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ECS1001 : ENGINEERING CLINICS

LASER TRIP-WIRE ALARM SECURITY

Used for the security purpose using technology

EC ID:220318

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ABSTRACT:

Technology develops day by day within the world. Nowadays the crime gang also improves their technology to hold out their operation. So technology of security should be modern with time to shield the planet from crime. We arrange to make a security issue as our project. During this project, we've got to used a laser ray to hide an outsized area. We all know laser light goes too long distances without scattering effects. Its additional laser beam is just at the source and destination point, in any case invisible. These two properties help us to develop a contemporary security system, which may name as the "Lase Tripwire Security System using Arduino UNO." When somebody or object crossover the laser light, automatically the buzzer starts ringing. The laser ray goes through a long-distance without scattering effect and the ray is almost invisible.

The abstract of this project is to design a Security Alarm using Laser Tripwire. This is based on the principle of voltage divider circuit. When the laser beam continuously falls on the LDR, the voltage drop across it is very low as the resistance of LDR becomes less. As the laser beam is interrupted or disturbed by any object or a barrier the voltage drop across it become high due to change in the LDR's resistance. This triggers the alarm in the circuit. In addition we have added Python controller to control the system and act as an initiator of this system.

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1.INTRODUCTION:

Security is the most important factor in dayto-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. 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. 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 got designed Laser Light Security System Using Arduino with Alarm with the applying of Laser Diode Module KY-008. The project idea revolves around creating a security alarm system using a laser diode module. Whenever any object will obstruct the rays the buzzer alarm will start ringing. This project will be implemented anywhere, not only in buildings or premises but many precious things like jewellery, diamonds, precious antique items within the museum, etc many other things are also are protected using such an invisible ray. 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. Thus, we've designed a security system using a tripwire system with Arduino and sensor, which is handy, portable, cost-effective, and highly effective yet. Such 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.

COMPONENTS FOR THIS PROJECT

Arduino:

- 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.

Fig. 1

LASER KY-008:

Laser Transmitter module KY-008 for Arduino emits a dot-shaped, red light of laser beam. The KY-008 Laser transmitter module consists of a 650nm red laser diode head and a resistor. Handle with caution; don't look directly into the laser head. The specification of Laser Transmitter Module KY-008 is as follows:

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

Fig. 2

LDR MODULE:

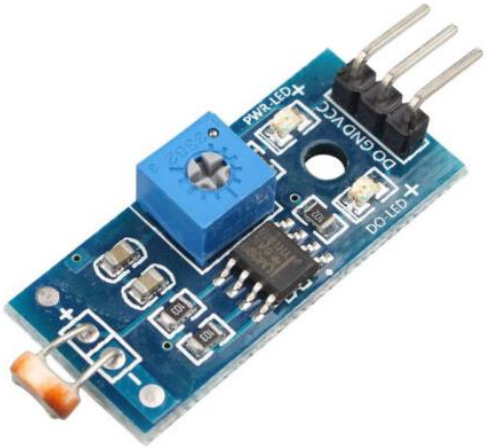

Fig. 3

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- A **LDR module** used for the prototype. By this the project is based on.
- It consist of a LDR, LM393 Comparators, variable Resistor, power LED, output LED.

GSM MODULE:

- GSM module SIM900A is a dual-band GSM/GPRS engine that works on frequencies.

Fig. 4

Fig.5(Adapter)

- Works on frequencies EGSM 900MHz and DCs 1800MHz.
- It comes with a antenna which receives signals to sim which we inserted in the module.

BREADBOARD:

- A bread board may be a rectangular plastic board with a bunch of little holes in it. These holes allow you to simply insert electronic parts to example (meaning to make associated check associate early version of) an electronic circuit, like this one with battery, switch, resistor, associated an LED (light-emitting diode).

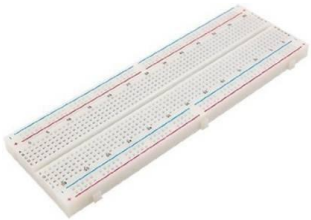


Fig. 6

Register:

Fig. 7

LED:

Fig.8

- To turn on associate LED, the Arduino has to send a HIGH signal to at least one of its pins. To show off the diode, it has to send a low signal to the pin. You'll create the LED flash by dynamical the length of the HIGH and LOW states.

