

# Eco-Friendly Agri-Friend Robot With Solar Tracking System:- Protection Against Wild Birds And Animals For Farmer Field With Farmer Identification System

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**Abstract**— This paper mainly focuses on the controlling of farmer field from wild animals and Birds with farmer identification; it can be use for providing security from thief. When the farmer is away from the field, the RFID based wireless technology to revolutionize the standards of living and providing security from wild animals and Birds which is very harmful for small crop E.g. Wheat, Jawar, Gram, sunflower .This system provides ideal solution to the problems faced by farmer in daily life in their field. The system is wireless therefore more adaptable and cost-effective. The system provides security against wild animals and Birds as well as thief using RFID technology. This system is consisting of solar tracking system for providing optimal energy of their work which is getting from natural source i.e sunlight by using solar tracking. The system uses embedded technology so all advantages of embedded system present there. The present life system of human beings is becoming fast and accurate. With the speeds and accuracy, people seem to take the path of the electronic automation.

**Keywords:** *RFID, EMBEDED SYSTEM, SOLAR TRACER, remote connection control, remote access*

## I. INTRODUCTION

System can be divided into three section .1) solar tracking for optimum power, 2) animals and Birds polling section 3) farmer identification section

**1) Solar tracking for optimum power:** - Solar is a non conventional source of energy, considering this to developed solar panels so that we can fulfill our electricity need. But due to revolution of the earth, solar source i.e. sun does not face the panel continuously hence less electricity is produced. The energy panel should face the SUN till it is Present in a day.

Renewable energy solutions are becoming increasingly popular. Photovoltaic (solar) systems are but one example. Maximizing power output from a solar system is

Desirable to increase efficiency. In order to maximize power output from the solar panels, one needs to keep the panels aligned with the sun. As such, a means of tracking the sun is required. This is a far more cost effective solution than purchasing additional

**2) Animals and Birds polling section:** In this section the ultrasonic motion detector is ONE SECTION OF PROTECTION FROM WILD ANIMALS AND BIRDS FOR CROP that using an ultrasonic sensor as its base to detect movement or moving objects in places. It is design to be a low cost ultrasonic motion detector. The transmitter sensor use to generate signal in that area. When the signal is block by moving or movement the receiver will gets the signal and amplifies the signal using transistor. The transistor is

use as an amplifier to the receiver circuit. The Led and buzzer (firing) in the circuit use to see if there is movement detect of Birds and wild animals by the sensor. The relay use to trigger another circuit when there is movement detects. The signal generate by the sensor is about  $\pm 40\text{kHz}$ . This is a fully hardware design system plus it is built to be a portable ultrasonic motion detect

**3) Farmer identification section:** Today's farmer life is very busy of their work in field. And they suffer from stolen of crop by being human and animals. Small height crop is varying easily damage, and overall production of farmer degrading. In this section farmer identification can be done by using RF module.

## II. LITERATURE SURVEY

In completing this paper, some literature reviews have been done on several resources. The related works has been mentioned [1, 2, 3, 4, 5, 6,]. The paper [1] introduces a system design for RFID reader. The architecture used in this paper implements various kinds of RFID standards by changing the soft of Nios-II core in FPGA. The paper [2] proposes an UHF RFID reader based on the ISO/IEC 18000-6B standard. It describes the hardware and software design of RFID reader. The paper [3] explains about microcontroller based RFID .It uses real time clock capability with which attendance can be taken more accurately since the time of attendance will be recorded. In Paper [4], it has implemented farmer field security systems which contains farmer identification and deactivate firing system using passive RFID. A centralized system is being used for controlling and transactions. The farmer identification works in real time that when the user taps the card in contact with the reader, the firing section of robot will be deactivated RFID technology is utilized to

provide solution for secure access of a space while keeping record of the farmer. Some systems use radio waves to communicate, which is also how Wi-Fi and cell phone signals operate. Farmer identification section doesn't require all the features of a Wi-Fi network because Farmer identification sections are Coded messages. The most prominent radio networks in Farmer identification section may be ZigBee and Z-Wave or RF module.

Remote control provides the convenience of controlling firing section of systems and there are several different "methods" of controlling devices remotely

## III. DESIGN

### 1) Solar tracking for optimum power:

The block diagram below shows system architecture it consist of a LDR sensor senses max solar power which is being given to the Microcontroller(P89V51RD) through the ADC which digitizes the LDR output. Controller then takes the decision according to then algorithm and tilts the panel towards the direction of the max energy given by LDR with the help of DC Motor

