



SMART PROTECTION SYSTEM TO MANAGE CROP VANDALIZATION USING RENEWABLE ENERGY

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Abstract: The Problem of wild animal attacks on crop field i.e. Crop vandalization is becoming a very common phenomenon nowadays. These attacks causes a lot of damage to crop either by running over them or eating them and vandalizing completely and Village people also lost their lives while they try to banish the animal out of their place, which happen Human-Wildlife Conflict (HWC). It has direct & indirect negative effects as crop loss and livestock loss in India. It is not possible to Barricade entire fields or stay on field 24 hours and guard it. The proposed automatic crop protection system for farmer is less complex and cheaper Farm Watchman Machine (FWM) Protection system. Solar photovoltaic energy supply to NODE MCU32S controller system base circuit is used in this system there for useful for off grid location too.

Keywords- FWM System, NODE MCU32S, IoT, Ultrasonic Sensor, LED, SPV.

I. INTRODUCTION

India is an agrarian region and Agriculture is the strength of economy which plays a vital role in the overall socio-economic factor of India, but because of animal interference in agricultural land, there will be massive loss of crop [1-3]. The increasing news of wild animal raiding agricultural crop during

harvest season shows that this animal can destroy a farmer's livelihood [2]. The important thing is to prevent the animals which moves from the forest into the agricultural land, has become one of the rising factor that affects agriculture. Sometimes people also lost their lives while they try to banish

the animals out of their place [3]. These intruder alerts protect the crop from damaging that indirectly increase yield of the crop. The develop FWM system will not harmful and injurious to animal as well as human beings [4]. For that a particular caution approach i.e. while implementing crop protection ,every farmer should be aware and take into consideration the fact that animal are living creature and need to be protected from any potential harm[5]. Many households continued to experience losses a nation wild study of the HWC around the wildlife reserves across the country has highlight the amount compensated and the perceives losses[6]. To avoid this problem of financial losses is very important to protect agriculture field or farm from animal. The Proposed work have to prevent the entry of animal into the farm. FWM System is used to produce sound and irritated the animal and redirect them. The Proposed design work will not harmful to animal as well as human beings also the use of SPV system to reduce energy bill it is beneficial for poor landholder. The available farm protection systems are comparatively costlier and they require regular maintenance which is difficult for villagers

II. LITERATURE REVIEW

M. Jaya Prabha. et al, in their propose work for overcome the issues of farm vandalization they design system which played sound to scare the animal and birds so they automatically run away [1]. **Sonal D. Khandare.**et al, in there propose work to resolve the issue of wild animal raiding agricultural crop and destroy farmer livelihood this system work on SPV and solar fensing and loud noise system for protection[2]. **Atchaya V.**et al , in their propose work IoT Based farm protection and monitoring system with Noise Repelled device(NDR)[3]. **Mr.D Meganathan** et al, in their propose work with PIC microcontroller with motion sensor to detect and alarm to woo the animal away from field [4].**Omkar Kekre** et al in this propose system work on three layer protection system for crop monitoring and repelled device use to redirect animal from

farmland[5]. **Abhijeet Bayani .** et al, in there propose work visual damage assessment method currently employed for paying compensation to farmer was uncorrelated to and grossly underestimated actual damage[6]. **P.Rekha** et.al, proposed Arduion and GSM based proposed system for farm protection and alert farm owner by sending SMS [7].**Rashmi R** et at, this work presenting the practical approach to protect the farm by YOLO framework which studies the behavior of animal and human, developed by raspberry pi and creating different sound to irritated animal or human and also alert authorized person by sending a message [8]. Farm protection proposed work should be simple to maintenance, as well use off grid so it will reduce electrical bill burden on poor farmer. In this proposed work ultrasonic sensors collect data from agricultural field and send it to Node MCU 32S controller which compared data and take appropriate action by sending signals to circuit.

III. EXISTING SYSTEM

In early days method by erecting human puppets and effigies in their farms, which is ineffective in warding off the wild animals and, though is useful to some extent to ward off birds. The other commonly used methods by the farmers in order to prevent the crop vandalization by animals include building physical barriers, use of electric fences, fire crackles, and manual surveillance various such exhaustive and dangerous methods.

