage by animals resulting in lower profits, old-style methods followed by farmers are not that operative and it is not feasible to employ guards to keep an eye on crops and avoid wild animals. The animal detection system is essential in farm areas. Most countries have an economy dependent on agriculture — either in a small or big way. From employment generation to the contribution to National Income, agriculture is very important. It contributes to the gross domestic products. Agriculture meets food requirement of the people and produces several raw materials for industries. Due to the animal interference in agriculture land farms, there is a huge loss of crops, as animals / birds destroy crops making a large amount of loss to the farmers. To avoid these financial losses to the farmers it is important to protect farms from wild animals and birds. In today's scenario there is not such importance given to the field of agriculture, due to this negligence there is lot of decrement in agriculture. To overcome this issue, it is proposed to design a system to prevent the entry of animals and birds into the farm. Main purpose is to develop fencing to the farm, this control the animals by giving them a short pulse just to be away from the fence, these fencing protect the crop from the damages by animals / birds. The system will not be harmful and injurious to animals / birds as well as human beings.

II. LITERATURE REVIEW

Saranya, "Design and Fabrication of Solar Panel" [1] has presented construction of Solar tracking system using DC gear motor. A solar tracker is a device into which solar panels are fitted which tracks the indication of the sun across the sky confirming that the extreme amount of sunlight strikes the panels all through the day. The solar tracker will to' to navigate to the best angle of contact of light from the sun. A detailed introduction to solar panel and solar tracker is described. Mostly the solar tracker is divided into two main classes, hardware and software. It is further sub divided into four main functionalities: method of Tracker Mount. Drivers, Motors, and Power supply of the solar tracker is also described.

Krishnamurthy B, "The Solar Fencing Unit and Alarm for Animal Entry Prevention" has reported that the aim of this paper is to Design and implementation of an intelligent security system for farm protection from wild animals. An electric fence is used as a barrier to protect a farm from wild animals. An electric fence firstly used in Texas in 1888. Electricity from generator using an overshot wheel was used to charge the top two wires of a four- wire fence. Often solar-powered, the fences were used extensively in the Panhandle to prevent cattle wandering onto farmlands. It is important to keep the area near the fence cleared of any such vegetation. It should be ensured that the grounding has been done properly. Failure to do so might create the electric fence ineffective.

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Atul R. Dange, "Performance of solar power fencing system for agriculture" in this paper solar power fencing system provides control for all type of animal. The application suits remote areas providing an economical and practical solution to achieve maximum protection in field or areas. The stated solar power fence system works on the solar energy the daily observation like solar radiation, panel voltage, panel current, battery voltage, fence voltage and current were noted and were plotted on graphs among these parameters. The average input/output energy from solar panel was found 172 and 23 watt respectively. Voltage in the fence live Wiring ranges from 2 to 11 kV. The range of pulsating current through the fence wire was 0.005 to 0.008 Amp. Each pulse in the fence wire is for 0.0003 of second and pulses spaced about 1.0 seconds. One panel of 35 kW and, 12 V battery Was set up effective for 3.5 km fence line. As sunshine hours during day decreases and battery which is charged get discharged. As results fence wire voltage decreases which gives poor performance to control animals from entering farm.

P. Rama Rao, "Protecting Crops from Birds, Using Sound Technology in Agriculture" this presents the range of hearing defines the range of frequency that is heard by humans or animals, although it can also refer to the range of levels. The human range is from 20 to 20 KHz, while humans have significant difference, mostly at high frequencies, and the gradual loss of sensitivity to higher frequencies with age is considered normal. The sensitivity also varies with frequency. Normal transmission for hearing loss usually includes an audiogram that shows the threshold levels relative to normal. Several species of animals can hear rate of recurrence that go beyond the limit of human hearing. For example, some dolphins and bats can hear frequency up to 100,000 Hz. Elephants can hear at a range of 14-16 While some whales can hear infrasound sound up to 7 Hz (in water).

