Mini Project Report

on

"Laser Tripwire Security System using Arduino and GSM900A"

Submitted by

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SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY

CERTIFICATE

This is to certify that

PE 46 Abhijeet Bakale
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of T. Y. B. Tech. successfully completed Mini Project in

"Laser Tripwire Security System using Arduino and GSM900A"

to my satisfaction and submitted the same during **Trimester VII, Academic Year 2021-22** as part of **Embedded and Internet of Things Laboratory** course.

Prof. **Sampada Kale**
Course Teacher

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Head of School

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1. Introduction

1.1 Purpose

Security is the most important factor in day to-day life. The need for security is the basic necessity of every individual. The sensation that we are safe and everything around us is fine is imperative for peaceful living. Be that because it may, during this unsafe world, when crime, terror, and dangers are at their pinnacle, how might one achieve that suspicion of safety? Here, a laser security system provides us with an answer and for this reason, more and more people are installing them so as to remain order safe and secure. They once accustomed to being very expensive solutions for security needs. Owing to cost-cutting and fast technological advancements, this type of security system is becoming more pocket friendly. During this project, we've designed Laser Light Security System Using Arduino with Alarm and LED with the applying of Laser Diode Module and Laser sensor module, and for extra Security, an alert system using SIM900A to send SMS alert to the user. Many people secure their homes, office, shops, warehouses, etc with the Tripwire security system of the document, cut and paste into it, and/or use markup styles

1.2 Need/Motivation

A laser tripwire Security system may be a system used for security purposes. It's a large application in fields of security and defence ranging from the protection of a simple household material to an awfully high valued material of a corporation.

1.3 Scope/applications

Can be used to secure homes, office, shops, warehouses, etc
A handy, portable, cost-effective, and highly effective security alarm systems are hugely in demand for security purposes, and thus the given system is often proved useful and effective see able of the above features.

2.Literature Survey

Security could be the most important factor in daily life. Need of security is that the basic necessity of every individual. The Sensation/feeling that we are safe and everything around us is all right is imperative for peaceful living. Be that because it may, during this unsafe world, when crime, terror, and dangers are at their pinnacle, how might one achieve that suspicion of safety? Here, a laser tripwire security system provides us with a solution and for this reason, more and more people are installing them so as to remain to stay safe and secured. Different electronic security systems are often utilized at the house and other significant working spots for security and safety purposes. A laser tripwire Security system/ alarm is a device used for

Safeguard/security purposes. It's a good application in fields of security and defence ranging from the security of a straightforward household material to a very high valued material of an organization. They once accustomed be very expensive solutions for security needs. Attributable to cost-cutting and fast technological advancements, this type of security system is becoming cheaper and more affordable. When the bad guys try to sneak up in the mid night, they kick the wire and pull over, making a rattle that awakens the sleeping good guys, who win the day. A laser tripwire security system works with the identical principle and working. Instead of a string, there's a ray of light surrounding the area, and instead of a can of rocks, there’s an alarm of one sort or another.

3. Requirements

3.1 Hardware

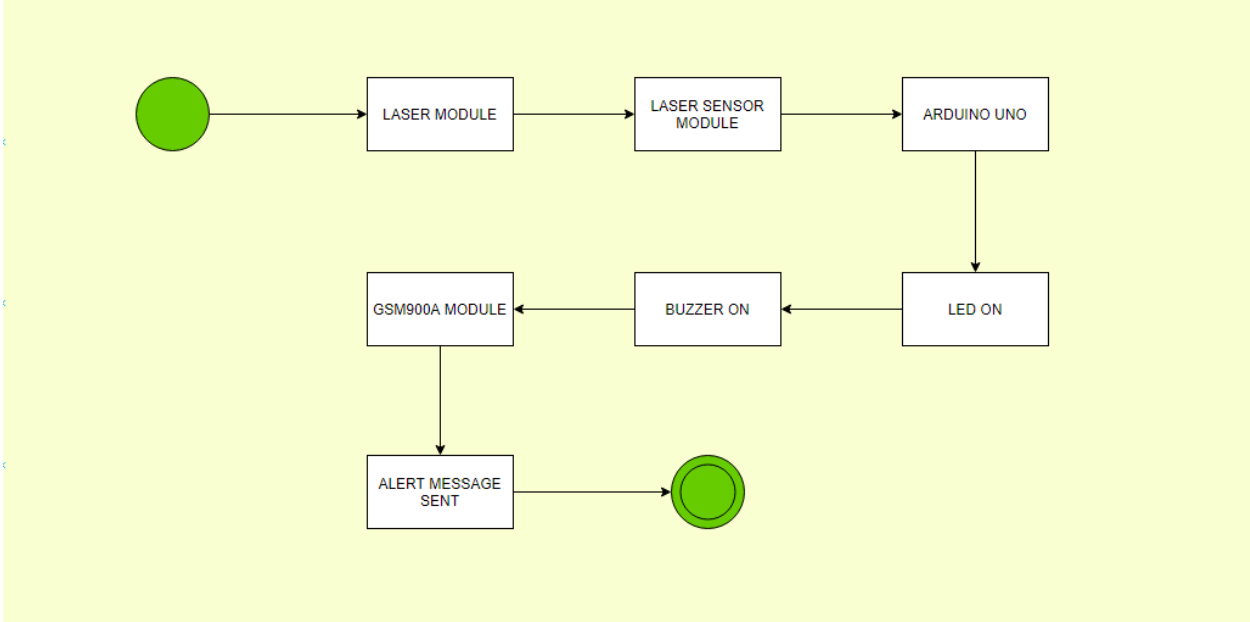
a) Arduino Uno R3
b) SIM900A GSM module
c) Laser Module
d) Laser Sensor
e) Buzzer
f) 3mm LED
g) Breadboards
h) Jumper Cables

