

Smart Security Alarm
Design Engineering Project Report
Submitted by

Name	Enrollment No.
Parmar Tirth	200170111040
Solanki Devang	200170111020
Patel Vinit	200170111002
Parmar Hardik	200170111067

Electronics & Communication Engineering
Vishwakarma Government Engineering College, Chandkheda



Gujarat Technological University, Ahmedabad
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**Vishwakarma Government
Engineering College, Chandkheda,
Ahmedabad**



CERTIFICATE

This is to certify that the project report submitted along with the project entitled Smart Security Alarm has been carried out by Team (361273) under my guidance for Design Engineering 1-B in Electronics and communication, 4th Semester of Gujarat Technological University, Ahmedabad during the academic year 2021-22.

Internal Guide

Head of the Department

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We would like to express our gratitude towards all the teaching and nonteaching staff of the department, who has contributed their precious time and efforts to help us in completing this Project work. We would like to thank our all team Members for their support throughout this design engineering project.

Date:10/05/2022	200170111040	Parmar Tirth
VGEC, Chandkheda, Ahmedabad	200170111020	Solanki Devang
	200170111002	Patel Vinit
	200170111067	Parmar Hardik

Abstract

The objective of this project is to design a Laser & LDR based Security system. This is based on the principle of voltage divider circuit. when the laser beam continuously falls on the LDR, the voltage drops across it is very low as the resistance of LDR becomes less. As the laser beam is intercept by any means of object or a barrier the voltage drops across it becomes high due to change in the LDR resistance. This project is very simple and helped us to learn more about the components we generally use in our labs and has increased our knowledge to a certain extend.

Chapter 1 Introduction

1.1 Introduction

Need of security is the basic necessity of any individual. The feeling that we are safe and secure around us is all right is imperative for a peaceful living. But in this unsafe world, when crime, error and threats are on their peak, how can one attain that sense of security? Here, laser security system provides us with a solution and for this reason more and more people are installing them in order to stay safe and secure. Various electronic security systems can be used at home and other important working places for security and safety purposes.

Laser Security alarm is a device used for security purposes. It has a wide application in fields of security and defence starting from the security of simple household material to a very high valued material of an organization. They once used to be expensive solutions for security needs. In this owing to cost cutting and fast technological advancements this form of security system is becoming more affordable.

1.1.1 The Principles of Laser Security Systems

There are three essential components to a laser security system: a laser, a detector and sensing circuit. The laser is a concentrated light source that puts out a straight line, pencil beam, of light of a single colour. The detector is sensitive to light and puts out a voltage when the laser light hits it. The detector is connected to the sensing circuit. When the laser beam is interrupted and can't reach the detector, its voltage output changes, and the circuit sense the change and put out a warning signal.

1.1.2 Lasers

Lasers differ front other light sources in a few significant ways. There are two features that are important for security systems. Unlike a lightbulb or flashlight, laser light doesn't spread out, it in a narrow beam. And laser light is essentially a single colour. Because laser light doesn't spread much, you can send it a long way and still have enough energy in a small area to trigger the security system detector.

1.1.3 System Layout

Laser light travels in a straight line. If you just wanted to protect the front of your yard, putting laser at one corner and the detector at the other corner would do the job. If the beam is interrupted anywhere between the laser and the detector, the electronics will find out the warning signal.

1.1.4 Warning Signal

Laser security systems are available in many configurations, with many levels of sophistication. There are do-it-yourself kits that will buzz or ring when the beam is interrupted. The electronics also can be set to trigger an auto-dial that contacts local law enforcement or a monitoring company. The electronics can also trigger the exterior lights of the house to flash, helping police locate the house where the alarm has been triggered.

1.2 Literature Review

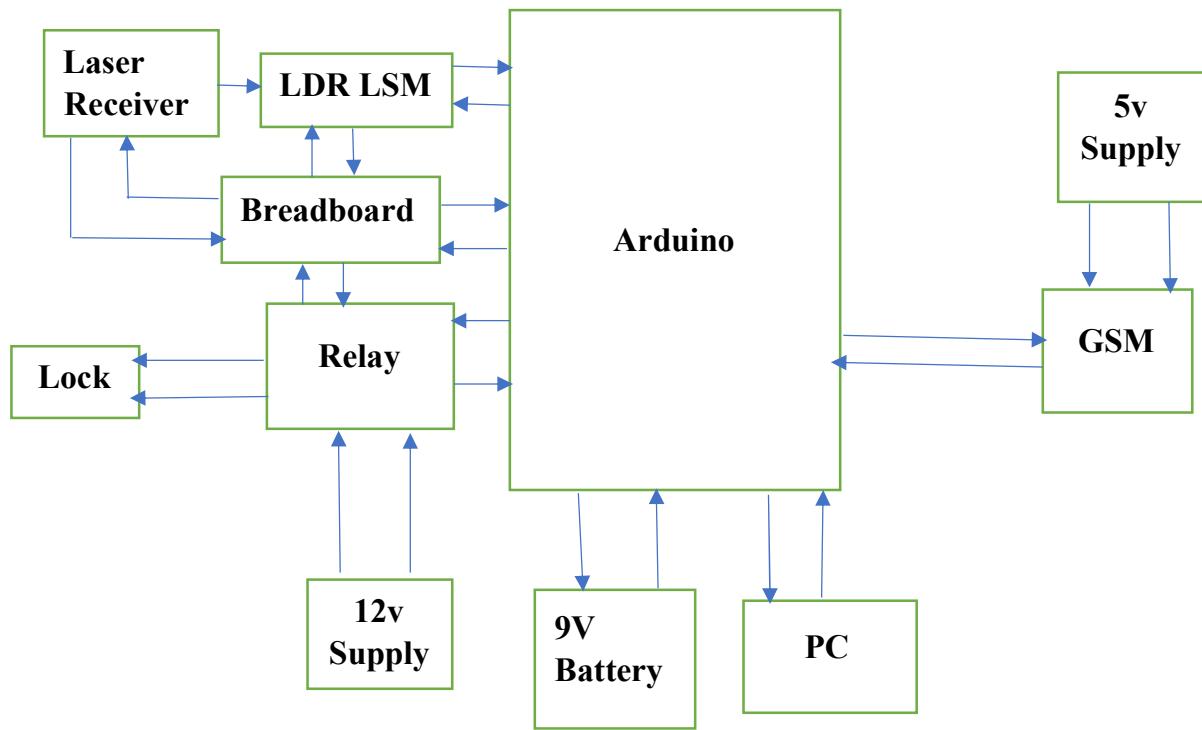
The earliest security system comes from the early 1990's. They were very expensive at that time and hard to monitor an intrusion. Now the technology has developed very much more than the old days. Laser security systems are also known as burglar alarm systems. In most common security system laser and light dependent resistor are used. This system is easy to construct and install. Nowadays lots of advanced security systems such as LDR based security system, temperature detecting based security system, infrared security system, etc. have come into existence. Among them this system is simple and effective too.