Connecting wires

Fig.9

- Connecting wires permits associate degree electrical current to travel from one purpose on a circuit to a different as a result of electricity desires a medium through that it will move. Most of the connecting wires are created from copper.

plan of action:

- Getting materials required
- Connecting the circuits to Arduino
- Writing code
- Testing and De-bugging the code
- Demonstration

Timeline of Progress

- It takes approximately 30 days to complete

2.BACKGROUND:

Old system:

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.

New System:

In this, we present the speculation on the laser tripwire security system. During this proposed diagram incorporates several blocks like laser module, LDR, buzzer Alarm is connected to our controller. There are three main components to a laser security system: a laser, an Arduino, and a Laser diode module. The laser could be a source of light that puts out a straight line, pencil beam, of light of a single color. The LDR is sensitive to light. The LDR is connected to the Arduino UNO. When the laser beam is interrupted and can't reach the LDR, its voltage output changes, and the circuit senses the change and puts out a warning in the code and then the buzzer starts alert signals. The project basically works on the principle of Laser light Intensity. If by any means the laser light is interrupted the alarm will start unless it is reset with the pushbutton. The laser may be a concentrated light source that puts out a straight beam of light of a single colour. The LDR is sensitive to light and puts out a voltage when the laser light hits it. When the laser beam is interrupted and can't reach LDR, its voltage output changes, and eventually the alarm will ring. By this new model user get an alert as the type of text or else phone call to the user mobile as per the input entered in the code. This may help more to the user privacy and user can access from anywhere.

As you can see that now-a-days the society became very fond of alarms as soon as they listen, most of the people ignore whether it maybe a child's thing. So, from our project it is modified. If user get text from the system, he/she can alert and call the emergency centres if they were not available at the place.

So, by this user can be feel more safe and secure..

3.PROBLEM DEFINITION:

In the case of old models developed based on this prototype, the alert we get from this model is only the buzzer. Now-a-days no one is going to respond for other's problems. So considering this situation we came up with a new model which is a combined project of laser trip wire alarm security, and messaging or calling feature included in this model.

The major agenda behind this model is to improve the security more as compared to previous one so by keeping it in mind we did an addition to last one. By the system, if there is any interrupt in between the laser and LDR the buzzer will make sound and with our additional gsm module the system will automatically make call or text message to the user. So, by this the user can get alert from anywhere and anytime. From this system he can get alert and he can call emergency if user is unavailable at that time. So it is a affordable and secured prototype model for the modern society and life.

4.OBJECTIVES:

1. The main objective for developing this system is:

- To produce security for the house.
- To produce a user-friendly system
- To produce security for bank lockers
- To produce a cost-efficient system.
- To safeguard a valuable item.
- To safeguard the individual from terror and threat within the unsafe world.
- To form and study the functions of the laser security systems.

5.PROCEDURE:

WORKING PRINCIPLE:

CIRCUIT DIAGRAM:

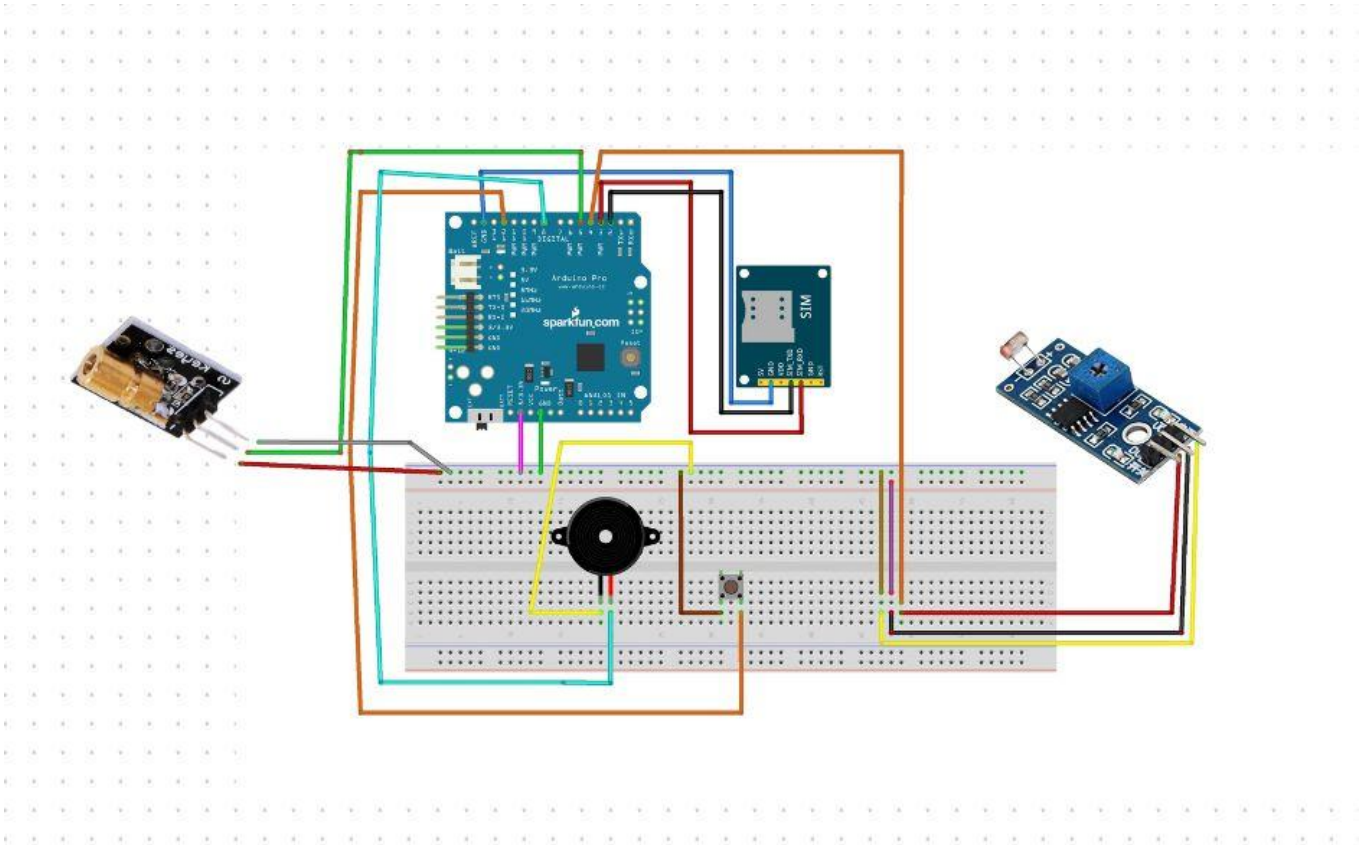


Fig 10:

The main working principle behind this system is in connecting the laser module and ldr to the Arduino using a breadboard from the designated values of Arduino we need to attach the jumper wires and from that we can able to access the buzzer.

Then we need to attach a switch for functioning of buzzer and system. Through the Arduino only we need to attach gsm module as shown in the picture so by attaching the setup as shown in Fig.7. by adding the code required we can make sure for whom the module should text or call by the user interest.

Power supply for the system can be acquired by the power bank of any type and for the power of gsm module we need to use a adapter. By that we can access the module completely and make sure the code is complied properly in the Arduino board.

Since the complete system should be embedded in a small box, Arduino uno is a perfect microcontroller for this purpose because of its dimensions and its work performance.

The module consists of led bulbs which indicates the fluctuations of LDR module and from that it will be visible.

ASSEMBLING OF LASER TRIP-WIRE ALARM SECURITY:

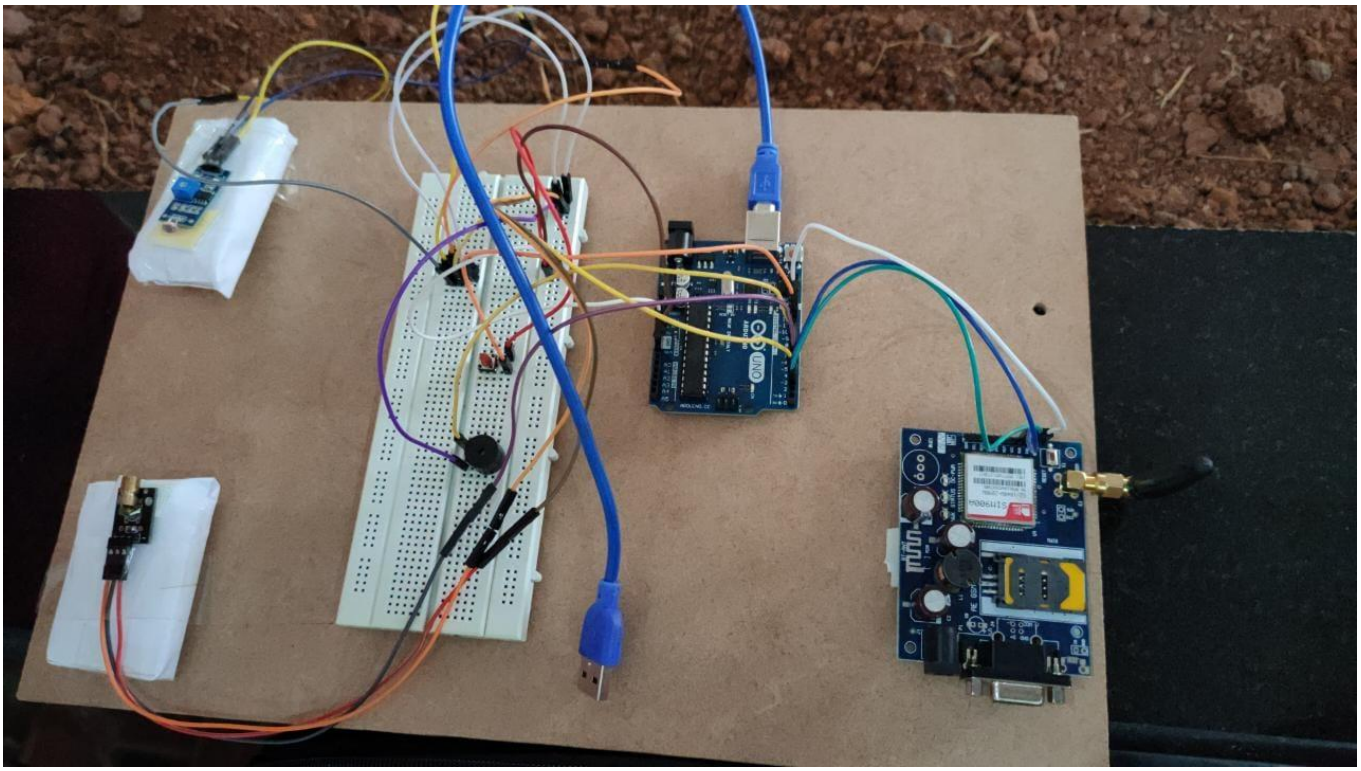
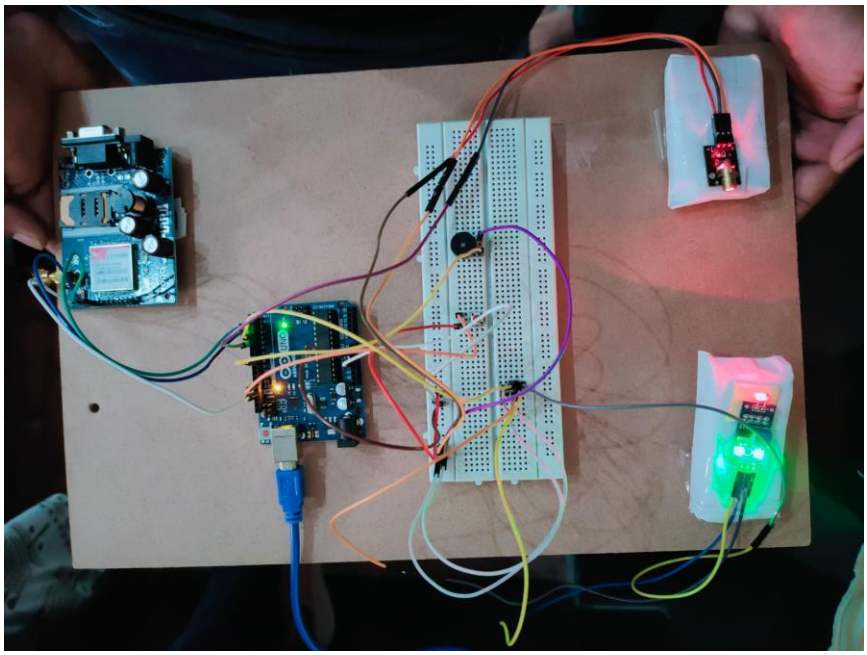