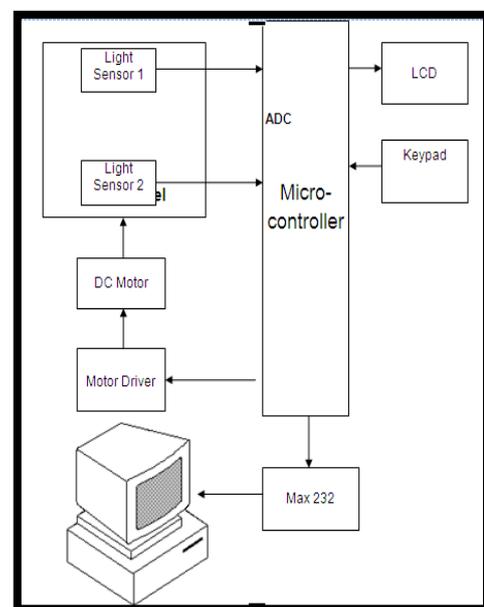


Fig. No-1:-Solar tracking system

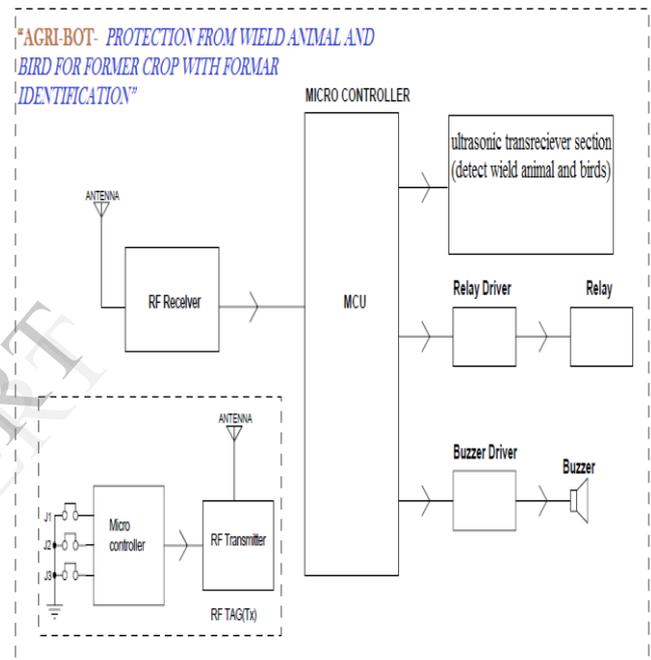
The DC Motor is used to rotate Mechanical mechanism. The LDR to sense the max solar power. And power supply continuously is getting to chargeable battery and dc battery will be charge and it is providing continuously power to various section of propose designed system

## 2) Animals and Birds polling section:

It consists of a set of ultrasonic receiver and transmitter which operate at the same frequency. When something moves in the area covered by the circuit, the circuits' fine balance is disturbed and the alarm is triggered and firing section will be activated. The circuit is very sensitive and can be adjusted to reset itself automatically or to stay triggered till it is reset manually after an alarm the ultrasonic motion detector is Animals and Birds polling section is using an ultrasonic sensor as its base to detect movement or moving objects in small places. It is design to be a low cost ultrasonic motion detector. The transmitter sensor use to generate signal in that area. When the signal is block by moving or movement the receiver will gets the signal and amplifies the signal using amplifier. it is use as an amplifier to the receiver circuit. The Led and buzzer or firing section is activated if there is movement detect by the sensor. The relay use to trigger firing section circuit when there is movement detects. The signal generate by the sensor is about  $\pm 40\text{khz}$ . This is a fully hardware design project plus it is built to be a portable ultrasonic motion detector.

**3) Farmer identification section:** This section aimed to develop a wireless system to detect and allow only the authorized farmer in their field. The system is based on Radio Frequency Identification (RFID) technology and consists of a RFID tag .it sends coded information to the Farmer identification section receives, decodes and checks

the information available in its Database and Manchester code was used to send that information. The system performed as desired with a 100m diameter antenna attached to the transponder. It is built by using the Popular 8051 family Microcontroller. It gets the tag ID and if the tag ID is stored in its memory then the microcontroller will allow the farmer inside the field.



**Fig. No.2- Eco-Friendly Agri-friend robot:-Protection against wild Birds and animals for Farmer field with Farmer Identification system**