1.3 Objective

The core objective of this project is to design a smart security alarm with laser and light sensor module, which will protect the individuals from crime, terror and threats in unsafe world in order to stay safe and secure.

Chapter 2 Project Details

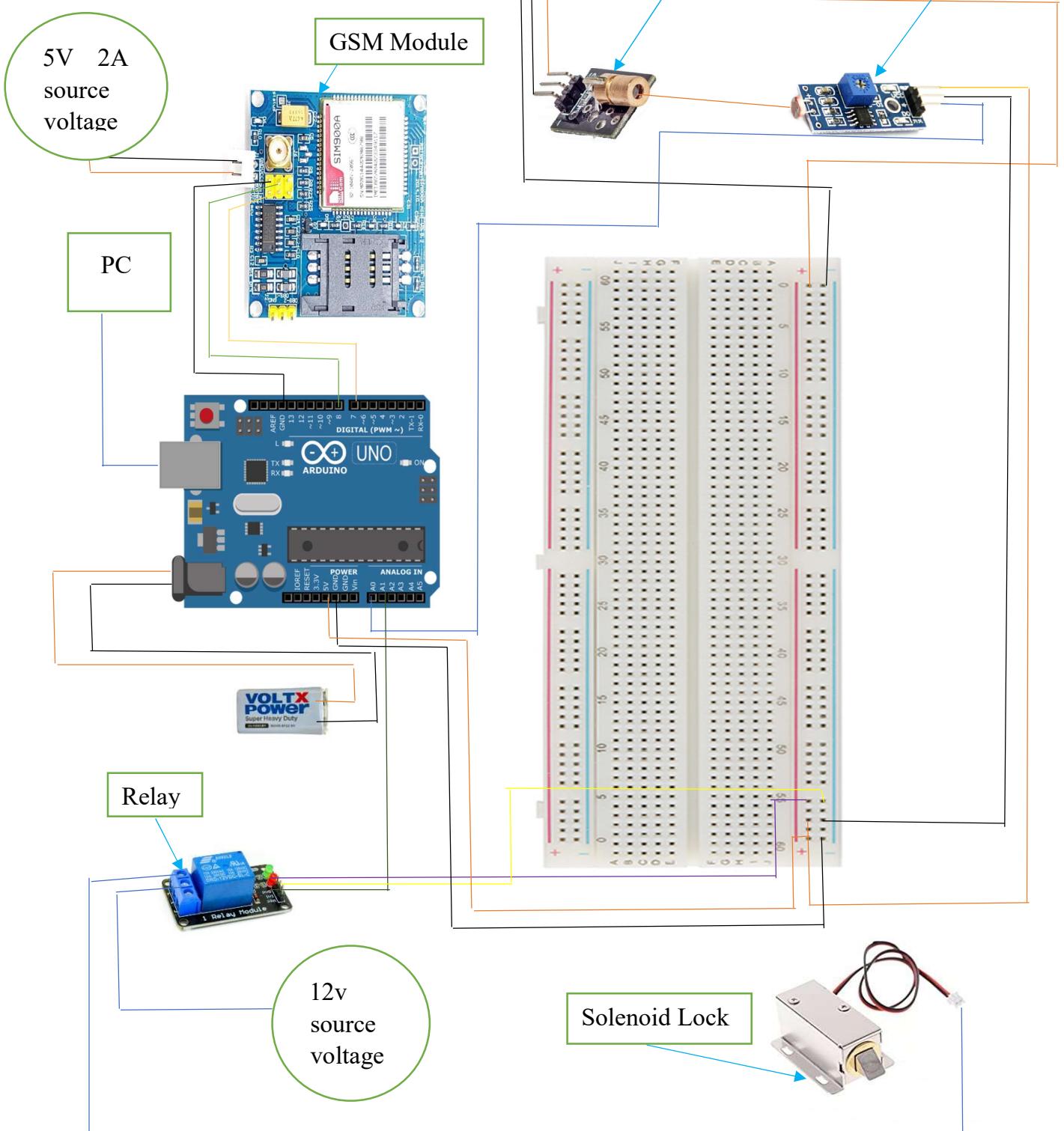
2.1 Block Diagram



2.2 Components used in the circuits:

Arduino	1	Receiver	1
Power supply	2	GSM	1
Lock	1	Relay	1
Transistor	1	Diode	1
Laser	1		

2.3 Circuit Diagram



Chapter 3 Description Of Components

3.1 LASER

A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The word "laser" is an acronym for "light amplification by stimulated emission of radiation ". The first laser was built in 1960 by Theodore Maiman at Hughes Research Laboratories, based on theoretical work by Charles Hard Townes and Arthur Leonard Schawlow.

