

A SOLAR-POWERED BIRD REPELLER TO PROTECT CROPS FROM BIRDS AND WILD ANIMALS BY ALERTING SYSTEM USING GSM

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Abstract

Ranchers employ many ingenious visual and oratory frightening techniques, obstructions, agronomic planting or harvesting modifications, and bird population's oppression methods. Under certain conditions, these strategies can decrease harm. A portion of the strategies they set up are electric fences around their fields, scarecrows, they put works for securing crops by giving wages and so on utilizing electrical wall is extremely perilous. It might make deadly wounds creatures and even lead to human casualties because of stun dangers. It additionally prompts an extraordinary wastage of electric power. But by utilizing these systems the profitability of yields are not expanding.

To defeat the issues from flying creatures and creatures from crushing the harvests we are presenting the system called To solar powered bird repeller to protect the yields from fowls and creatures by utilizing cautioning GSM. By using ultrasonic and infrared sensors.

Key words:- solar panel, ultrasonic sensor, infrared sensor, voice playback circuit, GSM

I.INTRODUCTION

In India, around 66% of the people are depending after cultivating for their occupations that contribute one-fifth of countries GDP. Agribusiness in India is the broadest money related zone and expect basic employment in the general monetary factor of India. The growing news stories in TV and paper on wild animals striking provincial yields in the midst of accumulate season exhibits that these animals can wreck a farmer's occupation. In such domains, Electric fencing structure can be used in which the animals experience a high voltage low stream stagger for a brief time allotment. Because of the little degree of current, there is no hazard to the

animal's life. Meanwhile, the generous significance voltage drives off the animals.

Flying animals exist in our ordinary territory. Despite the way that a part of these winged creatures is significant to man, two or three sorts of them can be antagonistic to individuals. Flying animals can be an exacerbation when they cause damage and medicinal issues. The New Zealand ranchers by the nation's Plant Protection Society revealed that far-reaching dimension of them had encountered yield hurt from flying animals (Coleman and Spurr 2001). In Nigeria, ranchers especially those arranged in the northern territory experience mischief to their reap from flying animal troubles. The size of obliteration acknowledged by these feathered creature aggravations can every so often be exceptionally extraordinary. Recently in India, the productivity of crops decreases due to various factors like improper irrigation system, present agricultural methods, and also damage caused by animals and birds. The activities of birds damages crops, grains in grain stores and rice shelling yards which vary from each state and area. Recently a survey told that about 36% of crops were damaged by bird and wild animals. so, overcome this problem the designed system is very useful. We realize that the scope of hearing depict a scope of recurrence that creatures or people can hear. Human recurrence range is around 20 t0 20,000Hz. Likewise, birds can hear a frequency of about 600 to 10,000Hz. So it is better to broadcast the distress calls to deter the pesky birds from the fields. Therefore, solar bird repeller is designed and fabricated and tested on ground fields.

II.EXISTING METHODS

The existing methods to protect crops are old and create great damage to birds and animals which leads to their death. Some of the methods are mentioned below

- Scarecrows:- Earlier scarecrows were used to frighten the birds, but this process can't control the total damage from the pesky birds
- Gas guns:- This is used to fire the birds but produces a loud sound which disturbs the neighbours
- Electric fences: These prevents the animals to enter the fields but sometimes it may lead to the death of animals and human casualties

On the other hands, there are different feathered creature executing systems like synthetic anti-agents, net, spike protects, a conventional method like shooting winged animals and so forth. All the bird control methods are less effective and cause huge damage to certain species. In this way, so as to defeat these issues, we are creating " solar powered bird repeller to protect the crops from birds and animals by using alerting GSM". By using solar power, we can reduce the cost of electricity and labour cost and use the extra solar power for operating the water pump.

III. PROPOSED DESIGN OF SOLAR POWERED BIRD REPELLER

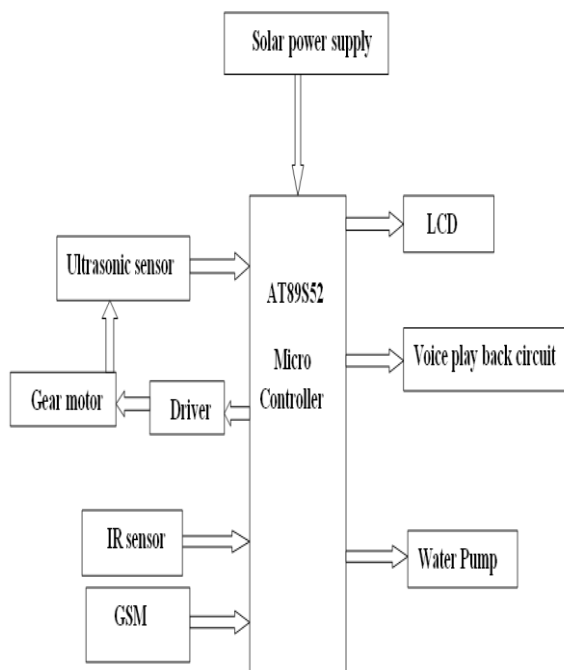


Figure 1 : Block diagram of solar powered bird repeller

A. Hardware Components:

Solar Panel

Battery

Micro controller (AT89S52)