IV. PROPOSED SYSTEM

In this propose system, crop monitoring is done by placing sensors in the agricultural field. In our proposed work ultrasonic sensors is uses sonar to determine distance and movement to any object and send this data to the NODE MCU32S microcontroller which react as brain of project and send acting reaction to the IoT (Internets of things) Wi-Fi module which result as loud Noise from Bhongaspeker for irritating animal and woo away

from farmland at same time it will send SMS to the farm owner. This all system name as farm watchman machine with NODE MCU32S microcontroller. For this system farmer must have Android base cell phone so the app application will develop on that with the help of MIT app inventor. The Fig.1 shows the block diagram of the proposed farm watchman machine for farm protection system to manage crop vandalization.

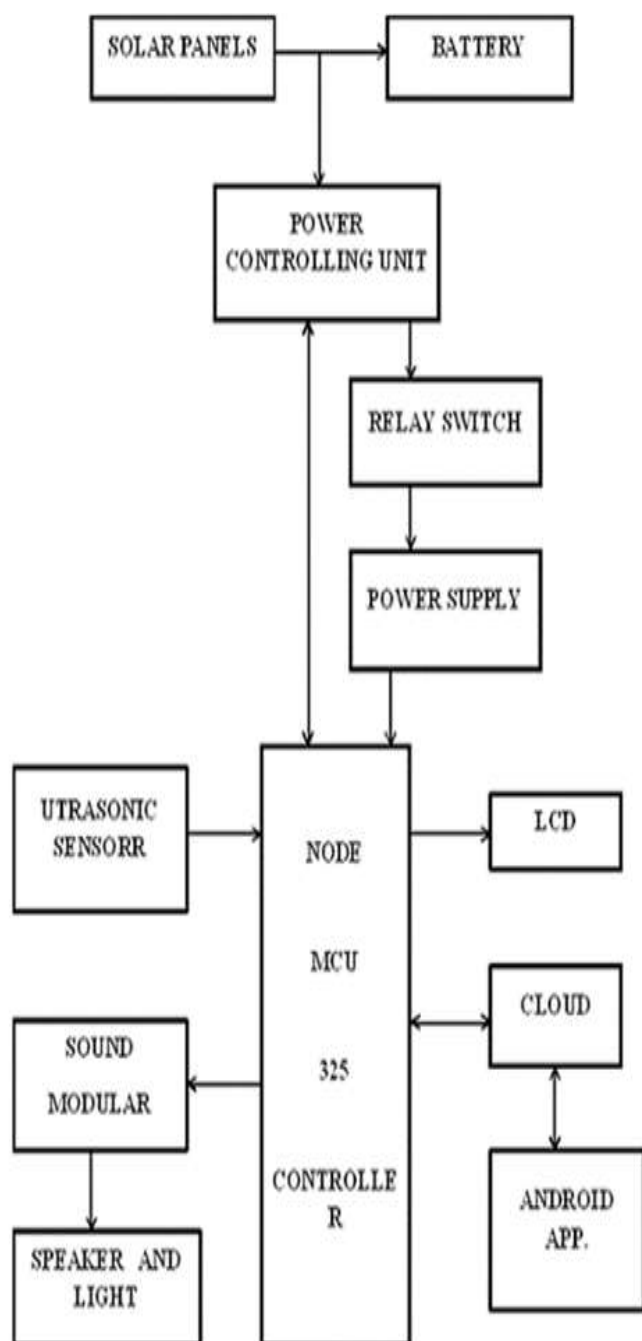


Fig.1 Block diagram for Farm watchman machine System.

V. HARDWARE DETAILS

a) Node MCU 32S:

Node MCU is an open source IoT platform. ESP32 is a series of low cost, low power system-on-chip (SoC) microcontroller integrated Wi-Fi and dual with employs a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, with a clock rate of up to 240 MHz. ESP32 is highly integrated with built-in antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, and power management modules. The device operates between 3.3 volts, 15 mA output current per GPIO Pin, 80 mA average working current, Frequency range 2.4 to 2.5 GHz



Fig. (b): Node MCU 32

b) Ultrasonic sensor:

The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do. It offers excellent non-contact range detection with high accuracy and stable reading in an easy-to-use package. It comes complete with ultrasonic transmitter and receiver module.