A laser differs from other sources of light in that it emits light which is coherent. The spatial coherence allows a laser to be focused to a tight spot, enabling applications such as laser cutting and lithography. The spatial coherence also allows a laser beam to stay narrow over great distances, enabling applications such as laser pointers and lidar (light detection and ranging). Lasers can also have high temporal coherence, which allows them to emit light with a very narrow spectrum.

3.1.1 Applications of Lasers

Laser is an optical device that generates intense beam of coherent monochromatic light by stimulated emission of radiation.

Laser light is different from an ordinary light. It has various unique properties such as coherence, monochromaticity, directionality, and high intensity. Because of these unique properties, lasers are used in various applications.

The most significant applications of lasers include:

- Lasers in medicine
- Lasers in communications
- Lasers in industries
- Lasers in science and technology
- Lasers in military

3.2 LDR Light Sensor Module

The LDR Sensor Module is used to detect the presence of light / measuring the intensity of light. The output of the module goes high in the presence of light and it becomes low in the absence of light. The sensitivity of the signal detection can be adjusted using potentiometer.

3.2.1 Features

- Can detect ambient brightness and light intensity
- Adjustable sensitivity (via blue digital potentiometer adjustment)
- Operating voltage 3.3V-5V
- Output Type
 - Analog voltage output -AO
 - Digital switching outputs (0 and 1) -DO
- With fixed bolt hole for easy installation
- Small board PCB size: 3cm * 1.6cm
- Power indicator (red) and the digital switch output indicator (green)
- Using LM393 comparator chip, stable

3.2.2 Pin outs

- External 3.3V-5V VCC
- External GND
- DO digital output interface, a small plate (0 and 1)
- AO small board analog output interface

3.2.3 How to use

- Photosensitive resistor module most sensitive to environmental light intensity is generally used to detect the ambient brightness and light intensity.
- Module light conditions or light intensity reach the set threshold, DO port output high, when the external ambient light intensity exceeds a set threshold, the module DO output low.
- Digital output DO directly connected to the MCU, and detect high or low TTL, thereby detecting ambient light intensity changes.
- Digital output module DO can directly drive the relay module, which can be composed of a photoelectric switch.
- Analog output module AO and AD modules can be connected through the AD converter, you can get a more accurate light intensity value.

3.3 Arduino

Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Its hardware products are licensed under a CC BY-SA license, while software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),^[1] permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially from the official website or through authorized distributors.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the Arduino language, inspired by the Processing language and used with a modified version of the Processing IDE. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE).

The Arduino project began in 2005 as a tool for students at the Interaction Design Institute Ivrea, Italy,^[2] aiming to provide a low-cost and easy way for professionals to create devices that interact with their environment using sensors and actuators. The examples of such devices intended for beginner hobbyists include simple robots, thermostats and motion detectors.

3.4 IDE

The Arduino integrated development environment (IDE) is a cross-platform application (for Microsoft Windows, macOS, and Linux) that is written in the Java programming language. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus. The source code for the IDE is released under the GNU General Public License, version 2.^[3]

The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

From version 1.8.12, Arduino IDE windows compiler supports only Windows 7 or newer OS. To run IDE on older machines, users can either use version 1.8.11, or copy "Arduino - builder" executable from version 11 to their current install folder as it's independent from IDE.^[4]

3.5 GSM

SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. It is common with Arduino and microcontroller in most of embedded application. The module offers GPRS/GSM technology for communication with the uses of a mobile sim. It uses a 900 and 1800MHz frequency band and allows users to receive/send mobile calls and SMS. The keypad and display interface allows the developers to make the customize application with it. Furthermore, it also has modes, command mode and data mode. In every country the GPRS/GSM and different protocols/frequencies to operate. The command mode helps the developers to change the default setting according to their requirements.

3.5.1 SIM900A GSM Module Pin Configuration Description

3.5.1.1 GPIO Pins

The GPIO pins help to perform the simple and advance I/O function. All pins give the maximum output equal to the power supply which is useable to control most of the devices like sensors and other modules. All GPIO pins in SIM900A are:

(1) GPIO Pins Table

GPIO1 Pin40	
GPIO2 Pin41	
GPIO3 Pin42	
GPIO4 Pin43	
GPIO5 Pin44	Keypad interface [ROWS & COLUMNS]
GPIO6 Pin47	
GPIO7 Pin48	
GPIO8 Pin49	
GPIO9 Pin50	
GPIO10 Pin51	
GPIO11 Pin67	General Purpose Input/output
GPIO12 Pin68	General Purpose Input/output

3.5.1.2 Status Pins

The module has two status pins which help to indicate two different kinds of status. The first one is the working status of the module and the second for communication status. Net status means either the module is connecting to the network or other network functions, etc. Both these pins can't operate LED directly. They always act with a combination of a transistor.

(2) Status Pins Table

STATUS Pin52	Indicate working status
NIGHTLIGHT Pin66	Indicate net status

3.5.2 SIM900A Display Interface Pins

The device offers a 4 pin display interface with itself. The display isn't necessary, it is only in case of requirement. The use of interface helps to get the visualization with the module and make it an application. All display pins are:

(3) SIM900A Display Interface Pins Table

DISP_DATA Pin12	For Display Data
DISP_CLK Pin11	For Clock Input
DISP_CS Pin14	To enable the display
DISP_D/C Pin13	To select between data and command

3.5.2.1 I2C Pins

SIM900A has multiple kinds of communication and I2C is one of them due to its popularity. The module has a single I2C protocol pin, which helps to build the application with any module with that communication.