Ultrasonic Sensor (HCSR04)

Infrared Sensor

Motor Driver L293D

Gear Motor

LCD

GSM

Voice Play Back Circuit

Water Pump

B. Software:

µVision IDE - Kiel

C Language

VI. HARDWARE COMPONENTS AND ITS SPECIFICATIONS

A. Solar panel:

Solar panel (figure 2) board is utilized for changing over the sunlight based vitality to electrical vitality by exciting electrons in silicon cells utilizing the photons of light from the sun. This electrical vitality is stored in battery for charging reason. In this technique we are utilizing solar panel of 20W and 12V (54*46cm) is utilized for power supply.



Figure 2: Solar panel

B. Battery:

Battery (figure 3) is used for storing the electrical energy it is used as backup and charging purpose during night-time and rainy day. Capacity of battery is 12V, 3.3Ah.



Figure 3: Battery

C. Micro controller:

AT89S52 (figure 4) is a low power superior CMOS 8-bit miniaturized scale PC, and it is planned to utilize Atmel's high-thickness non-volatile memory innovation. This small scale controller is utilized for putting away the guidelines for working of the unit. The directions are customized in keil programming and they are dumped into the microcontroller by utilizing dumper .sensors send contribution to the microcontroller then it reads the information and procedure the guidelines stored in it.

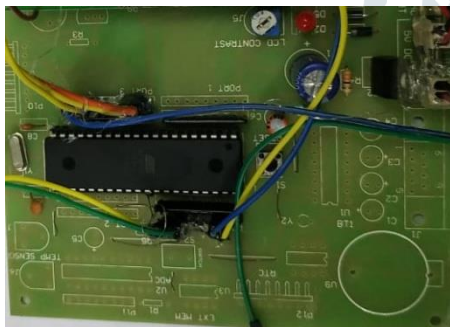


Figure 4: Microcontroller

D. Ultrasonic sensor:

HC-SR04 (figure 5) is utilized and it can make the grade regarding range from 2-400cm. The supply voltage is 5v. The ultrasonic sensor is utilized for short to long- rage discovery. It distributes separately by sending explicit repeat sound wave and checking out ricochet back for the sound wave. The division can be constrained by record the time between the sound wave age and recovery of the sound wave.

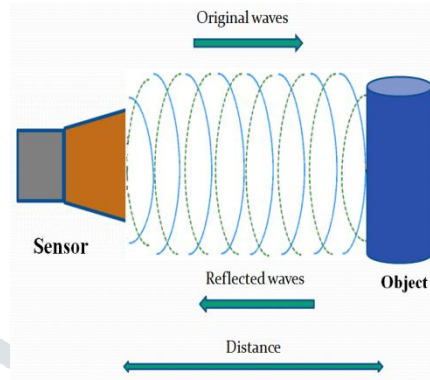


Figure 5: Ultrasonic sensor

E. Infrared sensor:

The IR sensor has a transmitter and recipient which that sends IR vitality and searches for reflected IR vitality to recognize the obstacle present before the sensor. This module has potentiometer which is used for adjusting the range of detection. The sensor works in daylight as well as in dark. The operating voltage ranges from 3.0V-5.0V and detects range from 2-30cm. There is an LED indicator which blinks during the obstacles.

F. Voice play back circuit:

sound account and generation are an electrical, electronic, mechanical is computerized engraving and diversion of sound waves, for example, verbally expressed voice, singing, instrumental sounds and so forth. The two primary classes of sound chronicle innovation are digital and analog recordings. In this undertaking, we are utilizing digital recording with the assistance of an amplifier. ICAPR600 (figure6) is single chip circuit which is used for playing various soundtrack for 20-20 seconds. The frequency range is about 30khz.