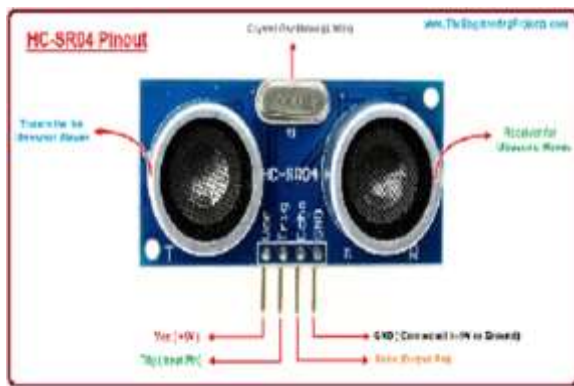


Fig. (C): Ultrasonic sensors

Specification:

Power Supply: +5 V DC
 Quiescent Current: < 2mA
 Working Current: 15mA
 Measuring Angle: 30 degree
 Ranging Distance: 2cm -400 cm/1" -13ft

c) DC Gear Motor



Fig. (d): DC Gear Motor

Motor is device that creates motion, not an engine; it usually refers to either an electrical motor or an internal combustion engine. DC motor -3.5 RPM-12 volts geared motor are generally a simple DC motor with gearbox attached to it. This motor widely used for robotics application, The Geared motor is high quality low cost DC geared motor. It has steel gears and pinions to ensure longer life and better wear and tear properties, motor gives 3.5 RPM at 12V but motor runs smoothly from 4V to 12V and gives wide range of RPM, and torque.

Specification:

DC supply: 4 to 12V
 RPM: 45 at 12V
 No Load Current: 50mA(max) at 12V
 Load Current: 300mA(max) at 12V
 Torque: 5Kg-cm at 12V.

d) Buzzer (Bhonga Speaker)

A Buzzer is a loud noise maker. Which connected with sound modular with different sound like dog barking and fire crackles.

Specification:

Rated Voltage: 6V DC
 Operating Voltage: 4 to 8V DC
 Sound Output at 10Cm* :> 85db
 Tone: Continuous

VI. HARDWARE RESULT:

Once the animal or bird is detected, Speaker will be on and the recorded sound is played for Continuous mode at 15 second interval in between and because of Blynk App application installed on farmer mobile the message travels to the Blynk Cloud and farmer also operate hardware through this app.

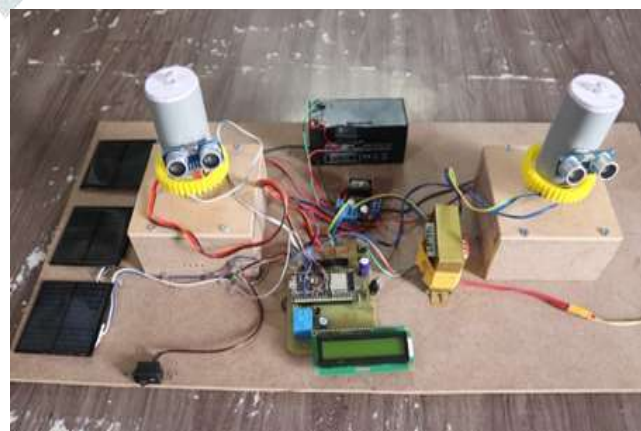


Fig (e). Farm Protection system



Fig (f). Farm Protection system with result analysis on App application and LCD display

VII. CONCLUSION

The problem of crop vandalization by wild animals has become a major problem. It requires urgent attention to prevent crop loss and to reduce financial loss of farmer. Thus this project carries a social relevance as it aims to address this problem. Hence we have designed a farm protection system which is less technologically complex, low cost and solar energy based so electricity consumption. Thus will automatically reduce electricity bill burden on farmer and help them in achieving better crop yields thus leading to their economic wellbeing

VIII. FUTURE WORK

In the future, there will be very large scope, the proposed protection system is planned to develop smart agro wireless communication system to connect with fire sensor, soil moisture sensor for irrigation system, and Temperature sensor in field and web camera functioning to detecting wild animal and for monitoring field.

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