(4) I2C Pins Table

SCL Pin38	Serial Clock
SDA Pin37	Serial Data

3.5.3 SIM900A GSM Module Keypad interface Pins

The two-pin keypad is interfaceable with the module. The module will take the keypad data as a 2D matrix value from the KCB pins for each value. The keypad interface pins in the module are:

(5) SIM900A GSM Module Keypad interface Pins Table

KBR0~KBR4 (ROWS) Pin40~Pin44	Keypad interface [ROWS]
KBC0~KBC4 (COLUMN) Pin47~Pin51	Keypad interface [COLUMNS]

3.5.3.1 Serial Port

The UART serial interface uses the two pins for proper data communication, which are RX and TX. Both pins have no independence on any other pins or modules. In SIM900A these pins are available but it also has some other pins for status/indication of data. By combining these pins, the serial port helps to generate the RS-232 connector too. All the serial pins are:

(6) Serial Port Table

RXD Pin10	Receive data
TXD Pin 9	Transmit data
RTS Pin8	Request to send
CTS Pin7	Clear to send
RI Pin4	Ring indicator
DSR Pin6	Data Set Ready
DCD Pin5	Data carry detect
DTR Pin3	Data terminal Ready

3.5.3.2 Debug Interface

Debugging helps the developers to debug the module and update its firmware. In this module, there are separate serial interface pins for debugging. Both pins are:

(7) Debug Interface Table

DBG_TXD Pin27	For Data Transmission
DBG_RXD Pin28	For Data receiving

3.5.3.3 SIM Interface

As we know that module SIM900A is a GPRS/GSM module. The module is dependent on some devices for some of its features. The most important one is the SIM. The SIM needs to connect with the module for GPRS/GSM functions to fully operate. All the sim interface of the module is:

(8) SIM Interface Table

SIM_VDD Pin30	Voltage supply for SIM card
SIM_DATA Pin31	SIM data output
SIM_CLK Pin32	SIM clock
SIM_RST Pin33	SIM reset
SIM_PRESENCE Pin34	SIM detect

3.5.3.4 Audio Interface

The audio interface will help to connect the mic and speaker with SIM900A. The connection of Line, Audio and Speaker will help to make the calls through the modules.

(9) Audio Interface Table

MIC_P Pin19	Microphone Positive
MIC_N Pin20	Microphone Negative
SPK_P Pin21	Speaker Positive
SPK_N Pin22	Speaker Negative
LINEIN_R Pin23	Right Channel input
LINE_L Pin24	Left Channel Input

3.5.3.5 Control Pin

There is power on pins on the device, which helps to turn it on using external signals. There are two power on pins. The first one is PWRKEY which requires a LOW signal to power on/off the system. To do that, the pins require an input signal for a little bit long time. The second pin is PWRKEY_OUT, which gets short with the PWRKEY pin and turn on/off the device.

(10) Control Pin Table

PWRKEY Pin1	Voltage input for PWRKEY. PWRKEY should be pulled low to power on or power off the system.
PWRKEY_OUT Pin2	For short time then release also can power on or off the module.

3.5.3.6 Reset pin

The device has an external LOW input signal reset pin to reset the device with the use of an external signal.

3.5.4 SIM900A GSM Module RF Antenna

To extend the range of the SIM900A the antenna pin needs to connect with an external wire. The official antenna is also available for the module.

(11) SIM900A GSM Module RF Antenna Table

NRESET Pin16	External reset input
RF_ANT Pin60	Antenna connection

3.5.4.1 Power Pins

The module SIM900A has multiple types of power pin. Some works as input and some as output. The most important one to understand is VRTC, which acts as a backup for the internal RTC of the device. All power and ground pins of the module are:

(12) Power Pins Table

VBAT(Input) Pin55, Pin56, Pin57	Three VBAT pins are dedicated to connect the supply voltage.
VRTC (Input/Output) Pin26	Current input for RTC when the battery is not supplied for the system
VDD_EXT(OUTPUT) Pin15	2.8V output power supply
GND Pin17	Ground

Applications

- The module is the best application to design a graphic for Voice call and SMS application.
- Some IoT applications, mostly in an emergency have the module.
- The location tracing system also uses SIM900A.
- SIM900A can use for mobile communication.

3.6 SOLENOID LOCK

The solenoid lock denotes a latch for electrical locking and unlocking. It is available in unlocking in the power-on mode type, and locking and keeping in the power-on mode type, which can be used selectively for situations. The power-on unlocking type enables unlocking only while the solenoid is powered on.

A door with this type is locked and not opened in case of power failure or wire disconnection, ensuring excellent safety. This type is used mainly for places requiring crime prevention. The power-on locking type can lock a door while the solenoid is powered on. If the power is disconnected, the door is unlocked. This type unlocks the door in case of wire disconnection due to a fire or accident, and it is used for emergency exits through which fire-fighting activity or evacuation should preferentially be made rather than safety for crime prevention

3.7 Relay

A Relay is a simple electromechanical switch. While we use normal switches to close or open a circuit manually, a Relay is also a switch that connects or disconnects two circuits. But instead of a manual operation, a relay uses an electrical signal to control an electromagnet, which in turn connects or disconnects another circuit. Relays can be of different types like electromechanical, solid state.

