

HOME & ASSETS SECURITY SYSTEMS USING 8051 MICROCONTROLLER

Here is where our presentation begins





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TABLE OF CONTENTS



Home Security

which includes homes,
industries, workplaces, etc.



Assets Security

which includes our assets like
cars, livestock, etc.



INTRODUCTION

Security is always a concern when one leaves hi/her own house, or industry or even workplace. Many automated systems are in place, few outdated and few still work in progress. Through this project, we intend to analyze few research projects of past on security systems and try to correct the flaws they have through our knowledge of microcontrollers and computer science combined.



01. Android Interface based GSM Home Security System

07-08 February 2014

Journal : IEEE Xplore

Rupam Kumar Sharma
Himanka Kalita

Ayub Mohammad
Dhiraj Kalita

MAIN FOCUS

- ▣ Focuses mainly on home security
- ▣ Development of an ANDROID app which interprets the message on mobile devices, received on possible intrusion
- ▣ SMS generated to trigger the buzzer/alarm to make others in surrounding aware



Lets get into detailed working of the project



KEY COMPONENTS



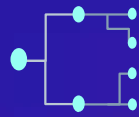
ANDROID OS

java based OS
which runs on
Linux 2.6 kernel



GSM MODEM

attached to
the door



HARDWARE CIRCUIT

including a
switch

A hand holding a white USB modem. The background is a gradient of pink and blue, with white circuit-like lines on the left side. A dark blue rounded rectangle with a light blue border contains the text.

What is GSM modem ?

Global System for Mobile Communication

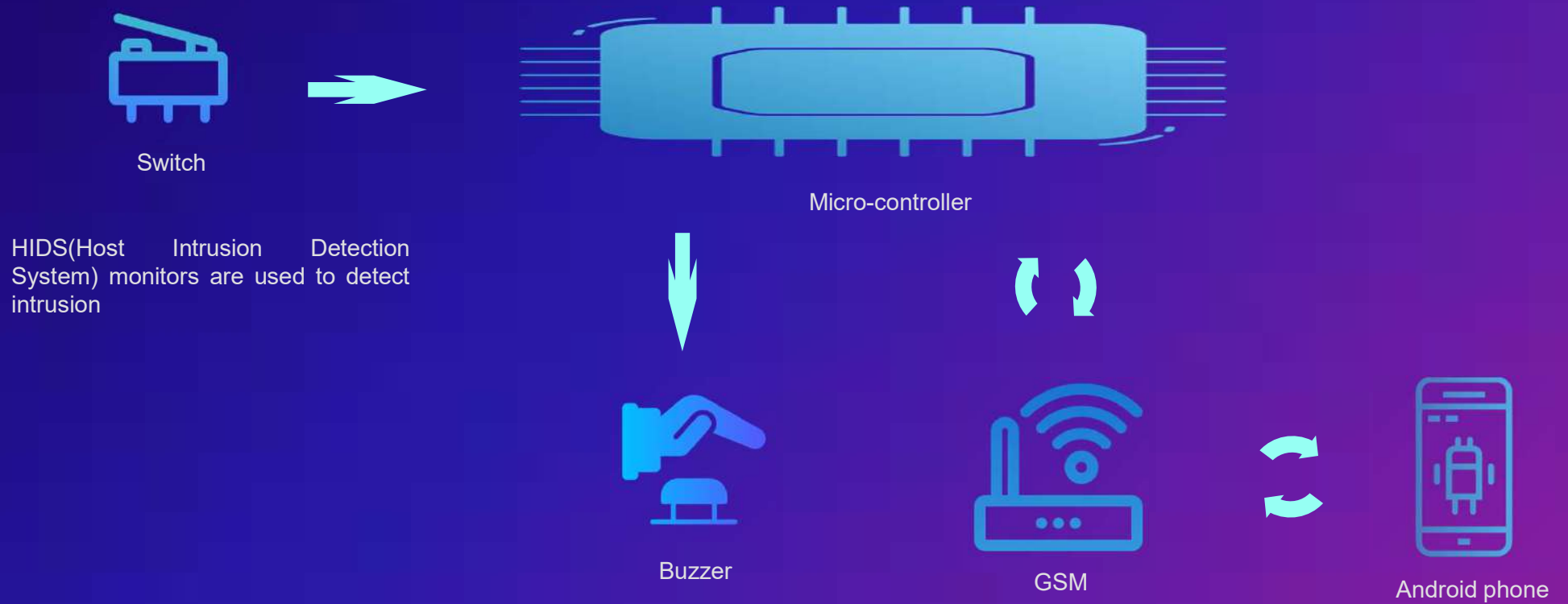


a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

Our mobile phones are GSM modems too



BLOCK DIAGRAM



PROJECT OVERVIEW

GSM modem & Hardware circuit

(installed on the door)
intruder detected?
switch triggers interrupt sends
signal to microcontroller

01

MICROCONTROLLER

sends signal to GSM modem
to transmit a SMS into
already registered number

02

ANDROID APP

receives a SMS from GSM
modem, which is detected
by the app

03

BUZZER/ALARM

GSM modem sends signal to
activate alarm. If response
isn't generated inside a
minute, it'll still activate the
alarm

04

if positive response from user is
generated



HARDWARE IMPLEMENTATION



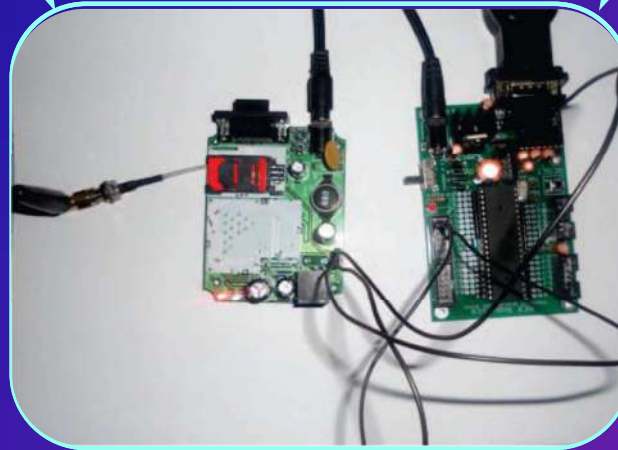
MAX232 IC

(incorporated inside GSM)
MAX232 is a dual transmitter /receiver that is used to convert the RX, TX, CTS, RTS signals.



P89V51 RD2

Development board which includes 8051 micro-controller



JAVA CODE

Main.java

```
1 Some sections of code of the MainActivity.java are listed
2 below [7].
3 Packages used and MainActivity Class (not shown all):
4 import java.io.FileOutputStream;
5 import android.app.Activity;
6 import android.app.AlertDialog;
7 import android.os.Bundle;
8 import android.app.Activity;
9 import android.view.Menu;
10 import android.app.PendingIntent;
11 import android.content.Intent;
12 import android.telephony.*;
13 public class MainActivity extends Activity {
14     Button BTN,ON,OFF;
15     IntentFilter intentFilter;
16     String s="";
17     EditText edittext;
18     TextView textview;
19     FileOutputStream fos;
20     FileOutputStream fis;
21     String FILENAME="";
22     int condition=0;
23     private BroadcastReceiver intentReceiver = new
24     BroadcastReceiver {
25     @Override
26     public void onReceive(Context context, Intent intent)
27     {
28     if « intent.getExtras().getStrin("SMS").equal(s))
29     {
30     {
31     showDialog(0);
32     I*if( condition==0)
```

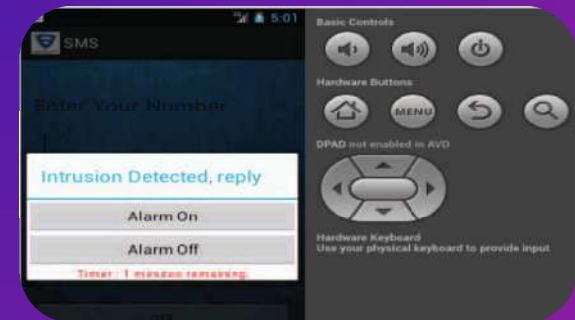
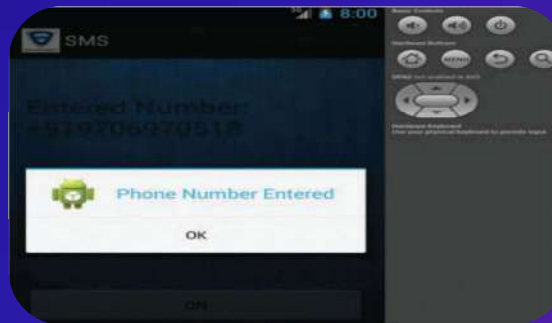
Main.java

```
33 {
34     sendSMS( s, "#PUMPON*");
35 } *1
36 II write a code here to create a dail box to reply to the
37 }
38 }
39 };
40 @Override
41 protected void onCreate(Bundle savedInstanceState)
42 {
43     super.onCreate( savedInstanceState);
44     setContentView(R.layout.activity _main);
45     intentFilter=new IntentFilter();
46     intentFilter.addAction("SMS _RECEIVED _ ACTION");
47     BTN =(Button) findViewById(R.id.BTN);
48     ON =(Button) findViewById(R.id.ON);
49     OFF =(Button) findViewById(R.id.OFF);
50     ON.setVisibility(View.INVISIBLE);
51     OFF.setVisibility(View.INVISIBLE);
52     edittext=(EditText) findViewById(R.id.edittext);
53     textview=(TextView) findViewById(R.id.textview);
54     BTN .setOnClickListener( new View. OnClickListener()
55     {
56     @Override
57     public void onClick(View arg0)
58     {
59     String temp="";
60     textview.setText("I");temp=edittext.getText().toString();edittex
61     t.setVisibility(View.INVISIBLE);
62     if(temp.length<10)
63     {
64     textview.setText("Enter 10 digit number");
65     }
```

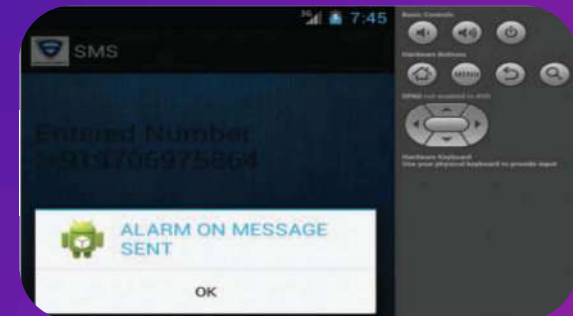
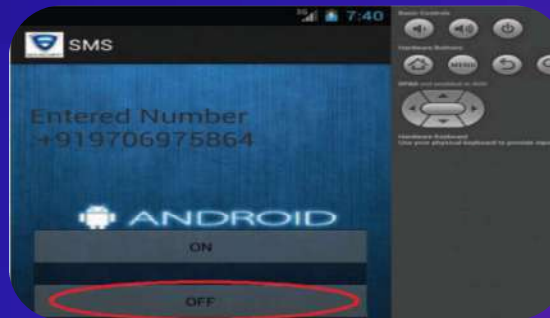
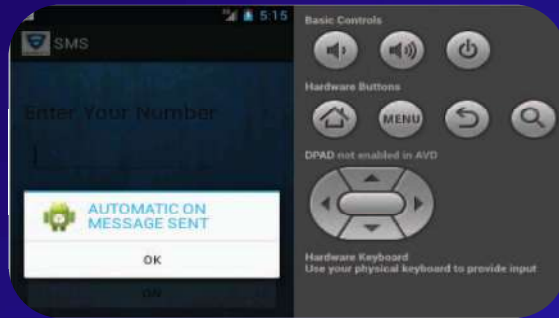
Main.java

```
42 {
43     super.onCreate( savedInstanceState);
44     setContentView(R.layout.activity _main);
45     intentFilter=new IntentFilter();
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50     ON.setVisibility(View.INVISIBLE);
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53     textview=(TextView) findViewById(R.id.textview);
54     BTN .setOnClickListener( new View. OnClickListener()
55     {
56     @Override
57     public void onClick(View arg0)
58     {
59     String temp="";
60     textview.setText("I");temp=edittext.getText().toString();edittex
61     t.setVisibility(View.INVISIBLE);
62     if(temp.length<10)
63     {
64     textview.setText("Enter 10 digit number");
65     }
66     else{
67     BTN.setVisibility(View.INVISIBLE);
68     ON.setVisibility(View.VISIBLE);
69     OFF.setVisibility(View.VISIBLE);
70     textview.setText("I");
71     textview .setText( edittext.getText().toString() );s="+91 "+textv
72     iew.getText().toString();
73     textview.setText("Entered Number :"+S);
74     showDialog( 1);
75     }
```


