# Solar Power Smart Automated Scarecrow

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***Abstract-*** *The present invention provides an apparatus for scaring deer and other unwanted animals away from agricultural crop production areas using unnatural audible and visual stimuli. The invention generally comprises a substantially hollow housing having a removable top portion mounted atop a rigid support frame member. The exterior of the housing includes a plurality of light and sound emitting devices attached thereto, in addition rotatable mounted elongated arms having a hollow interior portion particulate contained therein for producing unnatural sounds upon rotation of such for scaring deer and other unwanted animals away. The interior portion of the housing includes an electronic controller in electrical connection with a power relay for energizing the aforementioned electrical components, along with a motor assembly for imparting rotational motion to the rotatable mounted elongated arms on the exterior of the housing. The apparatus is generally powered by a battery connected to a solar charging panel. In this system motion sensor also interfaced to detect the motion of living body present in sensor region. Whenever sensor detects any motion in farm of any living things then scarecrow starts rotating and produce sound and light flash. In addition to this system a wireless remote also attached so if whenever we want to make continuous rotation and sound then it can be controlled by remote.*

***Keywords***- ATmega328AVR, PIR Sensor, RF Module

## I. INTRODUCTION

In this projects we are using a ATmega 328 AVR microcontroller to control all operation like central processing unit. Microcontroller is a brain of this project. Our main aim of this project to protect crops in agriculture field from deer and wild animals at day or night time. This animals enters to farm at any time and eats crops, so this makes loss for farmers. To avoid this we have implementing automated solar powered scarecrow with rotational and audio visible effect to scare the wild animals. In this system we using a PIR motion sensor to detect motion and presence of any living body near the sensor range. If any motion detected then motion sensor generate the output signal which receives by microcontroller. Microcontroller then activates relays of generating audio signal and light signal, and also activates the motor driver circuit to start gear motor which will rotate the dummy scarecrow. The system is powered by a 12 volt 8 Amp rechargeable battery connected to a 20 watt solar panel with solar charge controller. In addition to this system a wireless remote also attached so if whenever we want to make continuous rotation and sound then it can be controlled by remote and wireless solar powered RF motion detector is also implemented to cover more area because PIR motion sensor detects motion under 25 feet region. We are using 433MHz RF module to send signals wirelessly. RF Modules works under 100 Meter. RF module range can be increase depends on antenna height. Here we have using two wireless motion detectors one RF remote for activate and deactivate system.

## II. MODEL DISCRIPTION

Block Diagram Discription

A] Microcontroller ATmega328AV

The high-performance Atmel 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

B] HT12D And HT12E IC

The HT 12E Encoder ICs are series of CMOS LSIs for Remote Control system applications. They are capable of Encoding 12 bit of information which consists of N address bits and 12-N data bits. Each address/data input is externally programmable if bonded out.

The HT 12D ICs are series of CMOS LSIs for remote control system applications. This ICs are paired with each other. For proper operation a pair of encoder/decoder with the same number of address and data format should be selected. The Decoder receive the serial address and data from its corresponding decoder, transmitted by a carrier using an RF

transmission medium and gives output to the output pins after processing the data\

C] Crystal Oscillator

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency. This frequency is often used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

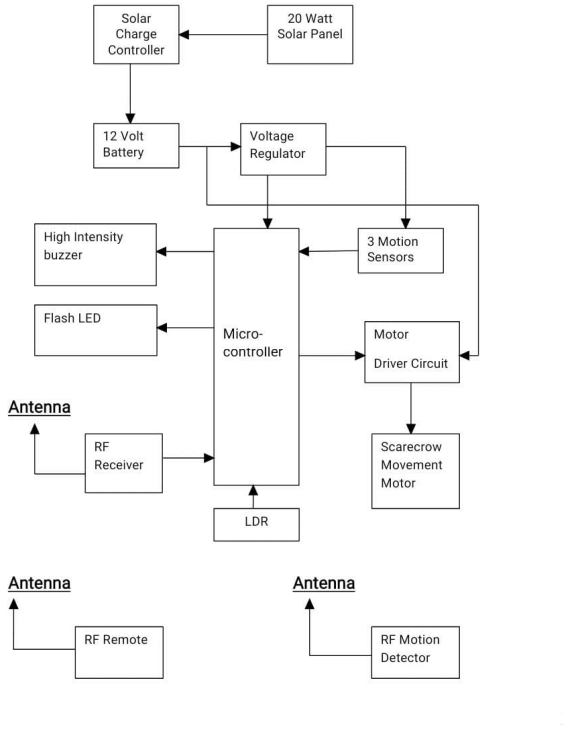


Figure 1: Block diagram complete control model

D] RF Module

In generally, the wireless systems designer has two overriding constraints: it must operate over a certain distance and transfer a certain amount of information within a data rate. The RF modules are very small in dimension and have a wide operating voltage range i.e. 3V to 12V.

Basically the RF modules are 433 MHz RF transmitter and receiver modules. The transmitter draws no power when transmitting logic zero while fully suppressing the carrier frequency thus consume significantly low power in battery operation. When logic one is sent carrier is fully on to about 4.5mA with a 3volts power supply. The data is sent serially from the transmitter which is received by the tuned receiver. Transmitter and the receiver are duly interfaced to two microcontrollers for data transfer.

E] PIR Sensor

The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors.When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.When the warm body leaves the sensing area, the reverse happens, whereby the sensor generates a negative differential change. These change pulses are what is detected.

## III. WORKING

Working of the system (project) is that , if any animals moved fast or any motion created in the range of motion sensor then , it sensed and generate output signal which received by microcontroller activate relay for generating audio signal and light signal and also activate the motor driver circuit to start gear motor which will rotate the dummy scarecrow and produce sound light flash . in addition to this system a wireless remote also attached so if whenever we want continuous rotation and sound then it can be control by remote.

## IV. RESULT

Our research get the observation that, it is one of the best way to help the farmer for making smart farm and also that reduce stress to the farmer.

Pictures of project model –


## V. CONCLUSION

An innovative system solar powered automated scarecrow is developed for agriculture field to protect crops from night animals and thief. The system has three motion sensor, LDR, RF remote and two wireless RF motion detectors which is implemented and working successfully. The motion sensor sensed motion only under 25 feet, so for we have implemented a wireless Motion detector using RF 433 MHz which has 100 meter range so we can cover more area by using multiple wireless motion detectors. The wireless RF motion detector is powered by mini solar panel and rechargeable battery.

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