Electromechanical relays are frequently used. Let us see the internal parts of this relay before knowing about its working. Although many different types of relay were present, their working is same.

Every electromechanical relay consists of an:

- Electromagnet
- Mechanically movable contact
- Switching points and
- Spring

Electromagnet is constructed by wounding a copper coil on a metal core. The two ends of the coil are connected to two pins of the relay as shown. These two are used as DC supply pins.

Generally two more contacts will be present, called as switching points to connect high ampere load. Another contact called common contact is present in order to connect the switching points.

These contacts are named as normally open (NO), normally closed (NC) and common (COM) contacts.

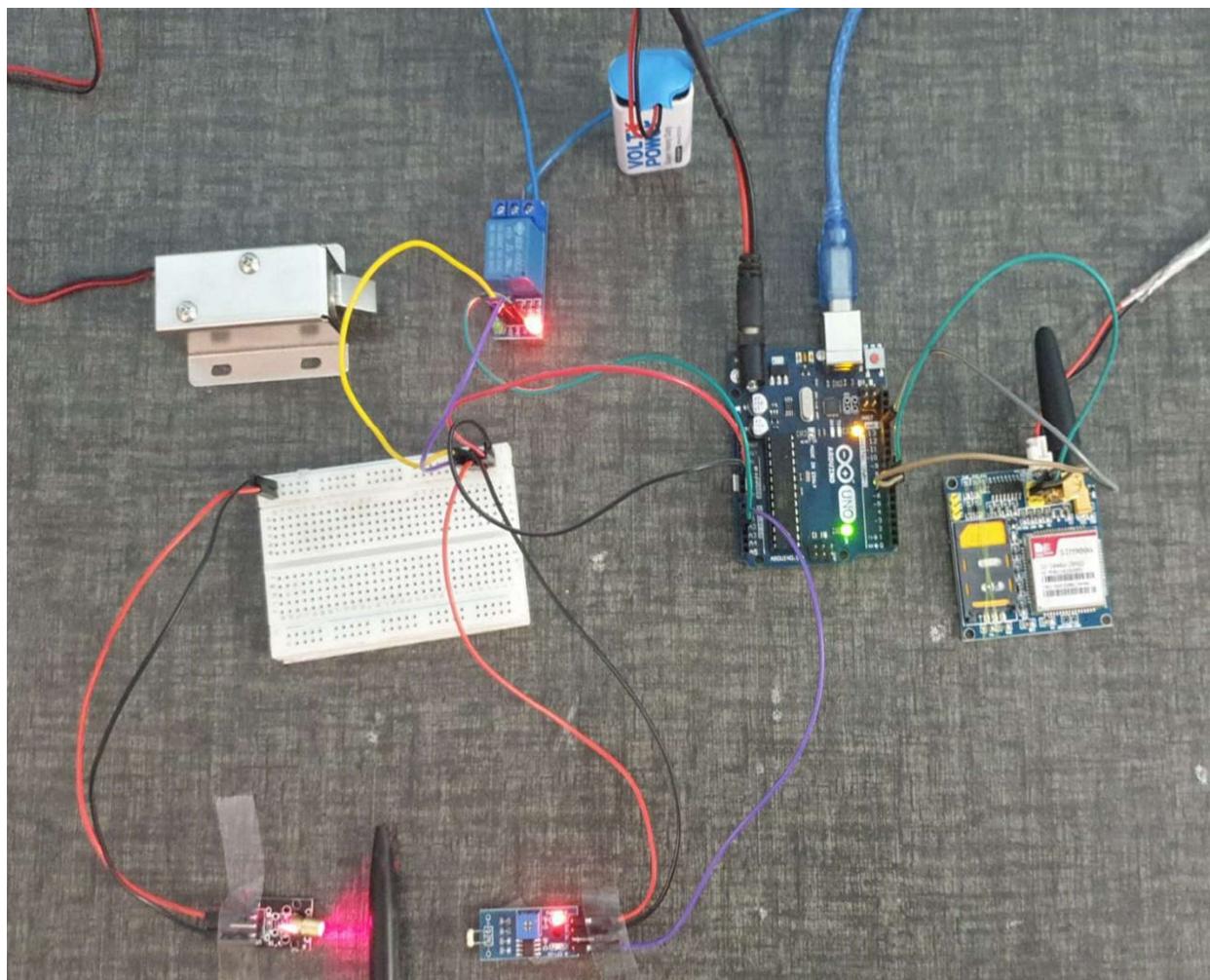
We can use a Relay either in an AC circuit or a DC Circuit. In case of AC relays, for every current zero position, the relay coil gets demagnetized and hence there would be a chance of continuous breaking of the circuit. So, AC relays are constructed with special mechanism such that continuous magnetism is provided in order to avoid above problem. Such mechanisms include electronic circuit arrangement or shaded coil mechanism.

Chapter 4 Results & Discussion

In our project Laser and LDR is the core of the laser security system. when the laser beam falling over the LDR continuously is interrupted by the object in the field of laser. Hence the LDR develops an output voltage and the message of an interrupt goes to mobile phone using GSM. After this process the lock of home is locked automatically using solenoid lock in this way it can reduce the problem of thief and intruders in our day to day life and it also helps in reducing manual works as this circuit is automatically operating one.

The Laser Security System has been successfully designed and developed. The message in mobile phone is turned on as the laser beam falling on the LDR is interrupted. The experimental model was made according to the circuit diagram and the result were as expected.

The LDR has to be placed in dark place or inside a case so that the other sources of light except the laser beam doesn't affect the LDR. This helps the circuit to work faster and properly. This is beneficial for the advanced protection over a very small objects.