ANDROID INTERFACE



ANDROID INTERFACE



LIMITATIONS



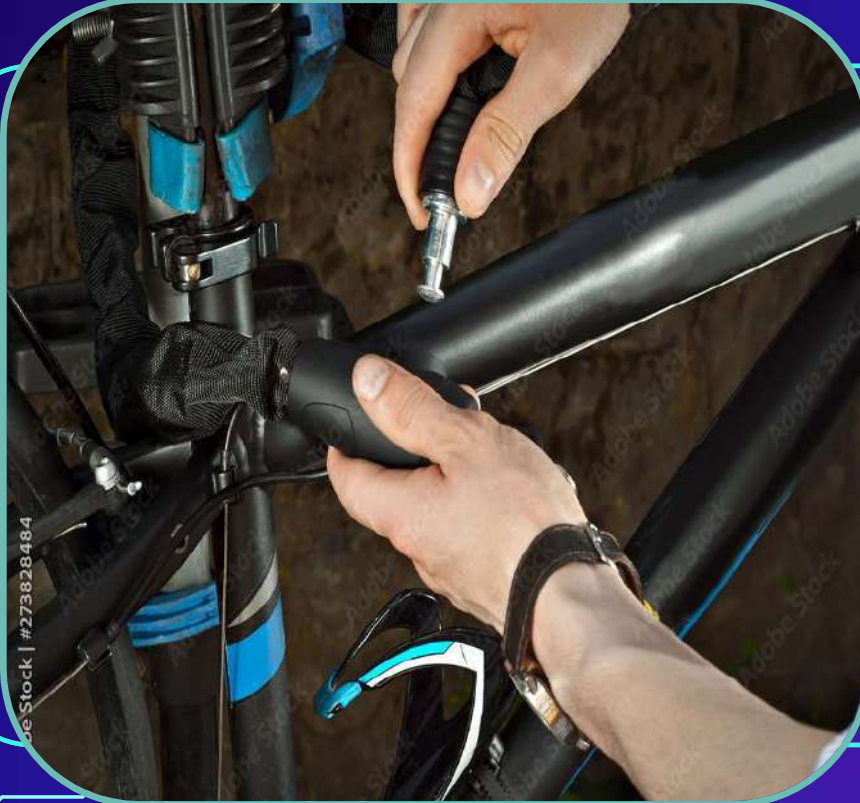
Buzzer could be replaced with Electronic door lock, which could be controlled by the user remotely through android app



Security features like password, motion sensors and remote controls other than alarm acknowledgement are not mentioned



Weak UI/UX . Given the project was build in 2014, we can't be much critical about that.
A lot of security systems have been developed since, but UI for apps is still very weak



02. Anti-Theft Monitoring for a Smart Home

2022

Journal : IEEE Xplore

Nagamani T
Beniga W H

Dhanish K S
Sherine Benitta A

MAIN FOCUS

- Focuses on home security from thefts and intrusion.
- It proposes a way to locate intruders even when they are hidden and also in the dark with the help of CCTV without any night vision capability.
- It then stores the video and also sends it to the owner for him to take action

Lets get into detailed working of the project





KEY COMPONENTS



CAMERA

CCTV or any
analog camera



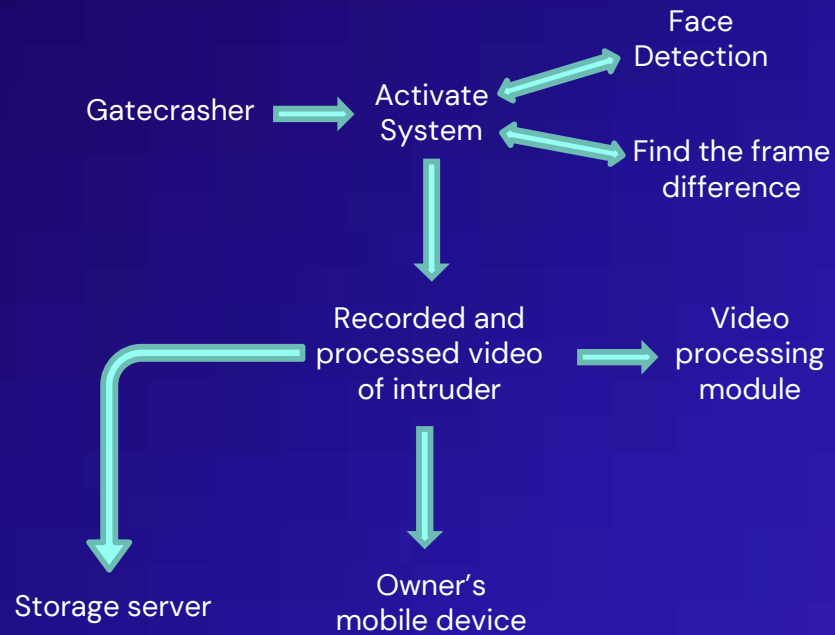
Raspberry-Pi

To run face
detection
software.



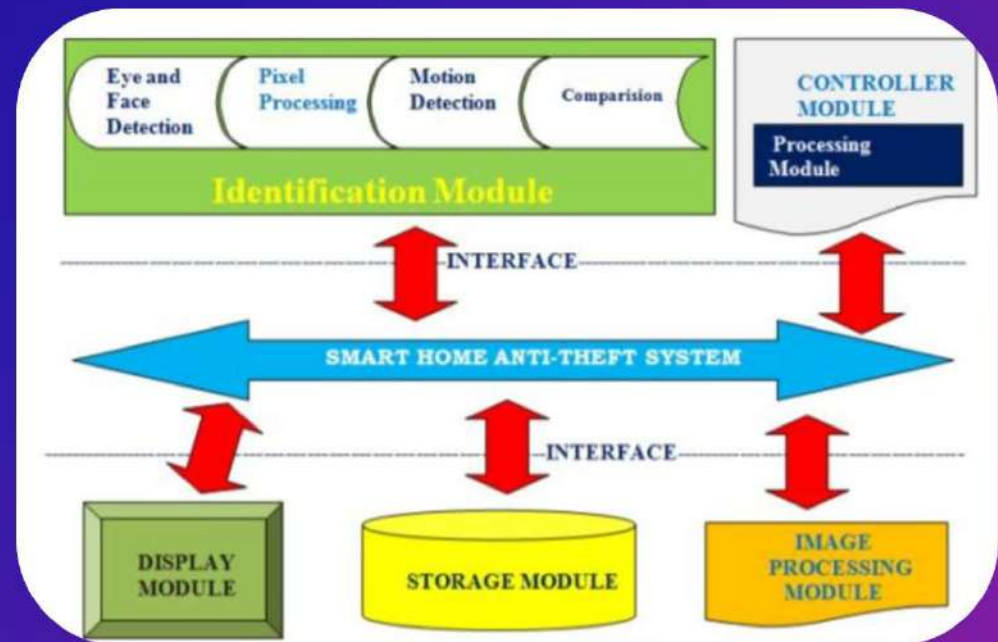
INTERNET CONNECTION

To send the video to
the owner for
further action



FLOWCHART OF THE PROPOSED SYSTEM

BLOCK DIAGRAM OF COMMUNICATION WITHIN THE ANTI THEFT MODULE



PROJECT OVERVIEW

FUNCTION MODULE

01

Captures intruder's presence in surveillance area at 15 fps

02

DETECTION MODULE

Locates the presence and finds whether it is a human or not. It consists of face and eye detection module, pixel processor module, motion detector module and comparative module.

STORAGE MODULE

03

Saves photos and videos of captured intruders



LIMITATIONS



It needs an active internet connection to send the video and picture of the intruder to the owner for further action to be taken



It lacks the presence of measures that stop the entrance of an intruder in the house through doors and windows

03. Design and Prototyping of Sensor-based Anti-Theft Security System using Microcontroller

March 2021

Journal : IJERT

Imran Chowdhury

Taslim Ahmed



MAIN FOCUS

- Safety of the home via a microcontroller-based solar-powered anti-theft automated security system is developed with arrays of sensors to detect possible intrusion incidents.
- It consists of motion sensor, fire sensor and glass break sensor.
- It produces three kinds of alarms – buzzer, bi-colour LED and SMS.

Lets get into detailed working of the project



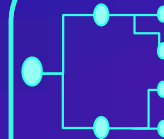


KEY COMPONENTS



Sensors

To detect anomalies at home



Atmega8

Microcontroller to control all the aspects of the system



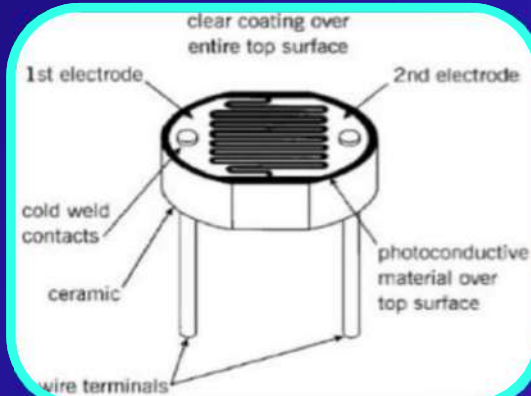
Alarm System

LED, buzzer and SMS (SIM900 (GSM))

HARDWARE

(RESET) PC6	1	28	PC5 (ADC5/SCL)
(RXD) PD0	2	27	PC4 (ADC4/SDA)
(TXD) PD1	3	26	PC3 (ADC3)
(INT0) PD2	4	25	PC2 (ADC2)
(INT1) PD3	5	24	PC1 (ADC1)
(XCK/T0) PD4	6	23	PC0 (ADC0)
VCC	7	22	GND
GND	8	21	AREF
(XTAL1/TOSC1) PB6	9	20	AVCC
(XTAL2/TOSC2) PB7	10	19	PB5 (SCK)
(T1) PD5	11	18	PB4 (MISO)
(AIN0) PD6	12	17	PB3 (MOSI/OC2)
(AIN1) PD7	13	16	PB2 (SS/OC1B)
(ICP1) PB0	14	15	PB1 (OC1A)