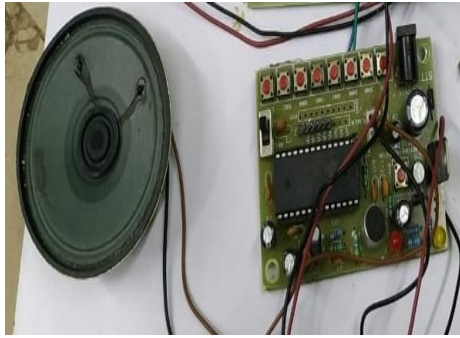


Figure 6: Voice play back circuit

V. WORKING PROCEDURE

The entire system is powered by Solar panel of 12V with battery backup. We are using the battery for harvesting electrical energy which gets energy from solar panel in daylight. With the goal that we can likewise utilize this technique using battery around evening time. Infrared sensor and ultrasonic sensor to detect the pesky birds and animals which are pulverizing the crop fields. Each sensor requires 5V of supply for there working. When the birds or animals enter the field, the sensors get activated and gives the input to the microcontroller. AT89S52 microcontroller reads the data and process the instructions stored in it. when the sensor gets activated automatically the recorded voice will play through the play back circuit. This voice playback circuit can store up to 10 voice tracks with frequency of 20khz. By hearing this sound the birds will flew off from the field. GSM modem is used to get the alert of birds and animals detected through SMS for checking our experimental setup working properly.

This monitoring process is continuously going on .The extra power produced can be used for starting the water pump. The flow chart shows the conditions used for programming the repeller. According to the flow chart (figure 7), the infrared sensor detects birds and animals is given as zero in the binary format while writing the program, It remains 1 when no birds are detected. In the same way, the ultrasonic sensor range is given greater than 50cm while writing the program, so when birds reach these range automatically we get SMS and voice playback circuit will be played.

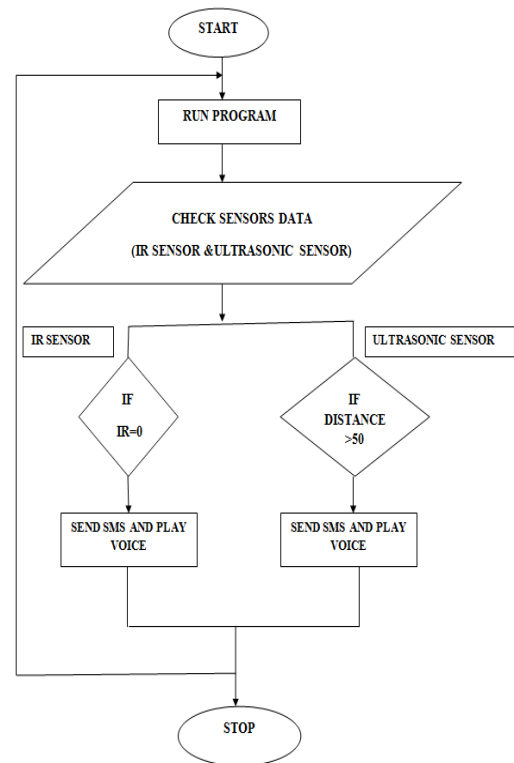


Figure 7: Flow chart for proposed system

VI. PROS AND CONS OF PROPOSED SYSTEM

Advantages:

- Reduces human work
- Increases crop productivity
- No harm to birds and animals
- Very efficient
- No wastage of electric power as we are using solar

Drawback:

Despite the fact that it is exceptionally powerful as a watched significant downside is environmental change. it performs less successfully on dull days.

VII. RESULTS AND DISCUSSIONS

The below (figure 8) show the development of solar powered bird repeller to protect the crops from birds and animals by using alerting system. when the kit is ON it display the title and when bird get detected it can be displayed. By using solar energy we are scaring the birds and running the motor. This has been tried in the ground field and obtained the outcomes about 80% of the winged creatures get frightened and flew from the field. Graphs (Figure 9) has been plotted for amount of power produced at

time for whole system during sunny day. During night time the power is obtained from the battery. The greatest measure of intensity is delivered in the early afternoon and again diminishes by 5 p.m.