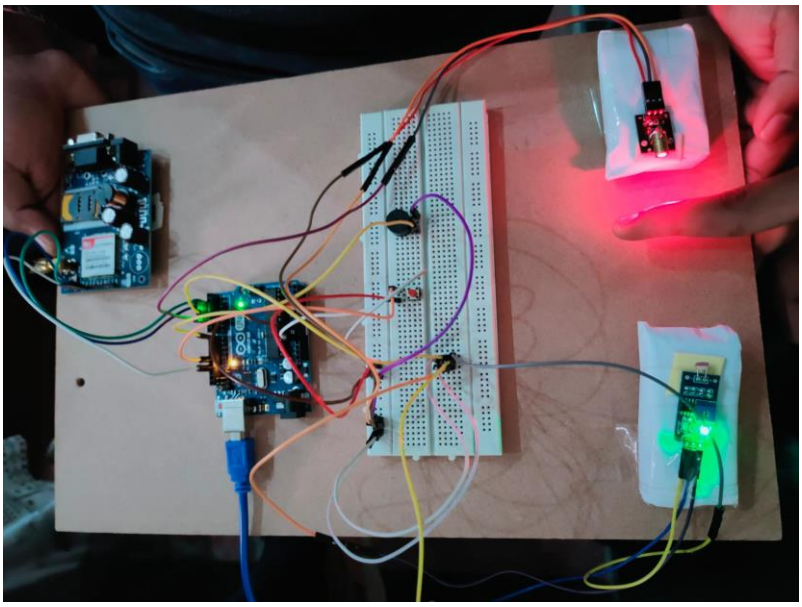
Fig. 10

6.RESULTS AND DISCUSSION:

LDR WITH NO FLUCTUATION



LDR WITH FLUCTUATION



7.CONCLUSION AND FUTURE SCOPE:

7.1 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” 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.

7.2 Future Scope

- We can add camera module so that the camera can make sure the photography of person or object.
- Can be make a more intensified and affective by increasing the LDR modules.
- By placing mirrors according to the makeover plan we can make sure from anywhere any object coming through it will be accessable.

CODE:

```
#include<SoftwareSerial.h>
//Alarm reciever's phone number with country code
//NOTE: Must be your personal phone number here
//this is not gsm module phone number
const String PHONE = "9381655746";
#define rxPin 2
#define txPin 3
SoftwareSerial sim900A(rxPin,txPin);
#define LASER_RECEIVER_PIN 4
#define LASER_TRANSMIT_PIN 5
//fire_flag = 0 means tripwire detected
boolean laser_flag = 0;
#define BUZZER_PIN 8
#define BUTTON_PIN 12
void setup()
{
  //------------------------------------------------------------
  //Begin serial communication: Arduino IDE (Serial Monitor)
  Serial.begin(115200);
  //------------------------------------------------------------
  //Begin serial communication: SIM800L
  sim900A.begin(9600);
  //------------------------------------------------------------
  pinMode(LASER_RECEIVER_PIN,INPUT);
  pinMode(LASER_TRANSMIT_PIN,OUTPUT);
  //by default the LASER Transmitter is ON
  digitalWrite(LASER_TRANSMIT_PIN,HIGH);
  //------------------------------------------------------------
  pinMode(BUZZER_PIN, OUTPUT);
  //by default the BUZZER is OFF
  digitalWrite(BUZZER_PIN,LOW);
  //------------------------------------------------------------
  Serial.println("Initializing...");
  //Once the handshake test is successful, it will back to OK
  sim900A.println("AT");
  delay(1000);
  sim900A.println("AT+CMGF=1");
  delay(1000);
  //------------------------------------------------------------
}
//_____________________________________

//_____________________________________
void loop()
```

```
{
  while(sim900A.available()){
  Serial.println(sim900A.readString());
  }
  int laser_value = digitalRead(LASER_RECEIVER_PIN);
  //The laser trip wire is detected, trigger Alarm and send sms
  if(laser_value == HIGH) {
    digitalWrite(BUZZER_PIN,HIGH);
    //-------------------------------------------------------------
    if(laser_flag == 0) {
      Serial.println("Laser Tripwire Detected.");
      laser_flag == 1;
      make_call();
    }
    //-------------------------------------------------------------
  }
  //No laser tripwire is detected, turn OFF Alarm
  else {
    //Serial.println("Laser Tripwire !Detected.");
    digitalWrite(BUZZER_PIN,LOW);
    laser_flag = 0;
  }
}
void make_call()
{
    Serial.println("calling....");
    sim900A.println("ATD"+PHONE+";");
    delay(20000); //20 sec delay
    sim900A.println("ATH");
    delay(1000); //1 sec delay
}
```

REFERENECES:

- https://create.arduino.cc/projecthub/ianabcumming/arduino-laser-tripwire-31e473?ref=search&ref_id=laser%20trip%20wire&offset=0
- https://www.youtube.com/watch?v=64m5mRouaXY