Atmega8



Light Dependent Resistor

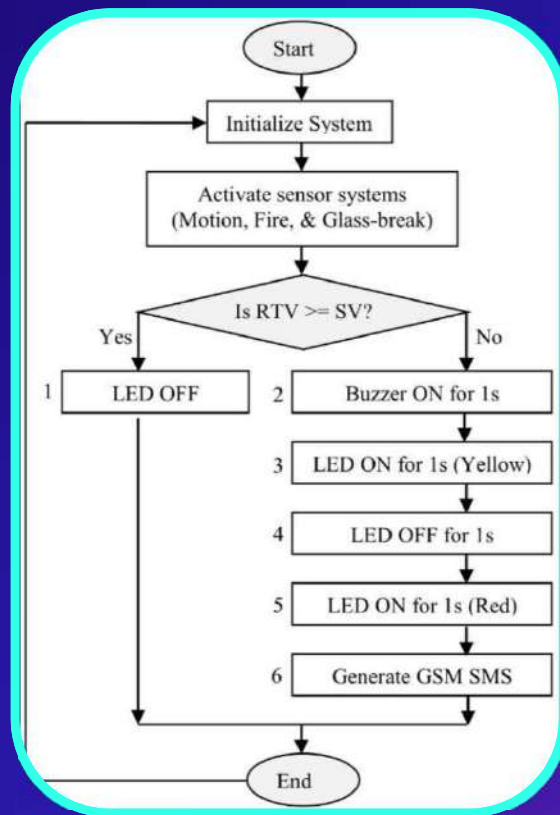


LM35 Temperature Sensor

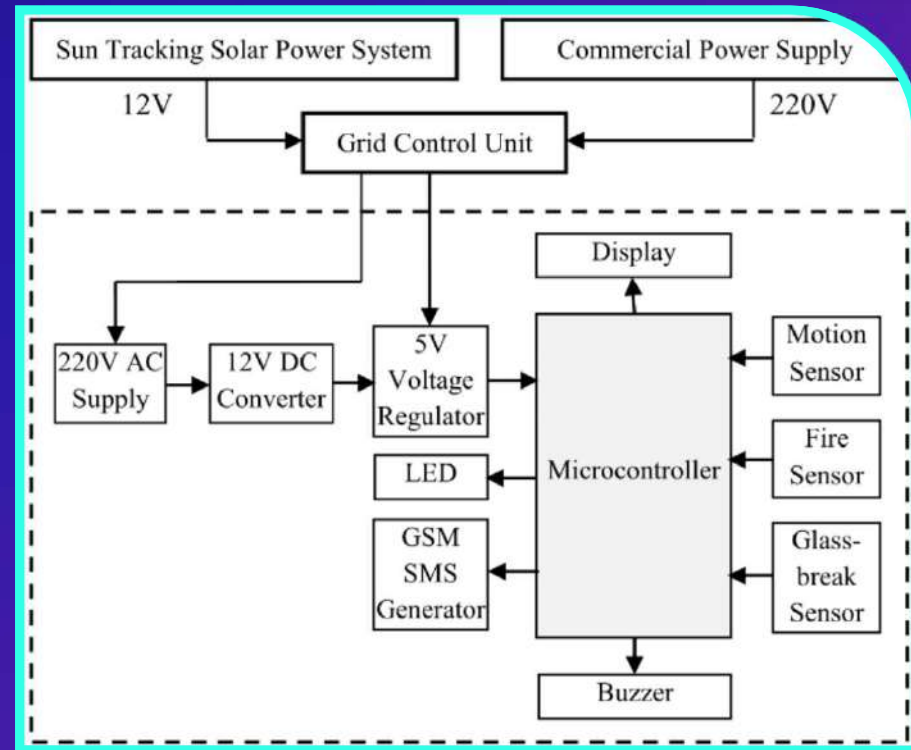


Glass break sensor

FLOWCHART OF THE SECURITY SYSTEM



BLOCK DIAGRAM OF THE WHOLE MODULE

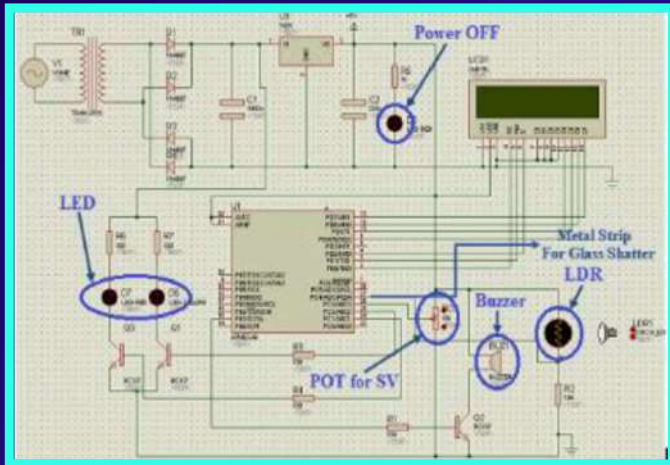




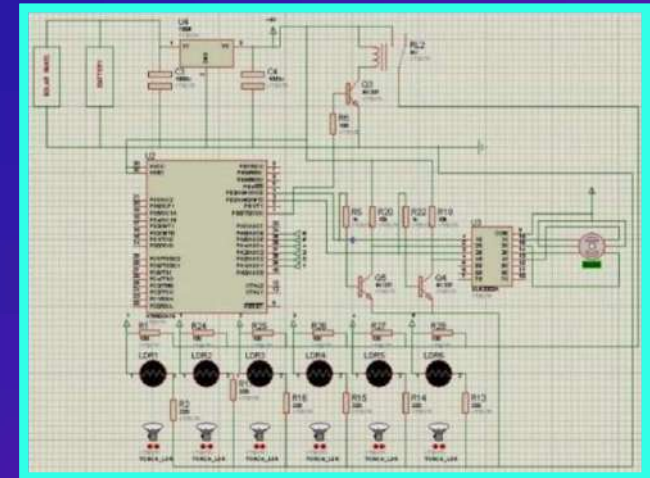
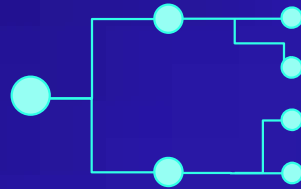
ATMEGA PROGRAMMING CODE

```
while (1)
{
  adc=read_adc(4)/10;
  lcd_clear();
  lcd_gotoxy(0,0);
  lcd_putsf("UITS Int. LAMP ");
  sprintf(lcd,"LDR Voltage=%d%c",adc,37);
  lcd_gotoxy(0,1);
  lcd_puts(lcd);
  delay_ms(500);
  if(adc>=(read_adc(3)/10))
  {PORTB.1=0;PORTC.1=0;PORTC.2=0;m=0;}
  if(adc<(read_adc(3)/10)&&m==0)
  {PORTB.1=1;delay_ms(1000);
  PORTB.1=0;delay_ms(1000);m=1;}
  if(adc<(read_adc(3)/10))
  {PORTC.1=0;PORTC.2=1;delay_ms(1000);
  PORTC.1=0;PORTC.2=0;delay_ms(1000);
  PORTC.1=1;PORTC.2=0;delay_ms(1000);
  PORTC.1=0;PORTC.2=0;delay_ms(500);} }
  PORTB.0=1;delay_ms(100);
  DDRB=0xFF;
  for(i=0;i<4;i++)
  {PORTB=0x08;delay_ms(5);
  PORTB=0x02;delay_ms(5);
  PORTB=0x04;delay_ms(5);
  PORTB=0x01;delay_ms(5);}
  for(i=3;i<4;i++)
  {PORTB=0x08;delay_ms(5);}
  delay_ms(100);
  for(i=4;i>0;i--)
  {PORTB=0x01;;delay_ms(5);
  PORTB=0x04;delay_ms(5);
  PORTB=0x02;delay_ms(5);
  PORTB=0x08;delay_ms(5);}
  for(i=1;i>0;i--)
  {PORTB=0x01;delay_ms(5);}
  }
}
```

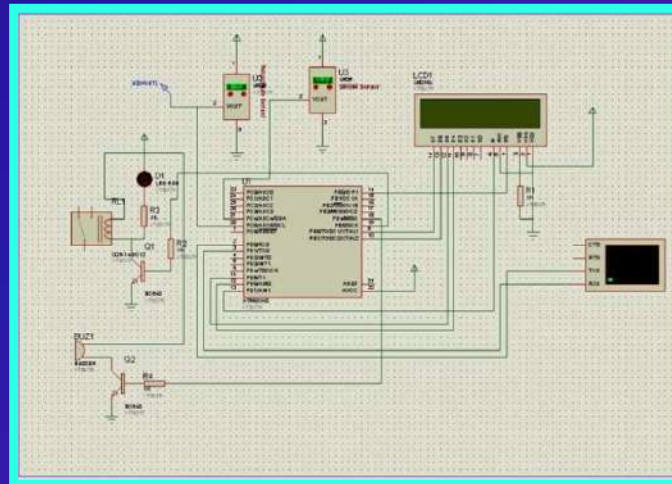
CIRCUIT DESIGNS



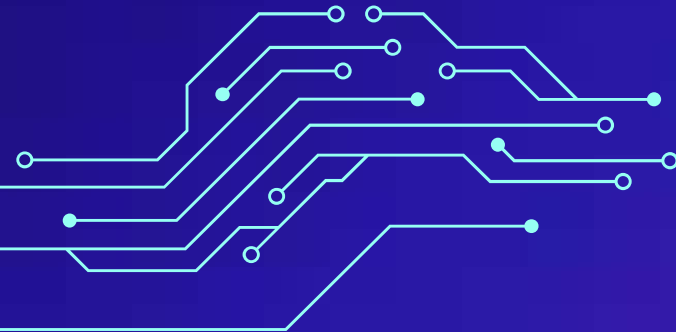
Designed circuit for security system with Motion Sensor and Glassbreak Sensor.



Designed circuit of an LDR-based precision Sun-tracking system.



Designed circuit with a GSM-based Fire alert SMS system



LIMITATIONS



The LDR used in a motion sensor takes a few seconds to get back to the original position once the light is absent again



Since it isn't a wireless system any damage caused to the connecting wires will result in the system being ineffective



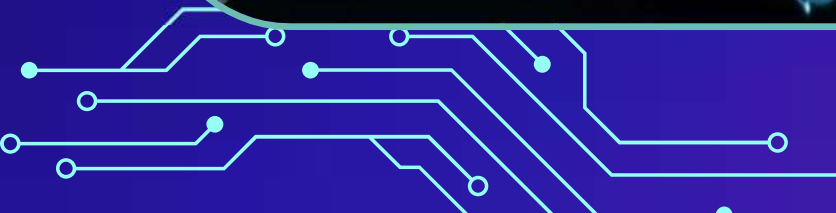
04. Development and Modeling of Automated Home Security System Using 8051 Microcontroller

16th July 2016

Journal : Research Gate

Bamigboye, O. O
Onawola, H. J

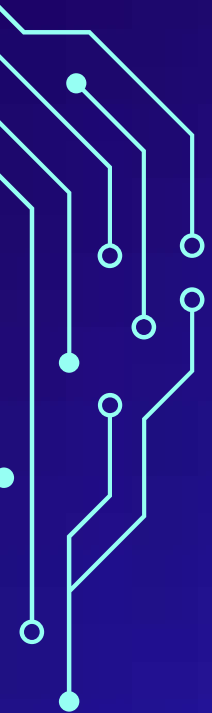
Ehiagwina, F. O.
Kehinde, O. O.