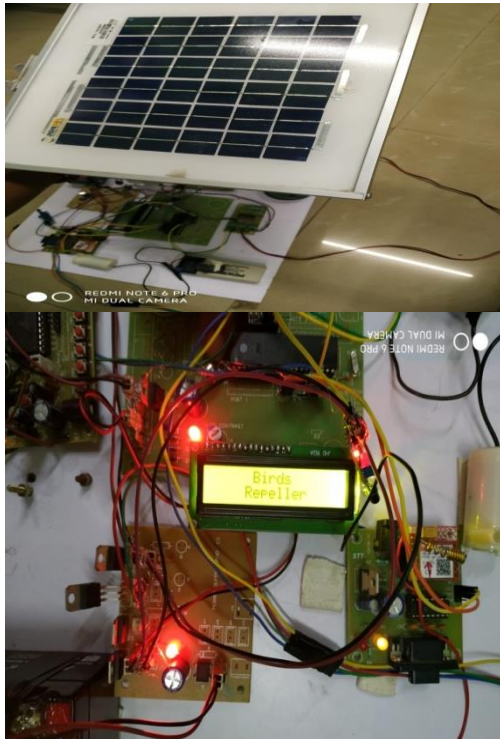


Figure 8: Experimental setup

By utilizing the multimeter(DMM) we can gauge the voltage and current qualities. The charts beneath demonstrate the connection between voltage, current, control as for time for the sun based board.

(Figure 9) Shows voltage v/s time, voltage increments regarding expansion in the force of light. During morning time the power of light falling is less contrasted with early afternoon so the voltage worth abatements after stipulated time as indicated by the chart voltage increments till 1 p.m and diminishes later. The pinnacle voltage got is 12v at 1 p.m.

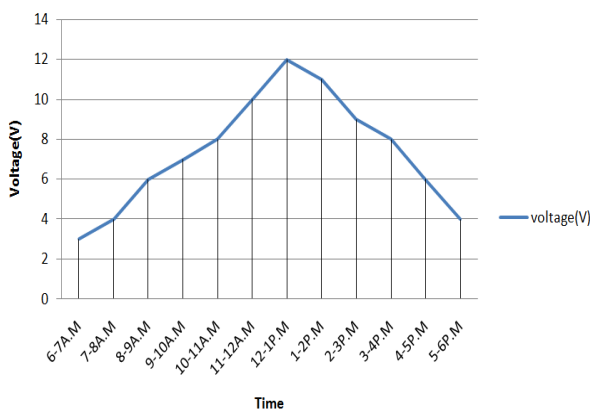


Figure 9: Graph for voltage and time

(Figure10) demonstrates connection for current and time, the most extreme current got is 0.3A at 1 p.m and the(Figure11) demonstrates the expansion in power, the greatest power is 3.6W at 1 P.m and diminishes to 3W at 2 p.m.

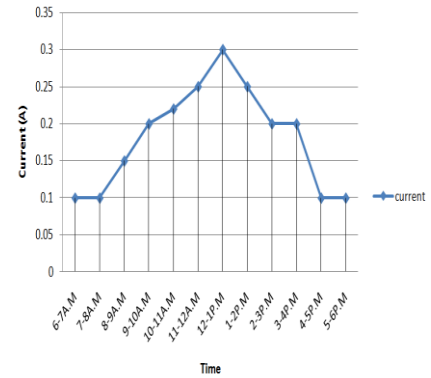


Figure 10: Graph for current and Time

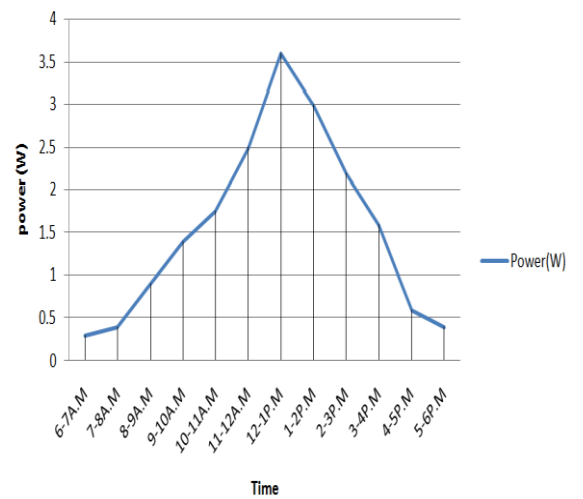


Figure 11: Graph for power and Time

The sun-powered bird repeller expends 2.65W of intensity. The voltage is 12V and current is 0.22A from this we can ascertain the power $p=v*I$. In this manner the power expended is likewise extremely less and viable that is 2.65W.

VIII.CONCLUSION

The bird repeller is an application of Science and Technology used in controlling birds and wild animals. The repeller has no side effect, unlike chemical and trap which is dangerous. It does not cause any harm to the environment or meddle with the freshness of the air. Notwithstanding, it is only the expense of improvement of a gadget that is required; using the device does not pull any additional money as it is solar powered. We have extended the effectiveness of the reap as well. It was

effectively tried. It is a new methodology in social perspective for Birds and Wild animal death avoidance etc.

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