(1) Photograph of the Prototype

Chapter 5 Conclusion

Laser security system provides us the security against any criminal, theft in our day to day life so people are installing them in order to stay safe, secure and sound. The various electronic security systems can be used at home and other important working places for security and safety purposes. It is a great opportunity and source of saving man power contributing no wastage of electricity. The "Laser Security System" is an important helping system. Using this system robbery, thefts & crime can be avoided to large extend. Avoiding thieves results in the safety of our financial assets and thereby this system provides us protection against all. The Laser & LDR system is highly sensitive with a great range of working. The system senses the light emitted by the Laser falling over the LDR connected with the circuit. Whenever the beam of light is interrupted by any means, it triggers the alarm or siren. This highly reactive approach has low combinational requirement, therefore it is well suited to surveillance, industrial application and smart environments.

5.1 Advantages and Disadvantages

Laser security systems have many advantages. They are simple to install and can be used effectively inside or outside a home. The systems can be used as a highly effective perimeter alarm for property boundaries or even for pools, where customers can have the lasers set to detect when small children come within a set number offset front the edge of the water. The smart security alarms can be prohibitively expensive while some security system plans allow for customers to target one room, plans that protect large number of land or an entire house will cost much more and can be difficult for many customers to afford.

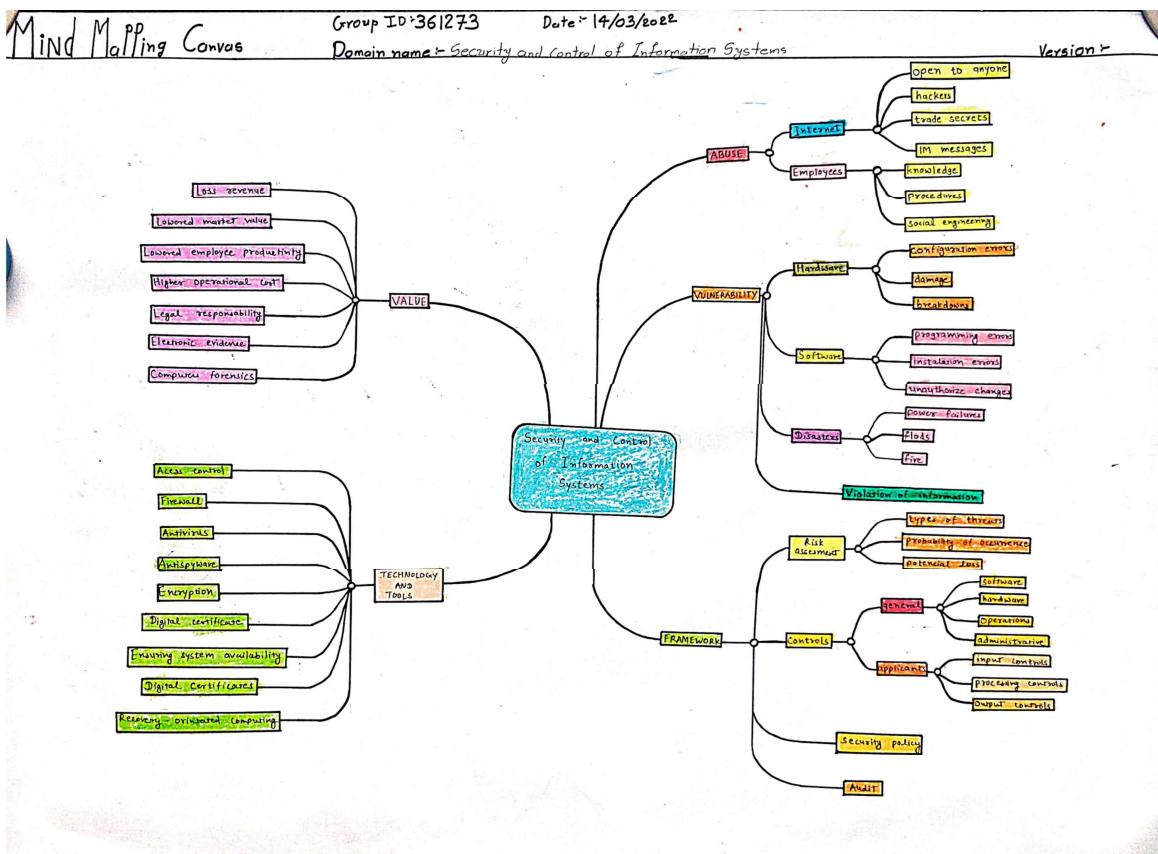
5.2 Future Prospects

Future progress of this work can be identified in the areas summarized below - We will try to upgrade this system to an advanced level by using invisible laser or infrared light means this circuit uses invisible infrared light to detect the movement of people through the door. A short beep will be generated when the infrared beam breaks. So it is ideal to monitor the passages in shops, banks etc where many people are moving. We can also use microcontroller or some timer IC circuit to make the performance of this system better. A touch sensor alarm circuit using 555 timer IC on a breadboard. It consists of a touch sensor (made up of conductive material like copper wire) which when touched by our skin or any object with electric charge, activates the buzzer alarm connected at the output of 555 timer IC. Because of the latching mechanism integrated in this circuit, the output alarm stays ON continuously until the reset button is pressed.