MAIN FOCUS

- ▣ Focuses on Automated Home Security
- ▣ Working of system detecting intruders using sensors and then sound an alarm to alert the homeowners
- ▣ Wireless home security system with PIR sensor, Smoke sensor
- ▣ Advancement in technology of automation and finding new ideas to deal with it

Lets get into detailed working of the project





KEY COMPONENTS



PIR SENSOR

Detects motion by measuring changes in the infrared levels

SMOKE SENSOR

Detects leakage of gases such as LPG, butane etc and alert the owner



GSM MODEM

Automated SMS system which uses mobile network for transmission

PROGRAMMING OF GSM MODEM

Uses low level language or assembly language to send SMS through microcontroller

BLOCK DIAGRAM

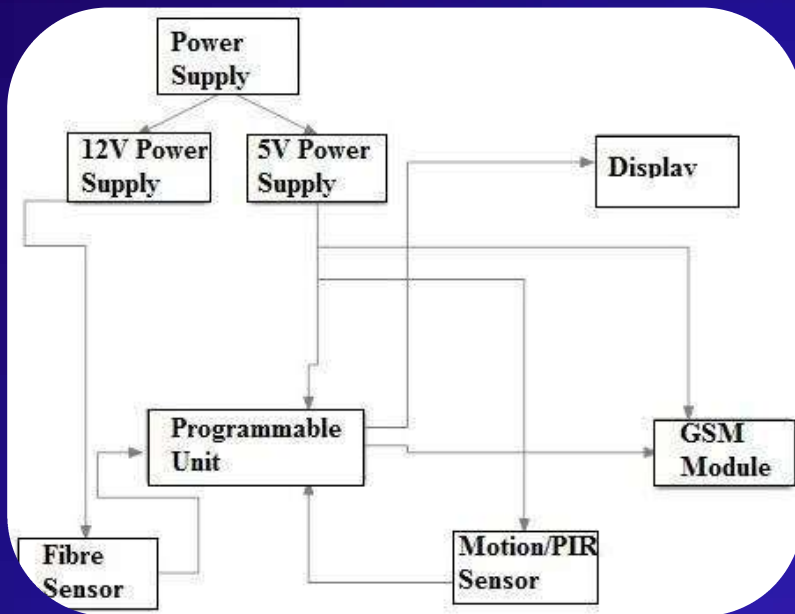


figure 1

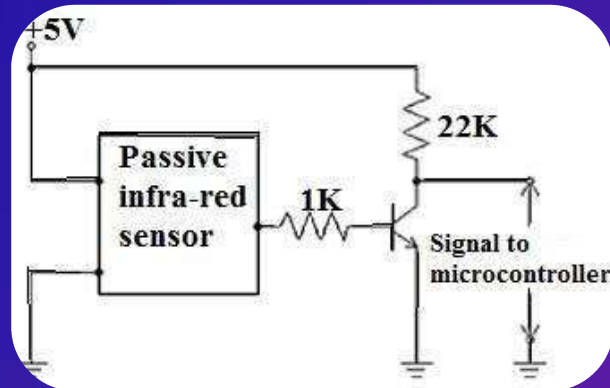


figure 2

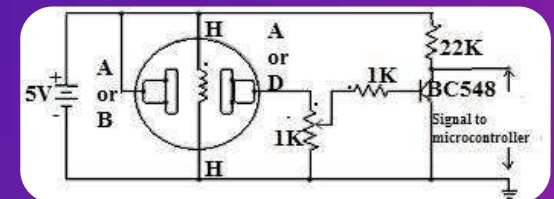


figure 3

PROGRAMMING OF GSM MODEM



SIM300 based quad band GSM module which supports GPS technology

- Launching keil
- Initialising variable and parameters such as input/output , ports,sensors
- Develop and Debug the program using AT commands which are instructions to command a modem
- Table shows AT commands related to writing and sending SMS messages

AT command	Meaning
+CMGS	Send message
+CMSS	Send message from storage
+CMGW	Write message to memory
+CMGD	Delete message
+CMGC	Send command
+CMMS	More messages to send

DRAWBACKS

Not suitable for
every time of
environment

01

02

Vulnerability To
hacking

Limited
scalability

03

Outdated
Technology

04

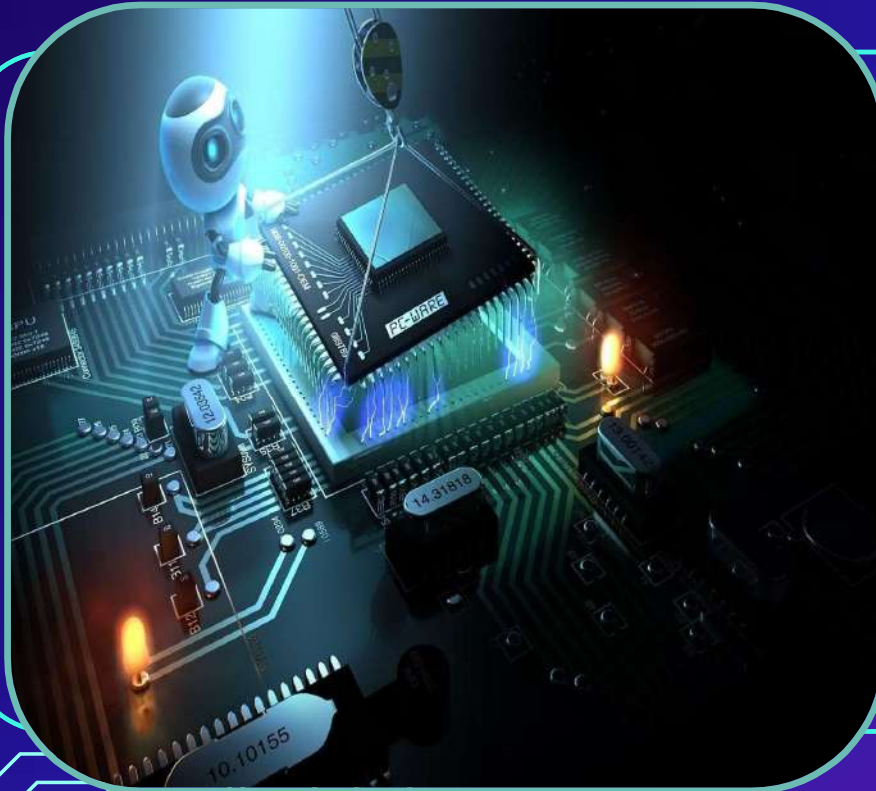




ADVANCEMENT THROUGH THE YEARS



- Bigger Emphasis on Cybersecurity
- AI-Based Visual Recognition
- More Child-Friendly Features
- Better Smart-Home Integration



05. A Microcontroller Based Security System

Journal - Scholars
Journal of Engineering
and Technology (SJET)
2014

Nathan David

Genesis Ajah



KEY STRUCTURE

OVERVIEW OF SECURITY SYSTEM

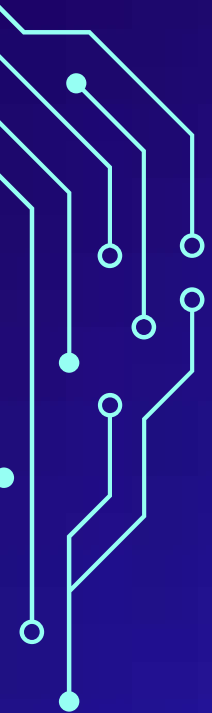
DESIGN AND IMPLEMENTATION

SOFTWARE AND HARDWARE MODULE

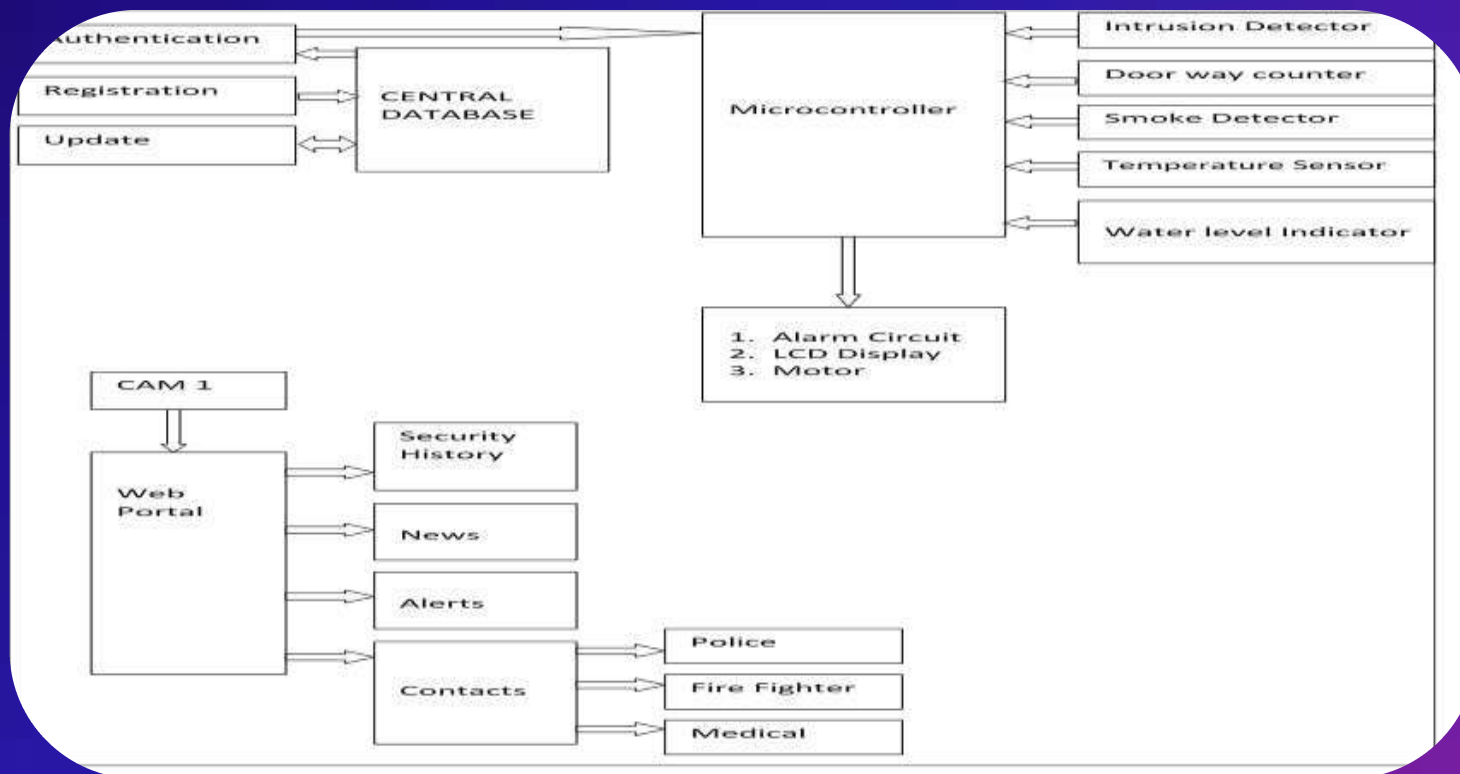
MAIN FOCUS

- ▣ Focuses in integrating the software module with hardware module
- ▣ Microcontroller accessing different type of devices and monitoring it and sending the information for display
- ▣ Web portal helps in accessing the various quick requirements while managing security

Lets get into detailed working of the project



BLOCK DIAGRAM



IMPLEMENTATION

SOFTWARE MODULE

User Registration and Update

Automated Fingerprint
Identification System (AFIS)

Web Portal

HARDWARE MODULE

The Temperature Sensor

Door way counter and intruder
detector

The Water Level Indicator

Light Source

Light Sensitive Device

The circuit diagram shows a precision current source. It features two operational amplifiers: an LM358 configured as a voltage follower and an LM24 configured as a transimpedance amplifier. The input signal is applied to the non-inverting input of the LM358. The output of the LM358 drives the base of a PNP transistor (Q1). The emitter of Q1 is connected to a 6V Zener diode (D1) which is grounded. The collector of Q1 is connected to the inverting input of the LM24. A feedback resistor R1 (20kΩ) connects the output of the LM24 back to its inverting input. The output of the LM24 is labeled as IOUT.