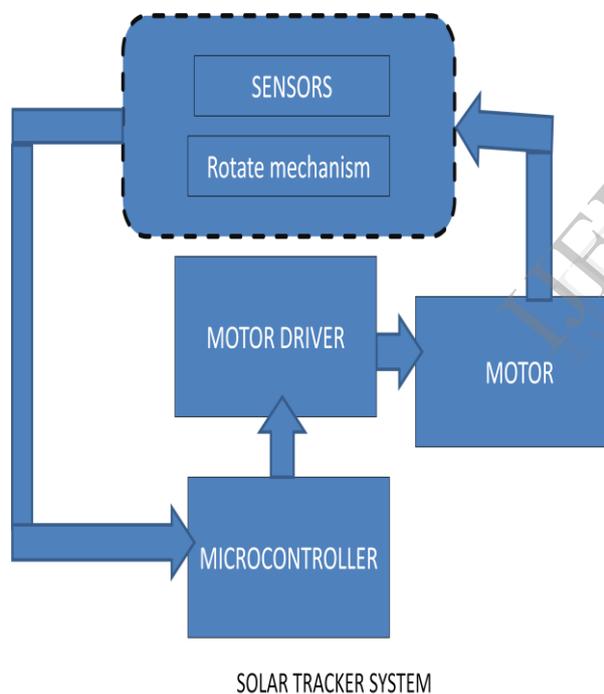
Shows the block diagram of the RF Tag. The system Comprises Microchip micro controller (U2), and RF Transmitter Module (U3). The micro controller chip is programmed to read BCD FARMER code and send data serially via RF Transmitter Module. The System is preprogrammed. Using a microcontroller greatly Reduces the component count while providing more features than could be found using dedicated logic ICs. Cost is also lower..

### Transmitter (RF Tag)

The circuit used in this kit uses only one IC – the microcontroller it is one of the PIC families of RISC based microcontrollers from MICROCHIP. The IC is preprogrammed. Using a microcontroller greatly PC interfacing module is used to give the feedback to the system monitoring unit. The vicinity it will detect and display the approximate distance. The distance is calculated depending upon the time it takes to travel from TX to RX.

## IV. IMPLEMENTATION

### A) Hardware Technology for solar tracking system



**Fig. No: 3-solar tracking system for agri-bot**

### MICRO-CONTROLLER (AVR IC89C51):

#### ALGORITHMS

1. Start
2. Initialize the LCD
3. Display the WELCOME Message

1. Display the Message "Receiving signal from LDR Read output voltage from LDR 1 and LDR 2
2. Check if LDR one voltage is than LDR 2 voltage
3. If yes then rotate solar panel towards LDR using the DC motor. Display that message on LCD.
4. Check if touch sensor output is detected.
5. If yes then stop the rotation of DC motor. Display that message on LCD.
6. Go to step 3

### LDR (Light Dependent Resistor):

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

A photo resistor or light dependent resistor or cadmium sulfide (CdS) cell is a resistor whose resistance decreases with increasing incident light intensity. It can also be referenced as a photoconductor.

### B) Farmer identification section and Animals and Birds polling section:

The entire functional flow of the system is designed as follows Entire system is farmer field protected from wild animals and Birds using RF technology and sensor based so only authorized farmer can gain access to field. This is the most important segment of the project, i.e. the microcontroller IC89C51

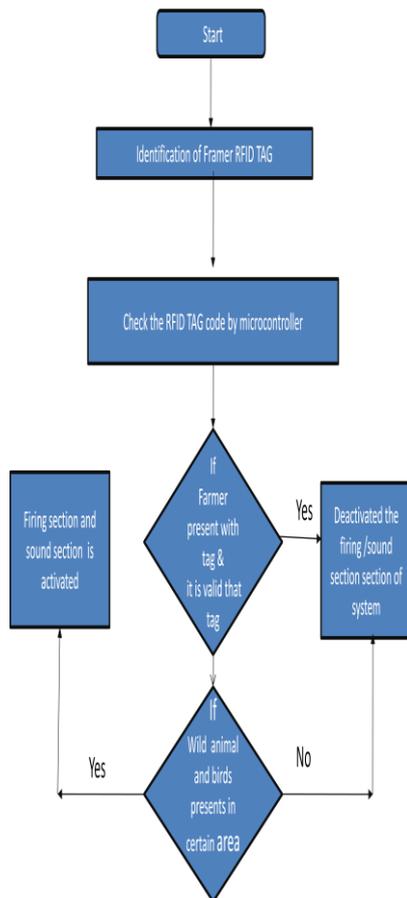


Fig. No.4-Actual working flow

The micro-controller is responsible for detection and polling of the peripherals status. It is responsible for making decisions for opening/closing the FIRING and sound sections. It is responsible for prioritizing all the devices attached to it. We have used the ATME/89V51RD microcontroller. The P89V51RD is a low-power, high-performance CMOS 8-bit microcontroller with 16K bytes of in-system programmable Flash memory. It has got 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and a clock circuitry

## V. CONCLUSION

The system characteristics involve remote controlling of **Animals and Birds polling section and** have many advantages such as availability and ease of farmer.

The system contains low cost components easily available which cuts down the overall system cost.

The ease of deployment is due to wireless mode of communication.

The system integration is simple and is also scalable and extensible.

RF technology capable solution has proved to be controlled remotely, provide security FARMER from wild animals and Birds in field and is cost-effective as compared to the previously existing systems

This paper has presented a means of controlling a sun tracking array with an embedded system. Specifically, it demonstrates a working software solution for maximizing solar cell output by positioning a solar array at the point of maximum light intensity. This project presents a method of searching for and tracking the sun and resetting itself for a new day.

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