3.2 Software

a) Arduino IDE

4. System Architecture

4.1 Block Diagram



4.2 Function/working

Arduino Uno:

The Arduino UNO is that the best board to get started with electronics and coding. If this can be your first experience tinkering with the platform, the UNO is that the most robust board you'll start fiddling with. The UNO is that the most used and documented board of the whole Arduino family

Laser Diode Module:

Laser Transmitter module for Arduino emits a dot-shaped, red light of laser beam. Laser transmitter module consists of a 650nm red laser diode head and a resistor. The specification of Laser Transmitter Module is as follows:

- Operating Voltage – 5V
- Output Power – 5mW
- Wavelength – 650nm

SIM000A GSM Module:

SIM900A Modem is built with Dual Band GSM based SIM900A modem from SIMCOM. It works on frequencies 900MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. SIM900A is an ultra-compact and wireless module. The Modem is coming interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls and ect. through simple AT commands. This is a complete GSM module in a SMT type and made with a very powerful single chip, allowing you to benefit from small dimensions. SIM 900A GSM Modem with serial and TTL outputs.

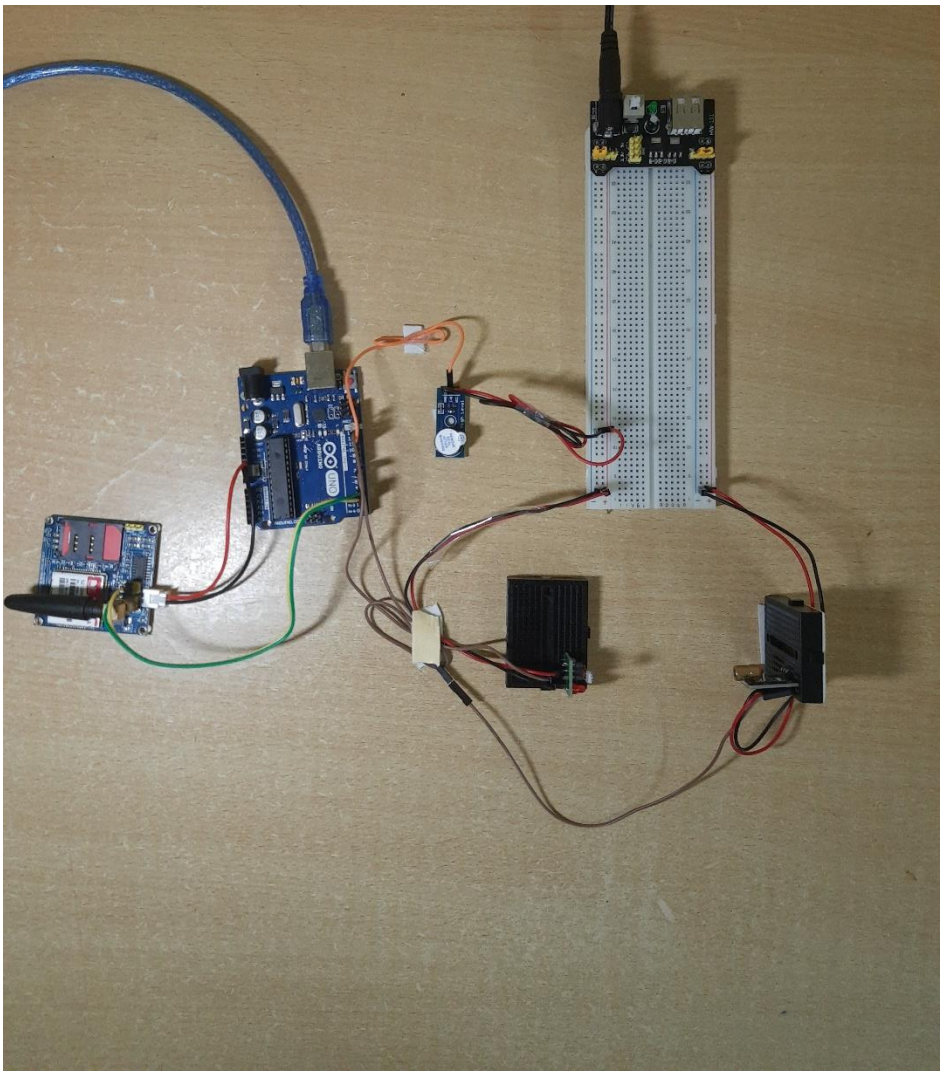
- Quad-Band GSM/ 850/900/1800/1900MHz
- Compatible with arduino, raspberry pi, arm, avr, pic, 8051
- power supply 12v 1amp to 2 amps max