06. Microcontroller Based Security System with a Laser Beam Networkm

07-08 November 2015
Journal : IEEE Xplore

E.Kanniga

M .Sundararajan

MAIN FOCUS

- Focus mainly on Laser Beam security system
- The objective of the Laser-based Security alarm system is that it will keep measuring the light coming from the Laser light using LDR, and the Arduino UNO MCU will check for the intensity to decrease from its initial value indicating obstacle between Laser light and LDR



Lets get into detailed working of the project



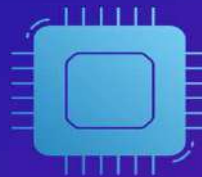
KEY COMPONENTS




LASER



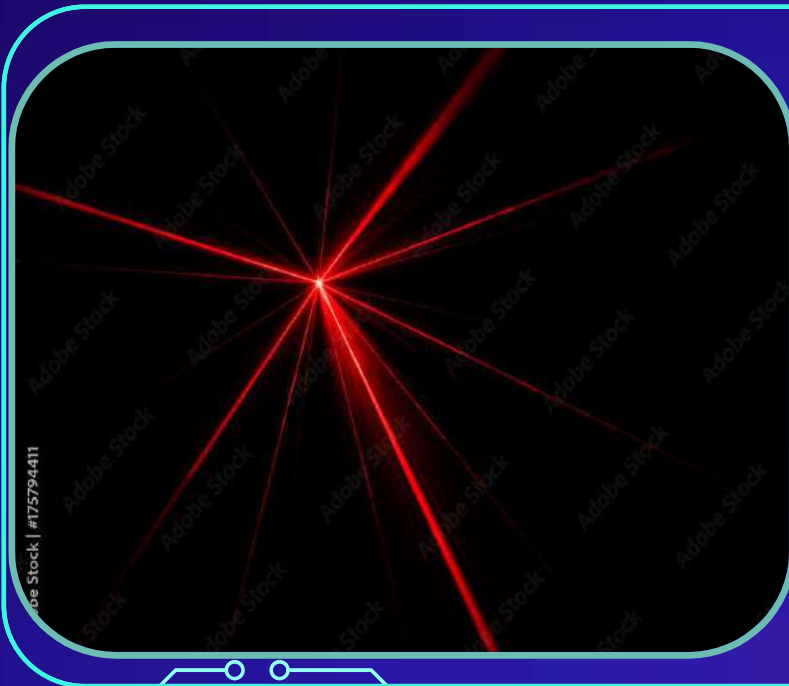
BUZZER



MICRO-
CONTROLLER



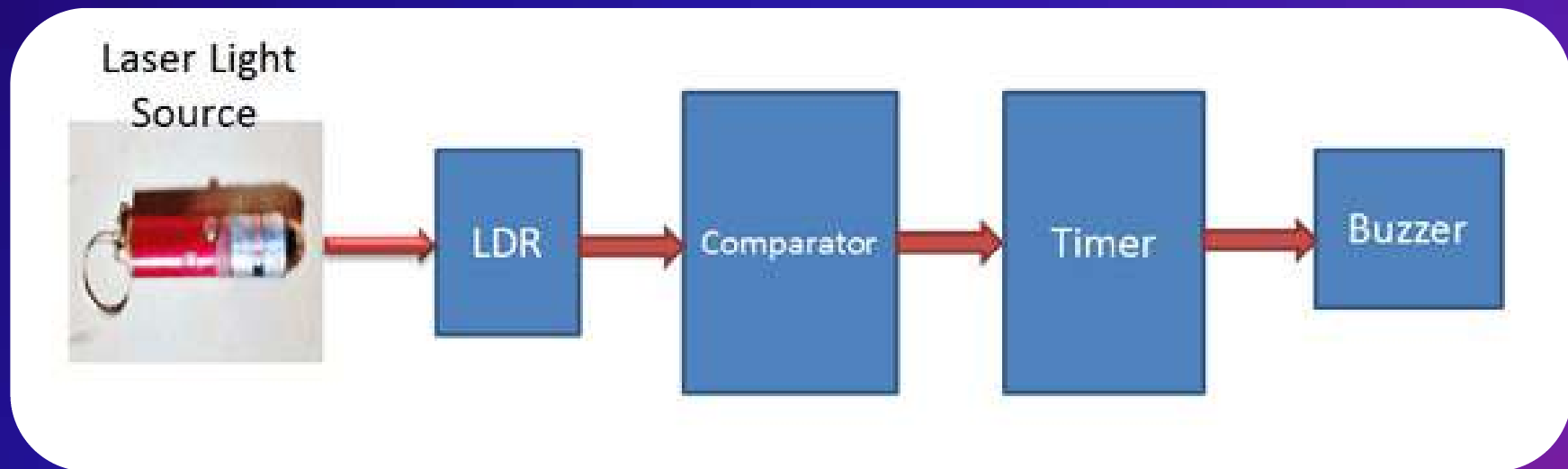
What is Laser Beam Security System ?



The laser based security system is designed to provide maximum security to a given restricted area where the presence of any person is not desired. If someone tries to pass over the boundary line defined by laser lights, an alarm will be triggered and a sms to the authorized person will be sent. Proper messages will also be displayed on the LCD.



BLOCK DIAGRAM



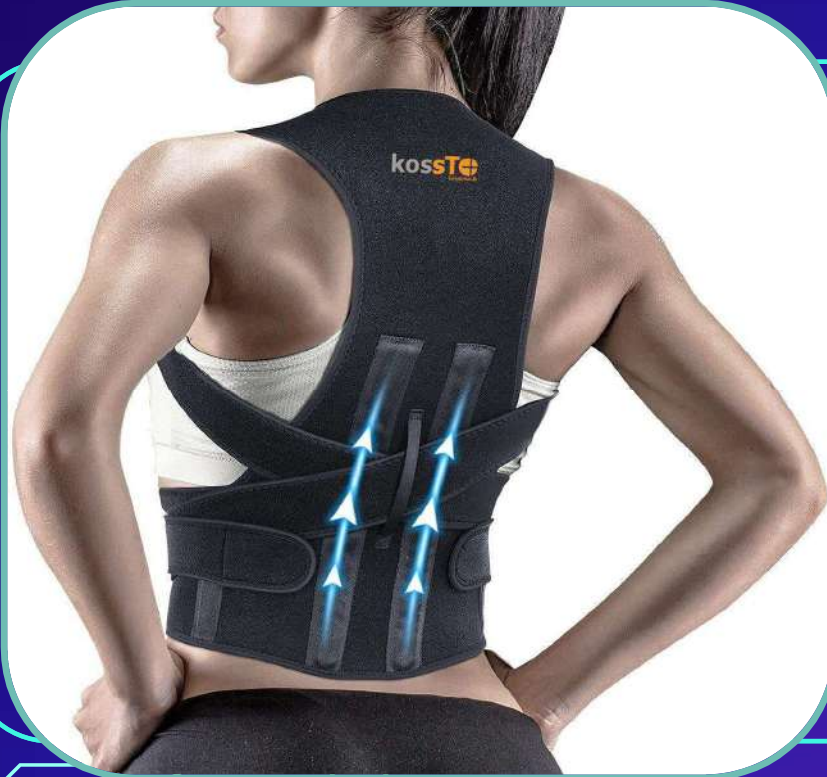
LIMITATIONS



The laser security system works only if the laser is obstructed. If the intruder passes without obstructing the laser, it is considered as a failure.



Security features like password, motion sensors and remote controls other than alarm acknowledgement are not mentioned



07. Women Protection System Using 8051 Microcontroller

07-08 November 2015
Journal : IEEE Xplore

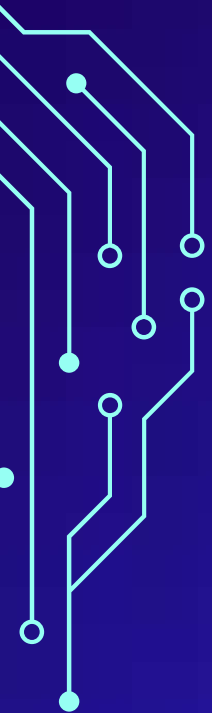
Aasawari Pharande Trupti Samarth
Priyanka Pokharkar Anuradha Bhosale



MAIN FOCUS

- Focus mainly on Woman Protection Security System
- The main goal of safety and health programs is to prevent workplace injuries, illnesses, and deaths, as well as the suffering and financial hardship these events can cause for workers, their families, and employers.

Lets get into detailed working of the project



KEY COMPONENTS



Modem



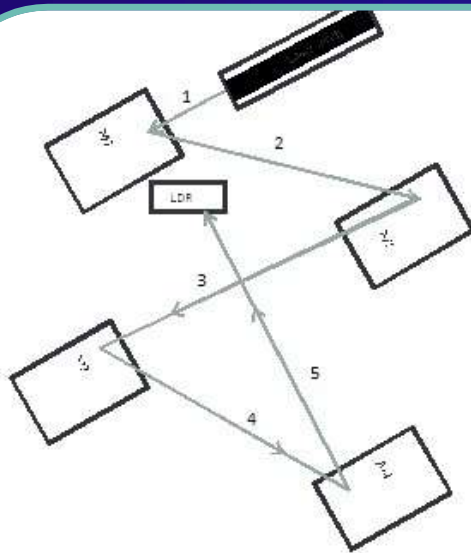
J2ME



Microcontroller



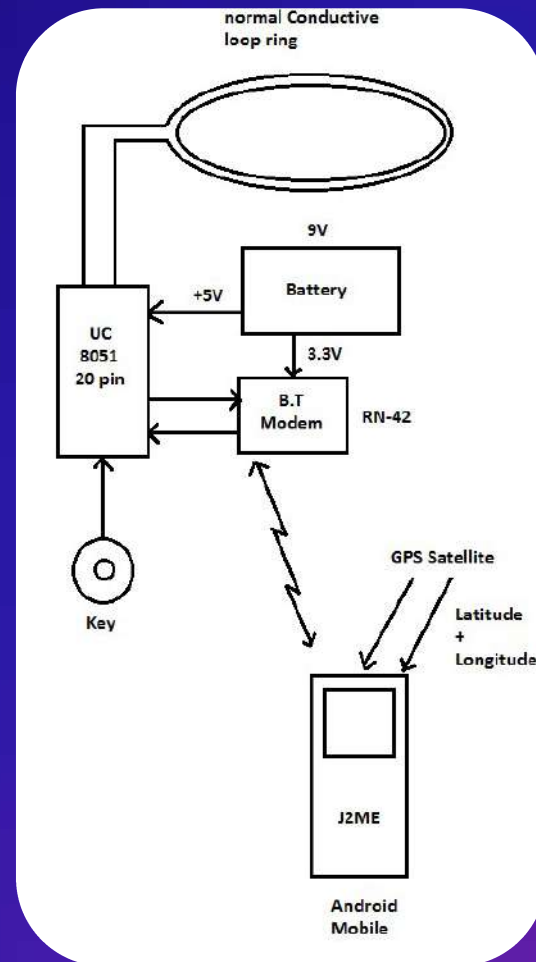
**What is Women Protection
Security System System ?**



ARRANGEMENT OF LASER BEAM NETWORK

Women Protection System aims at helping women from any type of assaults. A Conductive Belt is used which will prevent any kind of attack from occurring. A mobile application is to be implemented that informs the predefined numbers about the safety and location of the user. This application is accessible automatically as well as manually. This belt basically works on the principle of a closed loop circuit . The microcontroller is used to achieve this purpose. The connectivity between the microcontroller and the mobile is maintained through the modem .

BLOCK DIAGRAM



LIMITATIONS



If the battery drains, the system won't work.

