

# Design and Implementation of Elephant Repellent Device in the Areas of Sanamav Reserved Forest and Thali Region in Krishnagiri District

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**ABSTRACT:** Nowadays in most of the villages, farmer lands and crops are destroyed by elephants. In some parts of Tamil Nadu, people died because of the elephants and some people severely injured from elephant and can't be able to lead a normal life. Elephants came to agricultural lands due to the lack of food and drinking water. Some elephants are scattered from the elephant herd and forgot its own path and came to agricultural land and destroys them. In order to prevent agricultural lands from the elephants, we designed a new device using microcontroller, LDR sensor and Bomb and lion sound detection amplifier, which chases the elephants away from the agricultural lands. This repellent device protects the agricultural lands and crops destruction by elephants. This device can be charged by using a 12V battery or using a solar panel. Once the elephant crosses the device, then it produces the noise using the amplifier and sends the message to the nearby district forest officer or owner of the farm land.

**KEYWORDS:** LDR sensor, Pre-loaded amplifier, Solar Panel, Microcontroller.

## I. INTRODUCTION

People who are all living nearer to the forest are using bombs and fire lamps to repel the elephants from the agricultural lands when the elephants are entered to the cultivation areas. This method causes damage for both humans and animals. Hence, we introduced a new concept of elephant repellent by using sensor and microcontrollers. To avoid 24x7 human surveillance, the device is fully automated. The sensor detects the arrival of elephants. Various noises produced from the amplifier in the device which is preloaded. Alert or warning messages is sent to the ranger by using GSM present in the device.

## II. ELEPHANT REPELLENT DEVICE

We introduced a new concept of elephant repellent by using sensor and microcontrollers. To avoid 24x7 human surveillance, the device is fully automated. The sensor detects the arrival of elephants. Various noise produced from the amplifier in the device which is preloaded. Alert or warning messages is sent to the ranger by using GSM present in the device.

## III. IMPLEMENTATION OF REPELLENT DEVICE

### 1PIC16F877A

High-performance RISC CPU, Operating speed: DC - 20 MHz clock input DC - 200 ns instruction cycle, Up to 8K x 14 words of FLASH Program Memory, Up to 368 x 8 bytes of Data Memory (RAM) Up to 256 x 8 bytes of EEPROM data memory, Low-power, high-speed CMOS FLASH/EEPROM technology, In-Circuit Serial

Programming (ICSP), Wide operating voltage range: 2.0V to 5.5V, Commercial and Industrial temperature ranges, Low-power consumption [1].

#### **LDR SENSOR**

A Light dependent resistor is made up of high resistance semiconductor. In the dark, Light dependent resistor can have a resistance as high as several megaohms, while in the light, a light dependent resistor can have a resistance as low as a few hundred ohms. By using this sensor we can detect the elephant crossing, when the continuous beam of laser light is disturbed by the crossover of elephant.

#### **SPEAKER**

A speaker is an electronic amplifier that reproduces low power electronic audio signals such as the signal from radio receiver and powering the signal to strong enough for driving the loudspeakers [2]. Here the speaker is controlled by using the PIC microcontroller. Speaker is preloaded with lion and bombsounds, which is played when the laser beam is disturbed by the elephant.

#### **SOLAR PANEL**

Solar panel is one of the transducer that converts light energy into electrical energy. Photovoltaic modules use light energy (photons) from the sun and generates electricity through the photovoltaic effect. Hence this device is placed in forest areas there is absence of external power supply so we are placing solar panel with this device to produce power itself to operate the device.

#### **LM117 VOLTAGE REGULATOR**

LM117 is linear voltage regulator which regulates voltages below, rather than above the reference. For voltage differences, the energy lost as heat can ultimately be greater than that provided to the circuit. The alternative is to use usually more efficient but has a larger footprint and requires a larger number of associated components.

#### **GSM MODULE**

GSM module is a cellular network, where cell-phone is connected to the forest office for alerting or warning the officers that the elephant is arrived to the cultivation lands [3]. It makes the device fully automated and also it used as anwarning system.

#### **RELAY**

A relay is switch which is operated electrically. Here relay is used to control the circuit of the controller and speaker.

#### **LASER SOURCE**

A Laser source emits light through a process of optical amplification based on the stimulated electromagnetic radiation.

### **IV.METHODOLOGY**

In this project we have used PIC16F877A controller. This device has two parts, one is transmitter and another one is receiver. The transmitter contains the laser source which produces continuous laser beam. The receiver part contains the PIC16F877A microcontroller, LDR sensor, preloaded speaker and LM117 voltage regulator. For the power supply, Solar panel is attached to the device. The device is placed on the path of elephant surveillance. The laser beam produced from the transmitter is continuously fall on the LDR present in the receiver. When the laser source passing through the LDR is disturbed by the elephant, controller gives signal to relay to drive the speaker. The speaker is pre-loaded with Lion and Bomb sound with high decibel range, which is played when the laser beam is disturbed bsy the elephant. The sound produced by the speaker makes elephant to run away from the

place, where the device is placed. For the additional feature and Warning purpose GSM is connected to the device which gives alert message to the forest officers through the network connected to the device.

### ADVANTAGES

No need of human surveillance since the device is fully automated. Warning messages and alerting the people is possible. Detecting of elephant arrival into the land is made without any human intervention. Low power is needed. The device is easily portable and installation process is not complex.

### V. RESULTS AND DISCUSSION

If the elephant crosses between the transmitter and receiver, the laser beam (<400 dB) from the transmitter to the receiver is disturbed. Then the bomb sound produced from the amplifier, repels the elephant away from the agricultural lands. The Range of laser from the transmitter is 34.64 GHz. The noise produced from the speaker is 110 dB. The research and implementation made successfully in the regions of Sanamav Reserved forest and Thali region, Tamilnadu. Elephants are not harmed during the research. Fig 1.2 shows the image of repellent device.



Fig 1: Working Module

### VI. CONCLUSION

This paper, design and implementation of aElephant Repellent Device, alerting and saving the human lives and agricultural lands from the elephants. This device doesn't harm the elephant, it only repels the elephant back to the forest. Since the device is powered using solar, it is eco-friendly and reliable.

### REFERENCES

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