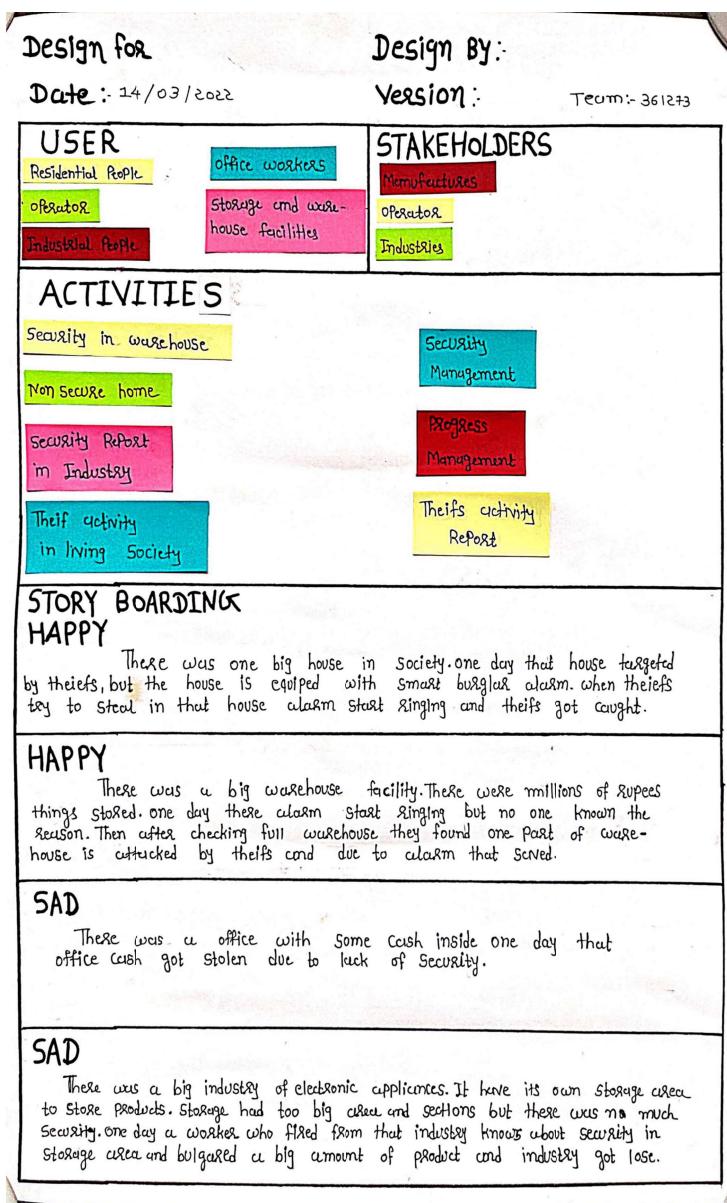
Appendix

AEIOU Summary:		
Group ID: 361273 Domain Name: SMART SECURITY SYSTEM	Date: 14-03-2022 Version:	
Environment:	Interactions:	Objects:
<p>The consumer is in a bank (physical sphere)</p> <p>The consumer is in Post office</p> <p>Someone is at office or big house or hospital at military base or Antique things exhibition</p>	<p>The consumer is talking to the bank manager. interaction observations whom, what?)</p> <p>The consumer is went to the post office and talking to the workers.</p> <p>A person went to Antique exhibition and Seen those Antiques.</p> <p>An military officer went to the base which is high security area.</p>	<p>lockers facilities at the bank.</p> <p>Inventory of key objects different machines for withdrawal and credit and balance</p> <p>separate desk for bank workers and their computers.</p> <p>At military base there is Arms storage, tanks missile, fighter jets etc.</p>
Activities:	Users:	servations involved? How?) special notes
<p>went to bank for account Enquiry</p> <p>someone went to Antique thing's exhibition to see those things and wanted to buy it if it was for selling purpose one person headed to high security area and caught by</p>	<p>Army chief went to military base to look into the arms storage and to make a list of tanks, missile, fighters Jets, navy ships, and other reinforcement facilities</p> <p>Security officer and investigating how he entered in this area</p>	<p>bank manager and other workers and in military base some terrorist caught by the</p> <p>- Scene of user in context consumers and the security officers of the bank.</p> <p>Some thieves entered the bank for theft and with the help of laser security</p> <p>in jewellery shop thief caught with help of laser security</p>