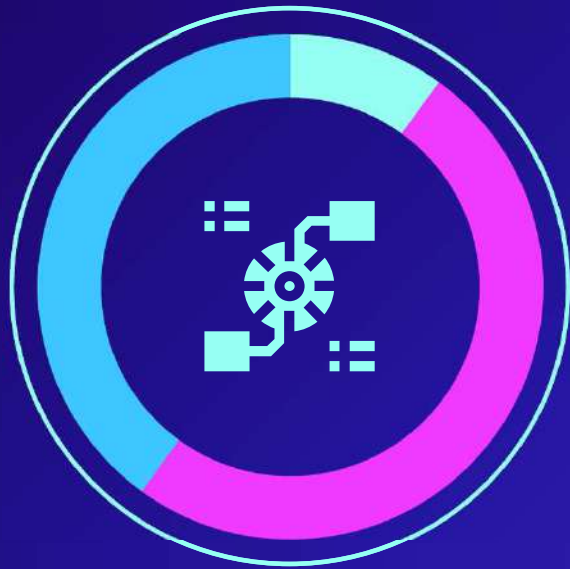


Failure of components may lead to dire consequences



The mobile application needs to be upgraded according to the user's need.

FUTURE ASPECTS



1. The efficiency of this system can be increased or in fact improved by making the belt water proof.
2. A buzzer alarm can also be included in this device which plays on pressing the key.
3. A voice processor can be employed. The voice of the victim will be transmitted as a voice message to the predefined numbers.
4. To increase the security more intensely a shock system can also be added, which gives a shock to the attacker if he tries to open the belt forcefully.



08. Design of Small Smart Home System based on Arduino

February 2014

Journal : IEEE Xplore

Andi Adriansyah

Akhmad Wahyu Dani

MAIN FOCUS

- ▣ Focuses mainly on automated home security.
- ▣ Small smart home systems is designed with the Arduino microcontroller-based with WLAN systems, which is able to monitor and control lights, room temperature, alarms for detecting suspicious movements, and other household appliances.
- ▣ SMS generated to trigger the buzzer/alarm to make others in surrounding aware and relays.



Lets get into detailed working of the project



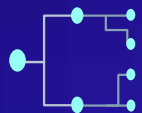
KEY COMPONENTS



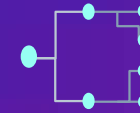
**INPUT/OUTPUT
BLOCK**



**NETWORK
BLOCK**



**MICRO-
CONTROLLER**



**MONITORING/
CONTROLLING**

A person in a dark suit and tie is holding a glowing, semi-transparent globe. The globe is connected to various network-related icons: a smartphone, a server rack, a cloud, a database cylinder, a desktop computer, and another smartphone. The background is a blurred office environment with blue and white lights.

What is **WLAN** network ?

Wireless local-area network



A wireless local-area network (WLAN) is a group of colocated computers or other devices that form a network based on radio transmissions rather than wired connections. Like broadcast media, a WLAN transmits information over radio waves. Data is sent in packets. The packets contain layers with labels and instructions that, along with the unique MAC (Media Access Control) addresses assigned to endpoints, enable routing to intended locations. A Wi-Fi network is a type of WLAN.



BLOCK DIAGRAM



Switch



Micro-controller



Buzzer

HIDS(Host Intrusion Detection System) monitors are used to detect intrusion.

1. PIR (Passive Infra-Red) for motion detection.
2. LM35 temperature sensor.



Relays



HTML5 Device

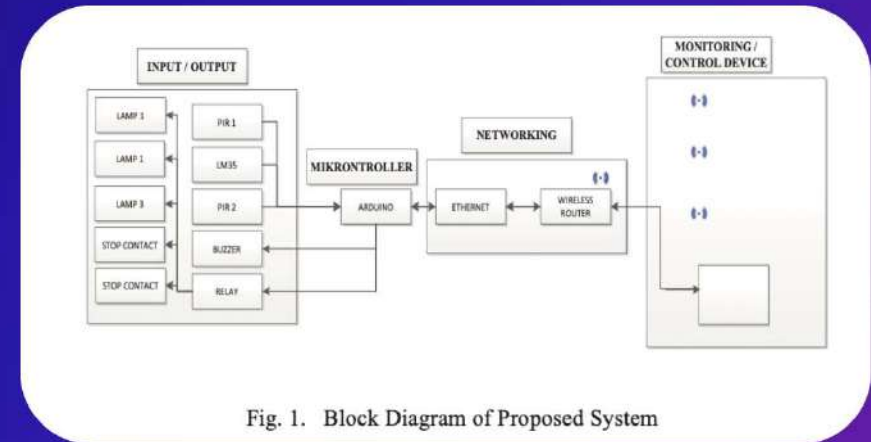


Fig. 1. Block Diagram of Proposed System

PROJECT OVERVIEW

Input/Output Block

Consists of PIR motion detector and LM35 temperature detector as inputs and lamps, sockets, relays and buzzer as outputs.

01

02

MICROCONTROLLER

Arduino (AT MEGA328) consisting of hardware and IDE as its software language.

NETWORK BLOCK

Consists of ethernet part (Arduino Ethernet Shield) based on Wiznet W5100 chip and a 3G/4G wireless router.

03

04

Monitoring/Controlling Device

Devices connected to WLAN via network block using HTML5 with 2 way communication.



HARDWARE IMPLEMENTATION

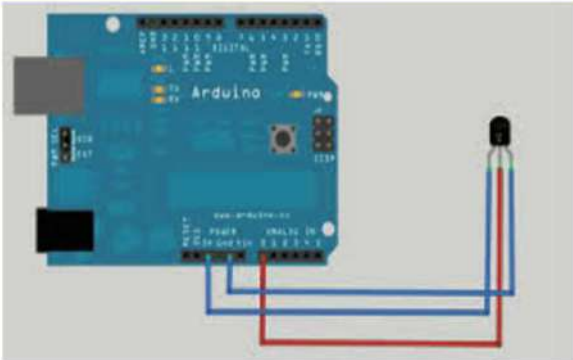


Fig. 3. Connection Circuit of LM35 Sensor



Fig. 5. Arduino System



Fig. 4. Relay Circuit

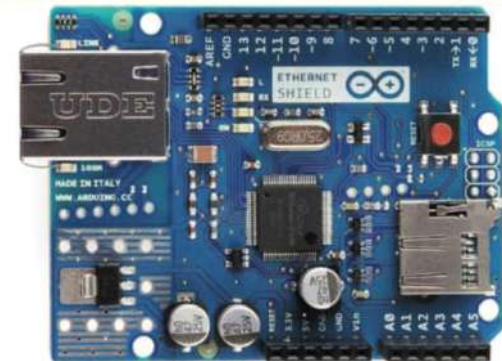


Fig. 6. Arduino Ethernet Shield

USER GAINS & NEEDS



AFFORDABLE and SIMPLE

smart home technology is very few adopted because it is very expensive and removing complex methods to control it. Hence, introducing security for small homes.



MULTI-TASKING

In addition to security, the detector are directly connected to the home appliances and can automatically on/off items using sensors.

LIMITATIONS



NOT SUITABLE FOR HIGHER SECURITY AREAS

Higher level of security measures are missing and not many sensors are being used.



DEPENDENCY

The alert for the intrusion is totally dependent on the internet provider.

EXPERIMENTAL RESULTS



Fig. 8. Smart Home System Hardware Implementation

SOFTWARE TOOL CALLED WIRESHARK



TABLE I. RESULTS OF SYSTEM TEST

No	Test	Function	Procedure	Result
1	Sensor PIR1	PIR Sensor used for Lamp activation	Lamp will on while any move detected	OK
2	Sensor PIR1	PIR Sensor used for move detection	Buzzer will on while any move detected	OK

No	Test	Function	Procedure	Result
3	Push Button1	For Lamp activation	Lamp will active depend on button	OK
4	Push Button2	For Lamp activation	Lamp will active depend on button	OK
5	Push Button3	For socket activation	Socket will active depend on button	OK
6	LM35	1. For temperature monitor	LM35 send data to Arduino microcontroller	OK
		2. For temperature regulator	Fan or AC will active while temperature is exceeds a certain limit	OK



09. Home Security System using Raspberry Pi with IOT

February 2021

Journal : IEEE Xplore

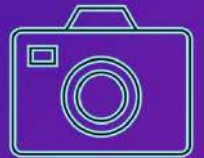
P.Amith Teja
A.Anne Frank Joe

V.Kalist

MAIN FOCUS



- ▣ Focuses mainly on home security
- ▣ Primary concern if the intruder possesses quite some knowledge about a security system, the sensor can be routed, hence employing additional sensors are required to record various other sensory captures.
- ▣ When there is an intrusion recorded then a live video and image is captured, sent to the owner and saved in the pen drive.



Lets get into detailed working of the project



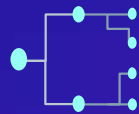
KEY COMPONENTS



RASPBERRY-PI



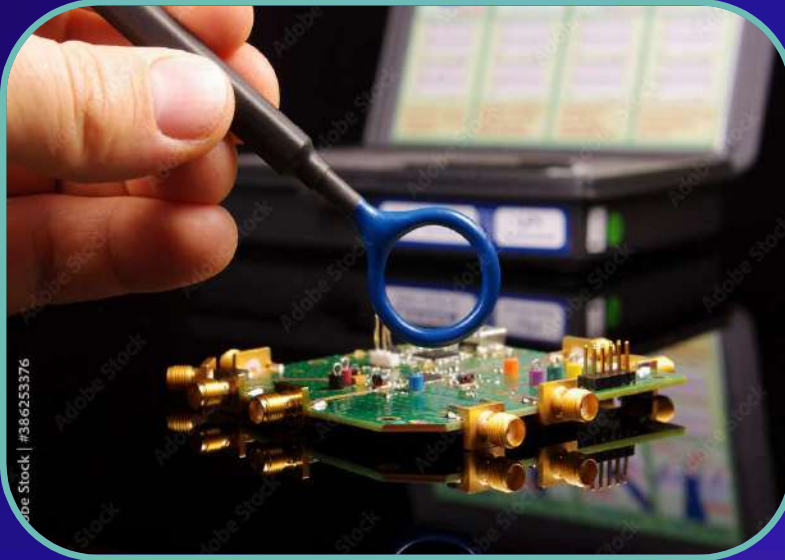
**SENSORS
AND
BACKED UP
DATA**



**HARDWARE
CIRCUIT AND
IOT**



What is **MICROWAVE**
target movement finder?



It is a locator for recognizing the Doppler move of high recurrence radio waves and it is fundamentally utilized in open spaces. Compared to infrared wave indicator, it examines comparative very high recurrence radio waves with extremely short frequency, which implies these are easily reflected by other objects.



BLOCK DIAGRAM



Sensors



Micro-controller



Buzzer



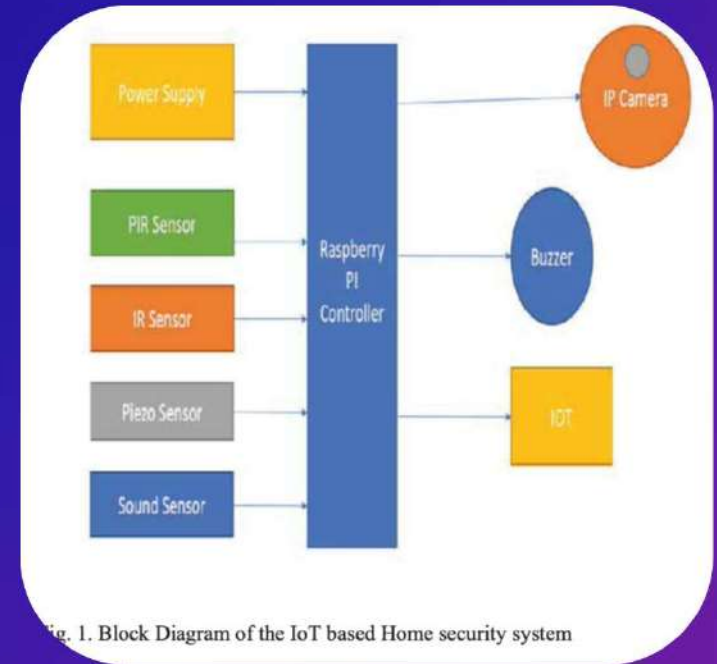
Camera /
Video



SMS to owner

HIDS(Host Intrusion Detection System) monitors are used to detect intrusion

1. PIR sensor for motion detection.
2. IR sensor to detect objects
3. Piezoelectric pressure sensor
4. Microphone
5. Raspberry Pi 2



PROJECT OVERVIEW



Sensors

Various installed sensors triggers interrupt and sends signal to microcontroller

01

02

MICROCONTROLLER

Raspberry Pi when triggered send the videos and photos captured to owner using IoT.