5. Design and Implementation

5.1 Features

Simple small sized design makes it appropriate for small scale security measures and laser moreover provides stealth making the whole system better as security measurement.

5.2 Snapshots:



5.3 Code

```
#include<SoftwareSerial.h>
SoftwareSerial SIM900A(2,3);
int led = 13;
int sensor = A0;
int laser = 12;
int buzzer = 8;

void setup(){
  SIM900A.begin(9600);
  Serial.begin(9600);
  pinMode(led, OUTPUT);
  pinMode(laser, OUTPUT);
  pinMode(sensor, INPUT);
  pinMode(buzzer,OUTPUT);
}

void loop(){
  digitalWrite(laser, HIGH);
  delay(200);
  int sensorReading = analogRead(sensor);
  Serial.println(sensorReading);
  if(sensorReading <900){
    if(Serial.available()>0){
      SendAlert();
    }
    digitalWrite(led, HIGH);
    tone(buzzer, 1000);
    delay(1000);
    tone(buzzer, 1500);
    delay(1000);
    noTone(buzzer);
  }

  else{
    digitalWrite(led,LOW);
  }
}

void SendAlert(){
```

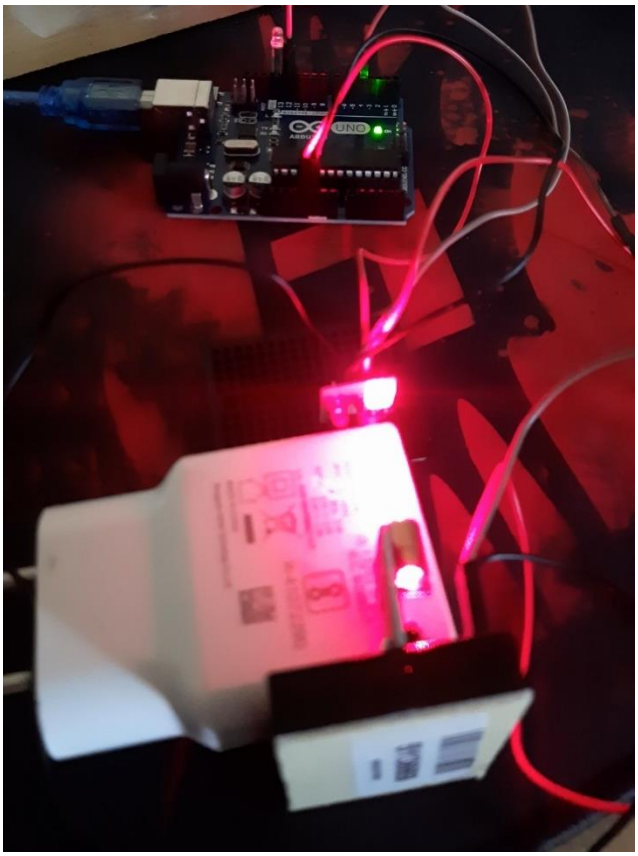
```
 Serial.println("in");
 SIM900A.println("AT+CMFG=1");
 delay(1000);
 Serial.println("senders");
 SIM900A.println("AT+CMGS=\"+919770800886\"\r");
 delay(1000);
 Serial.println("sending");
 SIM900A.println("Intruder Alert!");
 delay(100);
 SIM900A.println((char)26);
}
```