Animals	Range in Hertz
Humans	20 – 20,000
Bats	2000 – 110,000
Elephant	16 – 12,000
Fur Seal	800 – 50,000
Beluga Whale	1000 – 123,000
Sea Lion	450 – 50, 000
Harp Seal	950 – 60, 000
Harbor Porpoise	550 – 105,000

Animals	Range in Hertz
Killer Whale	800 – 13, 500
Bottlenose Dolphin	90 – 105,000
Porpoise	75 – 150,000
Dog	67 – 45, 000
Cat	45 – 64,000
Rat	200 – 76,000
Opossum	500 – 64,000
Chicken	125 – 2,000
Parakeet	200 – 8,500
Horse	55 – 33,500

First of all, the number of birds is collective. Many farmers are using chains to harvest rice and wheat. Relatively a large number of grains obtained in this way are left behind in the field. This gives birds an ample and high-quality food supply that adds to the increase in numbers, and keeps it stable. Furthermore, many farmers are starting to plant rice through seeding rather than by transplanting. The sown seed is a resource of food for ducks if the paddy fields are swamped and for sparrows and pigeons if the fields are drained. In some cases, loss has occurred to first-hand crops.

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III. METHODOLOGY

As most of the crops in agriculture land are not getting the sufficient environment for their growth due climatic condition and the loss made by animals/birds in the farm land. Many problems regarding growth of the crops/grains are related to animals / birds interference, when the crops are ready to be harvested at that time these animals / birds enter the farm field and destroy the crops which creates a huge loss to farmers, To protect these farm lands a system needs to be designed.

Solar Energy is used to energize such fence arrangement, as solar energy is abundant and free and problem of energy crisis can be solved. Solar energy is converted to electrical energy and the electrical power to high voltage short duration electrical pulse. These short duration pulse causes avoidance of animals but are not harmful for them. For more protection to the crops an ultrasonic sound / audio generator is being used to repel the birds, as most of the cereals are destroyed by birds by eating the grown cereals and grains in the farm. To avoid them audio generator is used to generate ultrasounds which are not audible to human hearing but animals and birds have some hearing range which is irritable to them, such ultrasound frequency is emitted so that animals / birds remain far from the field and there will be no loss in farming.

The Solar module produces the DC energy and controls the Battery. The output of the battery is attached to Energizer or Controller or Charger or Fencer. The energizer will yield a short, high voltage pulse at steady rate of one pulse per second. The live wire of the energizer is attached to the fence wire and the earth terminal to the Earth system. Animal / Intruder touching the live wire makes a path for the current over its body to the ground and back to the energizer via the earth system and completes the circuit. Thus the animal / intruder will receive a shock, the bigger the shock the animal/ intruder receives the more.

The Energizer has to be established up with its earth terminal attached to an adequate earthing or grounding system. The live terminal is coupled to the live shielded wires of the fence. Energizer will direct an electric current along the shielded steel wire. An animal or intruder touching the live wire makes a path for the electrical current over its body to the ground and back to the Energizer through the earth or ground system, thus completing the circuit. The greater the shock the animal obtains the more long-term the memory will be and the more the fence. The shock handled is a grouping of fence voltage and pulses time or energy. The higher the *joule grade of the energizer the bigger the shock and the larger the fence performance.

As in this system solar energy is used to utilize the energy efficiently, this system added a Pump, which supply water to the crops if the soil moisture level is low, a GSM modem is used to inform the farmer if any unusual issues occur and an alarm / buzzer is used for any alerts. Thus the whole agriculture/ farm protection system is build.

IV. CONCLUSION

A fence is provided across the field, so whenever an animal tries to enter the field will receive shock the fence should be grounded properly. Protecting the farms, animal definite frequency spectrum signals are produced. The animals are warned with these signals of danger and effectively ran away. System can be added on vehicles or trains in its place of mounting poles on road side. Buzzer will be activated. So that wild animals will not come in into the farm. It will run away. GSM module guides message to the farmer to alert him, after the initiation of system. From this it is determined that the design system is very beneficial and cheap to the farmer.