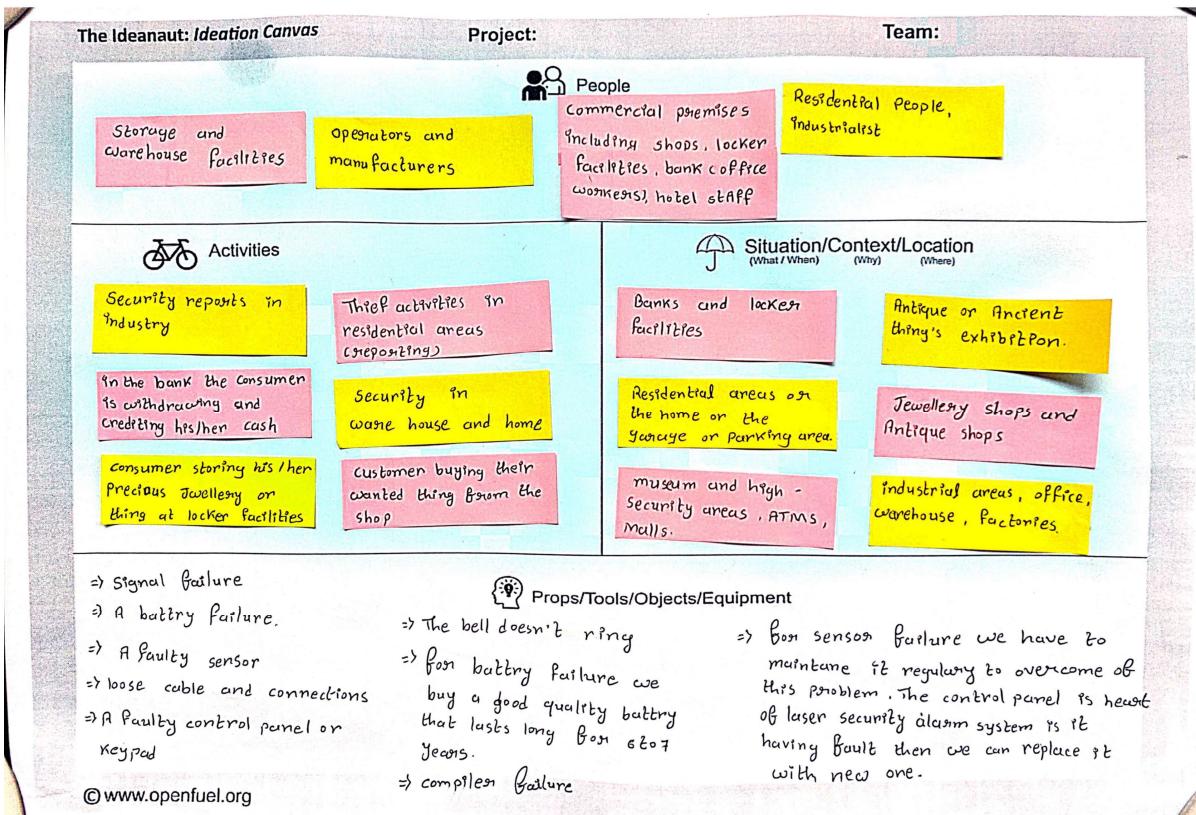
(2) AEIOU Canvas



(3) Mind Map Canvas



(4) Empathy Canvas



(5) Ideation Canvas

Learning Need Matrix

Group ID: 361273 Date: 17/03/22

Theories/Methods/Application process Involved/Mathematical Requirement	Applicable standards and design specifications / Principles & Experiments
<ul style="list-style-type: none"> Sensor technology. Computer simulation circuit Security management Security Applications <p>Energy Conservation → Pedestal Safety → chemicals → Electrical</p> <p>Security System Chemical → Electrical</p>	<p>Stage III</p> <ul style="list-style-type: none"> - Design specifications as design checked (MD-1,2) <p>Solenoid Lock GSM Module Arduino</p> <p>Stage II</p> <ul style="list-style-type: none"> → 3-2-1 Fixing principles → resistance theory Implementation <p>Tool standard ASME standard IEEE sta. for Sensor</p> <p>LDR Sensor Arduino Simulator</p> <p>Purpose/Product Concept</p> <ul style="list-style-type: none"> - Motivate about Safety and Security of Pedestrian <p>Materials Required Properties</p> <ul style="list-style-type: none"> Components <ul style="list-style-type: none"> - Button - 2N 7000 Transistor - 6.8 k ohm Resistor - Breadboard - I2C - 9V Battery
<ul style="list-style-type: none"> Arduino IDE Autodesk Multisim <p>Circuit designing (Autodesk)</p> <p>Simplifying Circuit designing.</p> <p>Multisim analysis and simulation.</p>	<p>Stage I</p> <ul style="list-style-type: none"> - Advance Security system for Pedestrian Smart Security System <p>Multisim</p> <p>Circuit Design Multisim software</p> <p>Circuit analysis.</p> <p>list of Components</p> <p>Availability of material in Market</p> <p>Money Components Materials</p> <p>Component testing as per application</p> <p>Bill of Component</p> <p>Cost comparison.</p>

Software/Tools/Simulation Methods/Skill

Component Materials & Strength Criteria (Exploration-varieties / testing requirements)

(6) LNM Canvas

Product Development Canvas

Team - 361273

Date :- 14 / 03 / 2022

PURPOSE	PRODUCT EXPERIENCE		CUSTOMER REVALIDATION	
	Accurately warnings	Easy operations		
PEOPLE	PRODUCT FUNCTION		REJECT, REDesign, RETAIN	
	Laser detection	Quick lock		
PRODUCT FEATURES		Proper use of technology		
Easy work flow		Easy to use		
Prefer quality of Raw materials for good quality security		Multi Purpose		
Best design to warn till system turn its off		Proper use of technology		
COMPONENTS		Make Quick Responsive		
Buzzer		Solenoid Lock		
2N 7000 Transistor		9-V battery		
6.8 kΩ Resistor		Bread board		
Copper wire		GSM Module		
Arduino				

(7) Product Development Canvas

Program

```
#include<softwareserial.h>
SoftwareSerial SIM900(7, 8); // gsm module connected here
String textForSMS;
int data = 0;
int sensor = A1;
void setup() {
  randomSeed(analogRead(0));
  Serial.begin(9600);
  SIM900.begin(9600); // original 19200. while enter 9600 for sim900A
  Serial.println(" logging time completed!");
  pinMode(sensor, INPUT);
  delay(5000); // wait for 5 seconds
}
void loop() {
  data = analogRead(sensor);
  Serial.println(data);
  if ( data < 400 ) //
  { textForSMS = "\nIntruder detected";
    sendSMS(textForSMS);
    Serial.println(textForSMS);
    Serial.println("message sent.");
    delay(5000);
  }
} void sendSMS(String message)
{
  SIM900.print("AT+CMGF=1\r");
  delay(1000);
  SIM900.println("AT + CMGS = \"+923339218213\""); // recipient's mobile number, in
  international format
  delay(1000);
  SIM900.println(message); // message to send
  delay(1000);
  SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
  delay(1000);
  SIM900.println();
  delay(100); // give module time to send SMS //
  SIM900power(); // turn off module
}
```

References

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