6. Testing and Results

Case 1:

No obstacle, LED off, Buzzer off

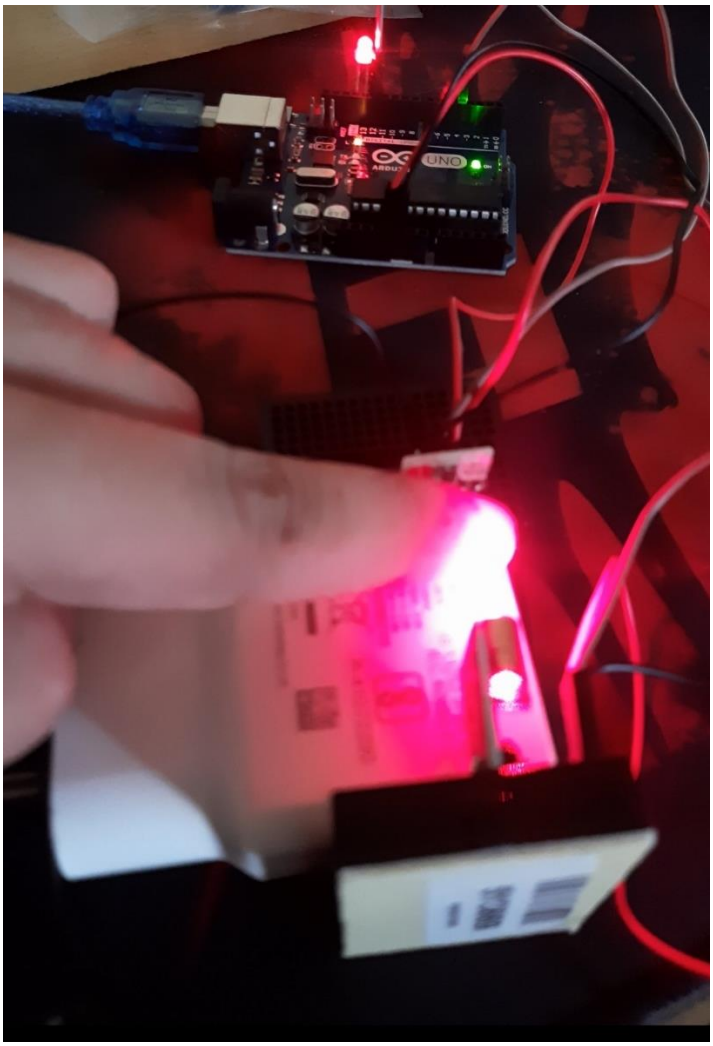
Laser Sensor returning Value ‘HIGH’ (Normal Condition)



Case 2:

Obstacle, LED On, Buzzer On, Alert message “Intruder Alert!” sent to concerned person’s mobile phone

Laser Sensor returning Value ‘LOW’



7. Conclusion

Laser Security System gives us protection from any crime, theft in our standard of living thus individuals are installing them so on to remain sheltered, secure and sound. Various electronic security systems will be used at the house and other important working places for security and safety purposes. It's one among the simple opportunities and source of saving manpower contributing no wastage of electricity. The “Laser tripwire Security System” Pratiksha Pawar, et. al. International Journal of Engineering Research and Applications www.ijera.com ISSN: 2248-9622, Vol. 11, Issue 6, (Series-II) June 2021, pp. 56-59 www.ijera.com DOI: 10.9790/9622-1106025659 59 | P a g e is a very important and helpful system. Using this model/technique

robbery, thefts and crime are often avoided to large extent. Avoiding thieves end up in the protection of our financial assets and thereby their system provides us protection against all. The laser beam and LDR module system is extremely sensitive with a great range of work. The model senses the light emitted by the laser falling over the LDR connected with the circuit. Whenever the beam of laser light is interrupted by any means, it triggers the alarm or siren. This highly reactive approach has low computational requirement therefore it's the similar temperament to surveillance, industrial application, and smart environments.

8. References

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- **https://create.arduino.cc/projecthub/**
- **https://harshsharmatechnicals.com/**
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