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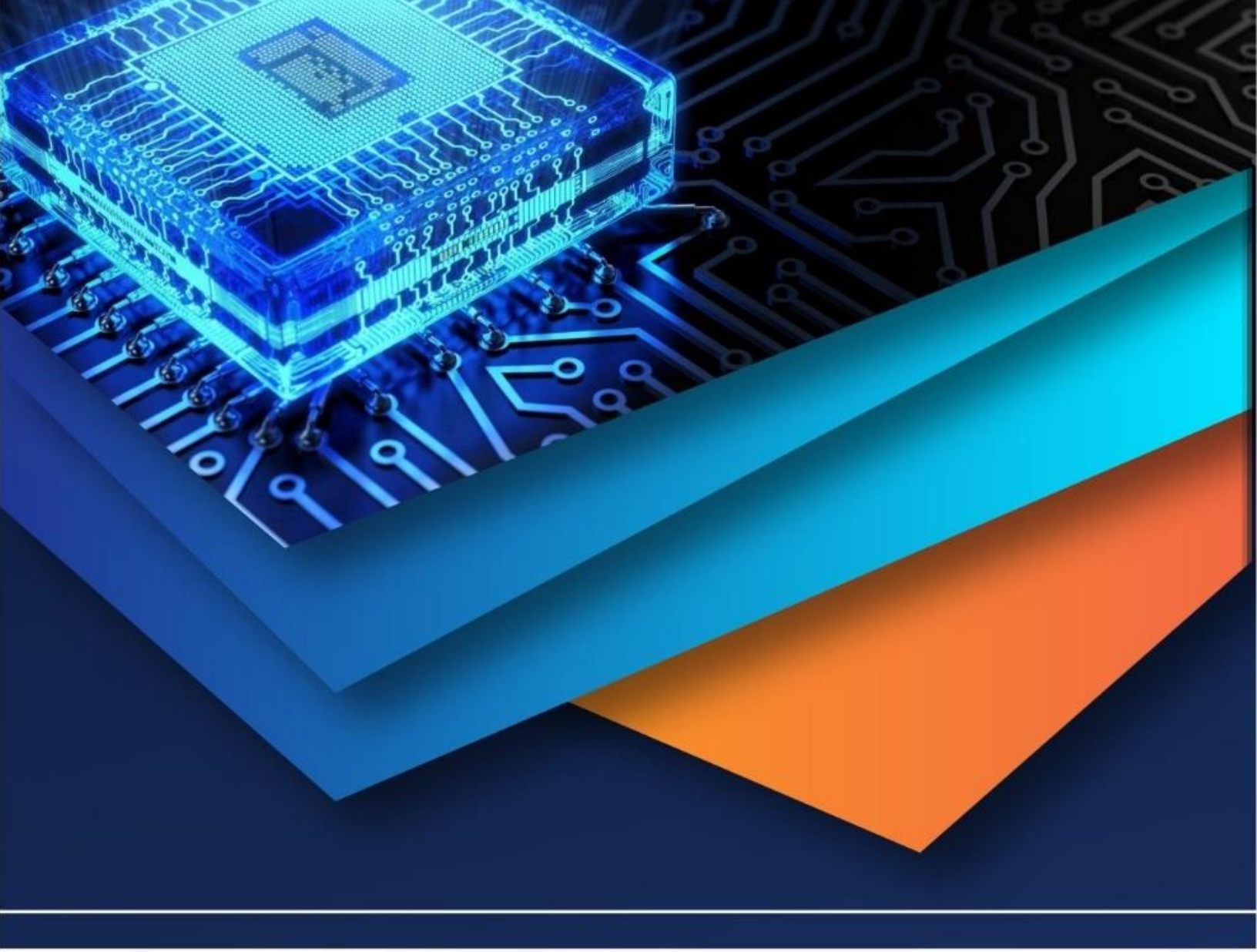

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