Video / Picture

When intrusion is detected the microcontroller takes the image and the video of the intruder.

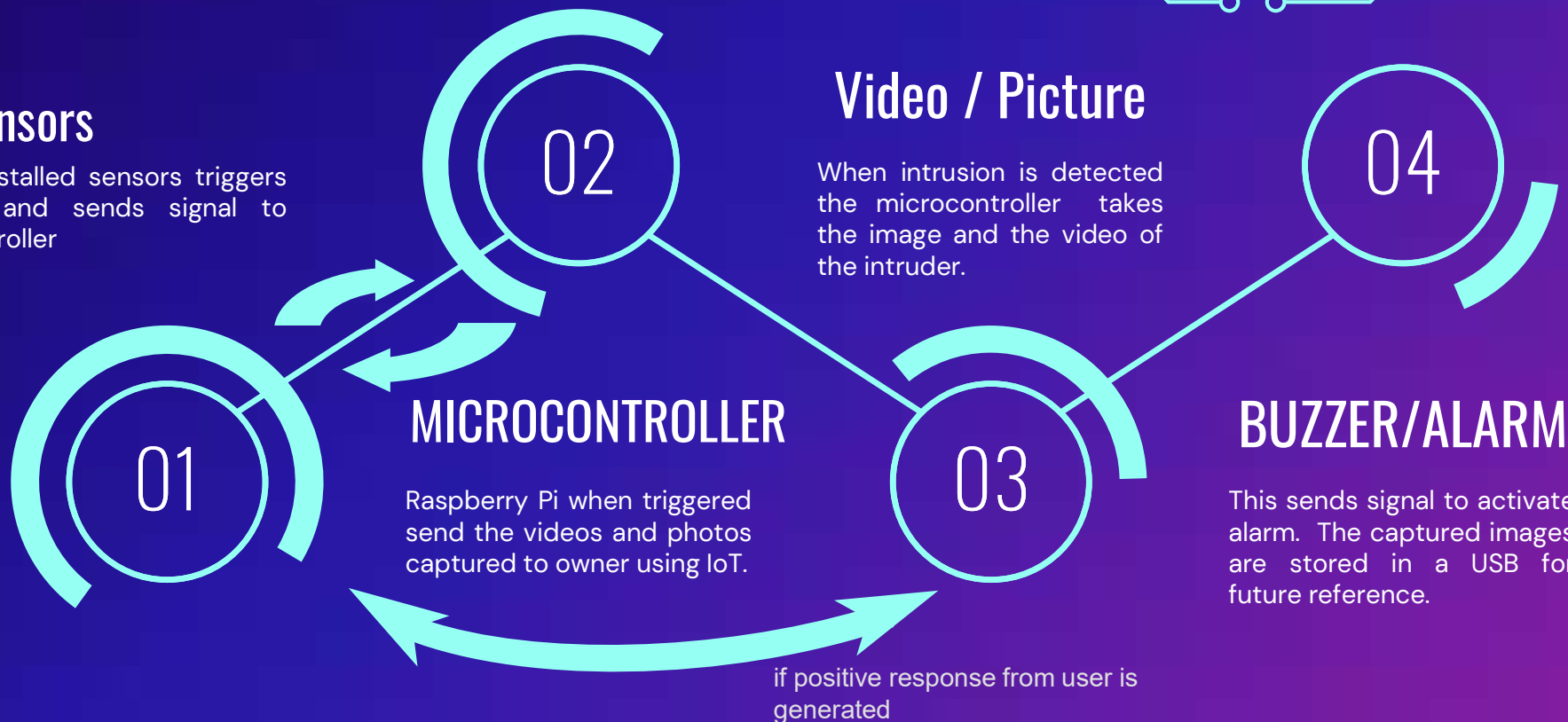
03

04

BUZZER/ALARM

This sends signal to activate alarm. The captured images are stored in a USB for future reference.

if positive response from user is generated



HARDWARE IMPLEMENTATION



Fig. 2. Sound Sensor



Fig. 3. Connection diagram of Raspberry Pi 2 module



Fig. 4. Prototype of the Home security system



USER GAINS & NEEDS



AFFORDABILITY

It is less expensive compared to other security systems given in the market. It contains many types of latest sensors also.



BACKED UP MEMORY

All the video and images captured by the system is send directly to the user and stored in a USB drive for future reference and insurance claims.

LIMITATIONS



REAL-TIME MONITORING

If a known person comes to the house and sets off the alarm, the owner can see the video in real-time through the camera.



FIRE DETECTION

Only focuses in intrusion detection and not give highlight to other means of damage to property.

EXPERIMENTAL RESULTS



Fig. 5. Image captured by the Home security system



Fig. 6. A 7 second video captured by the Home security system

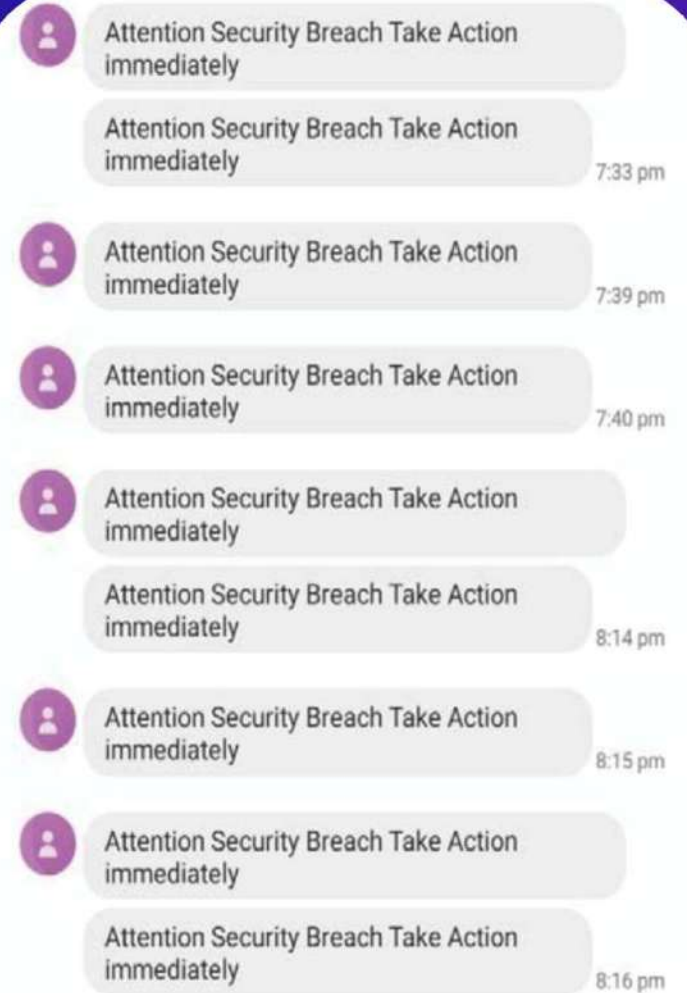


Fig. 7. Screenshot of SMS alert of Intruder activity



Conclusion

Here is what limitations we found in the past projects, and what we are thinking of implementing in the future



WHAT CHANGES WE COULD MAKE



There are a lot of big players like MI Homes in the security market which provide a complete smart home packages, which include vacation mode, automated switches,, remote control using app, etc. However, there are few drawbacks out of which we want to implement atleast one in this project, if not all.



BASIC

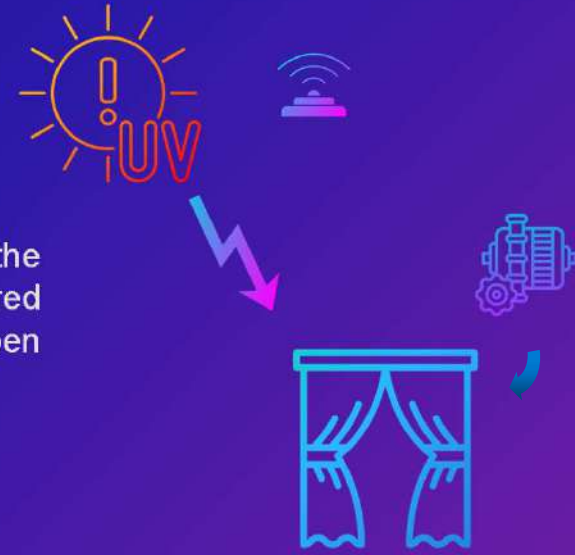


- Basic home security systems right now easily available in market are **human detection** (face recognition, insider, outsider, pets)
- LPG, smoke and temperature detection systems are also available
- Remote contols like controlling through apps and all is also available
- ✗ No UPS integration, so no power backup



SUN EXPOSURE

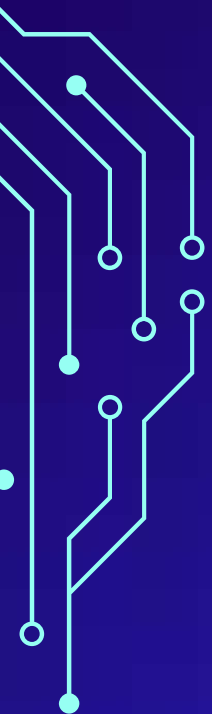
We could use an LDR sensor to detect the intensity of light, and by the use of Geared brushless motor we can auto close/open the curtains
Also



Using a gyroscope, which detects the movement, we could give signal to buzzer in order to alert others and empty the building, as sometimes people don't realize when the first tremor of earthquake hits

EARTHQUAKE DETECTION





CHILD & TRIP PROTECTION



We could use remote control using app to lock a door remotely if the child is seen (through camera) accessing the rooms/ kitchen which we don't want them to access. Electric lock with password would be used

Apple watch has this feature, if a person faints and falls down it'd let others know. We could use the same app based system to do the same. It could be implemented by a Machine Learning model for fall detection whose link is given below:

<https://github.com/ambianic/fall-detection>



TRIP PROTECTION FOR ELDERS



AUTO AC ON/OFF

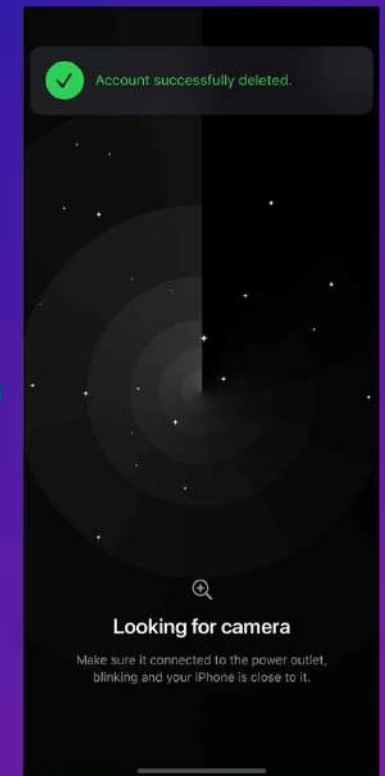
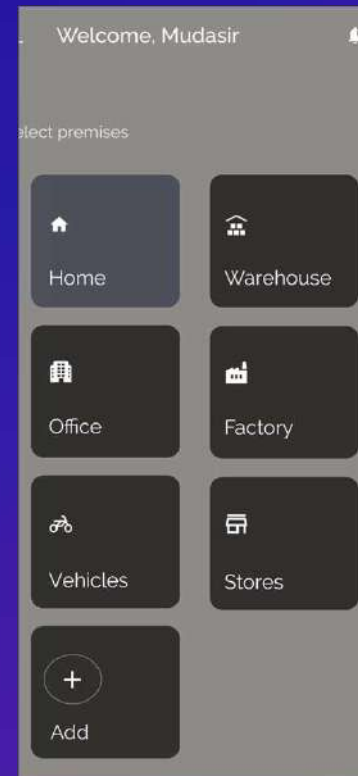
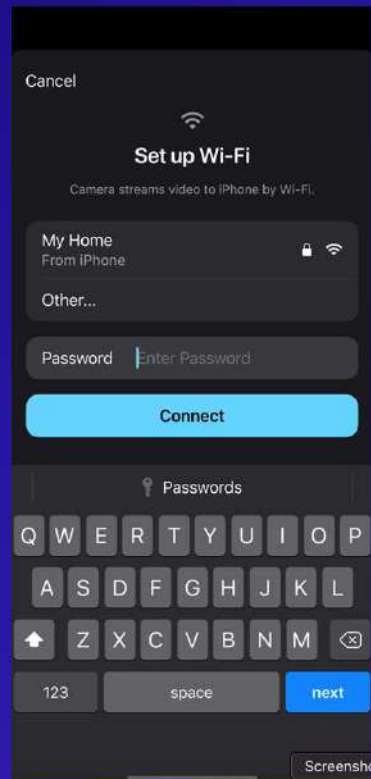
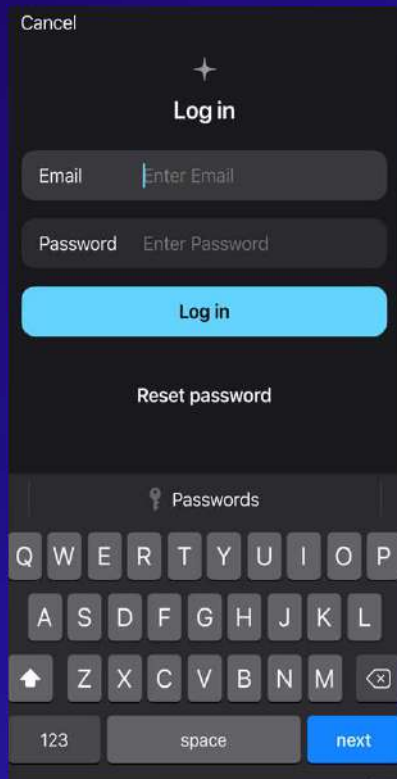
Using temperature sensor & LDR sensor, if the temperature outside exceeds a certain limit, we could develop a project to send signals to AC for ON/OFF in order to prevent heat exposure or too much exposure to AC



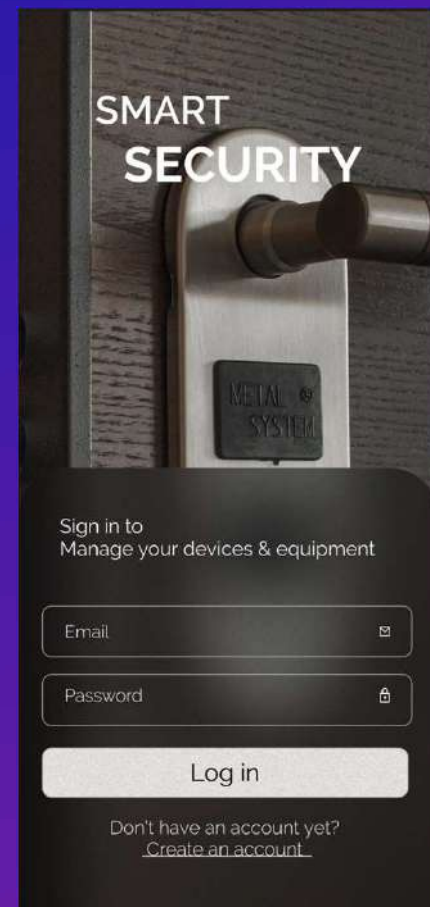
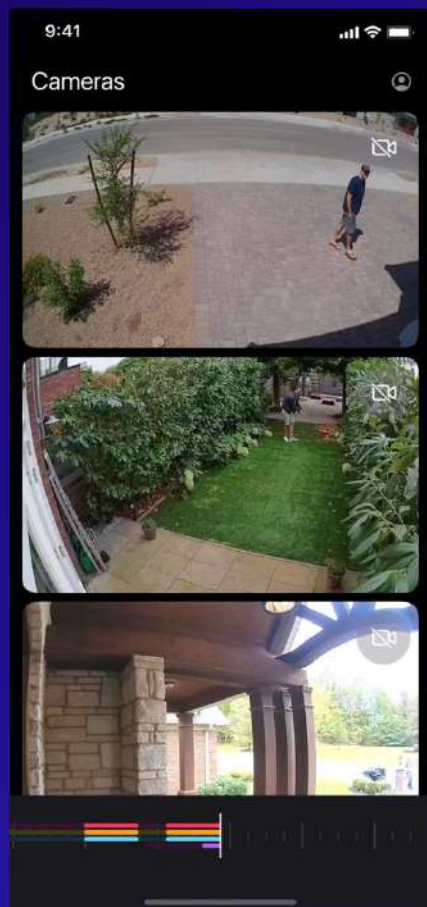
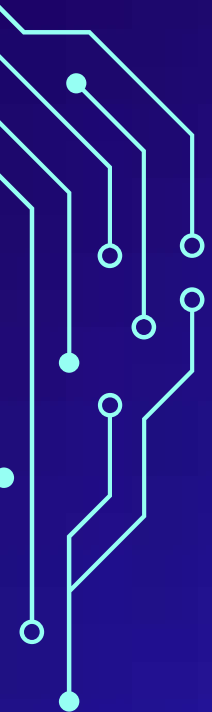
Lightening could be detected using lightning sensors which detects the electromagnetic pulse (EMP) emitted by a lightning strike. Using magnetic coil inside **Relay**, we can switch off all the electrical appliances in the house.

LIGHTNING DETECTION

OUR PROTOTYPE



Disclaimer : This is not our final project, it is just the way we want to implement things. All the features discussed can't be implemented at once, we'll try to implement as much as possible





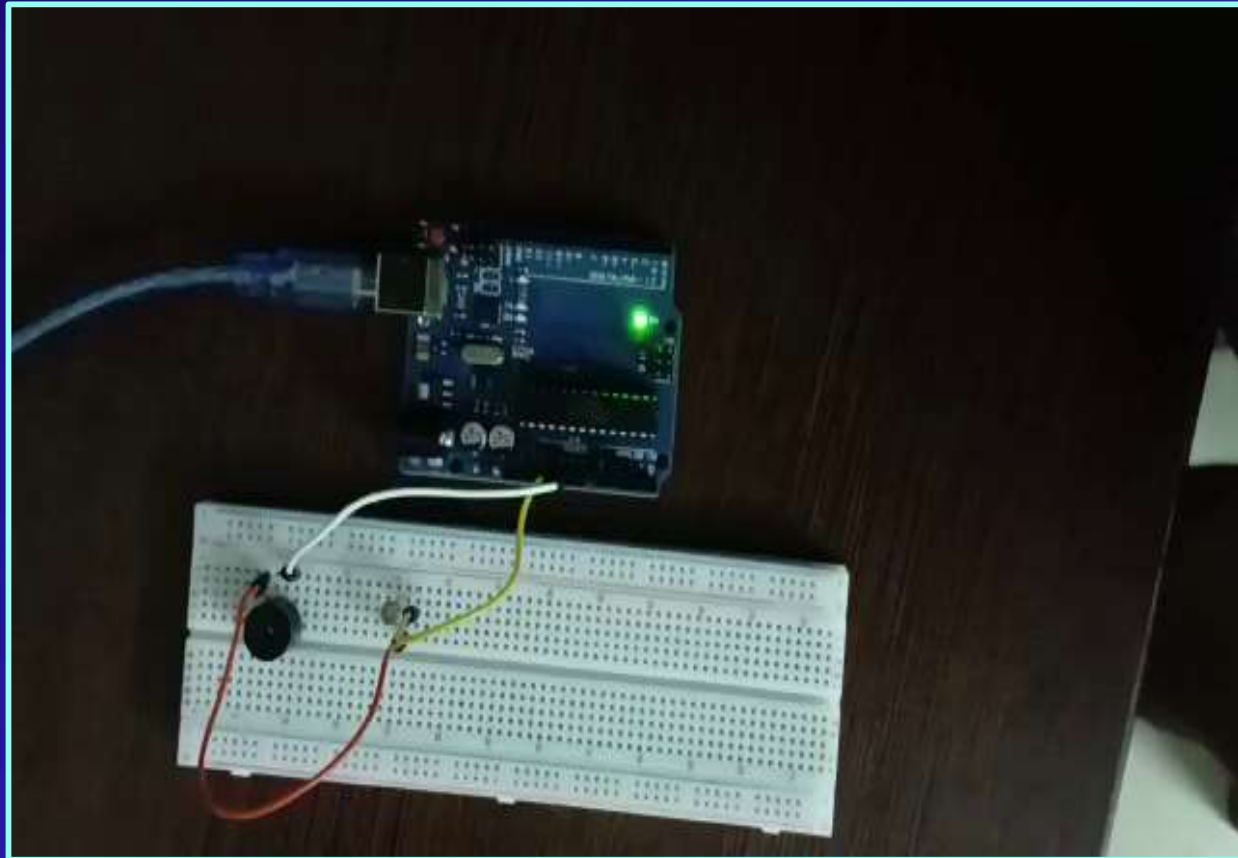
Access Control Intercom System



24 Security



A short video on how LDR sensor works using Arduino



Our Team Project

Arduino Based Home Automation & security

Features



**Curtain
Automation**

**Fire &
Smoke
Detection**

**Temperature
UV
detection**

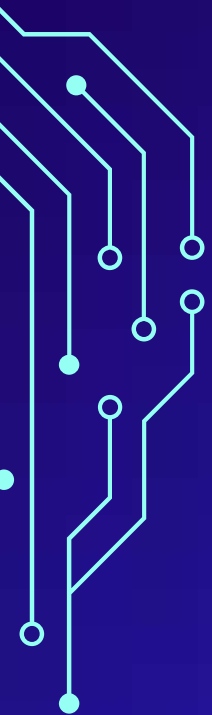
**Automatic
Door Lock/
Unlock**

**SMS
Notifiaction**

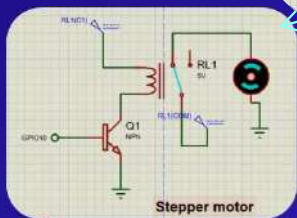
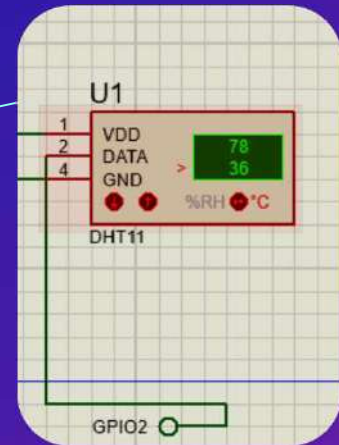
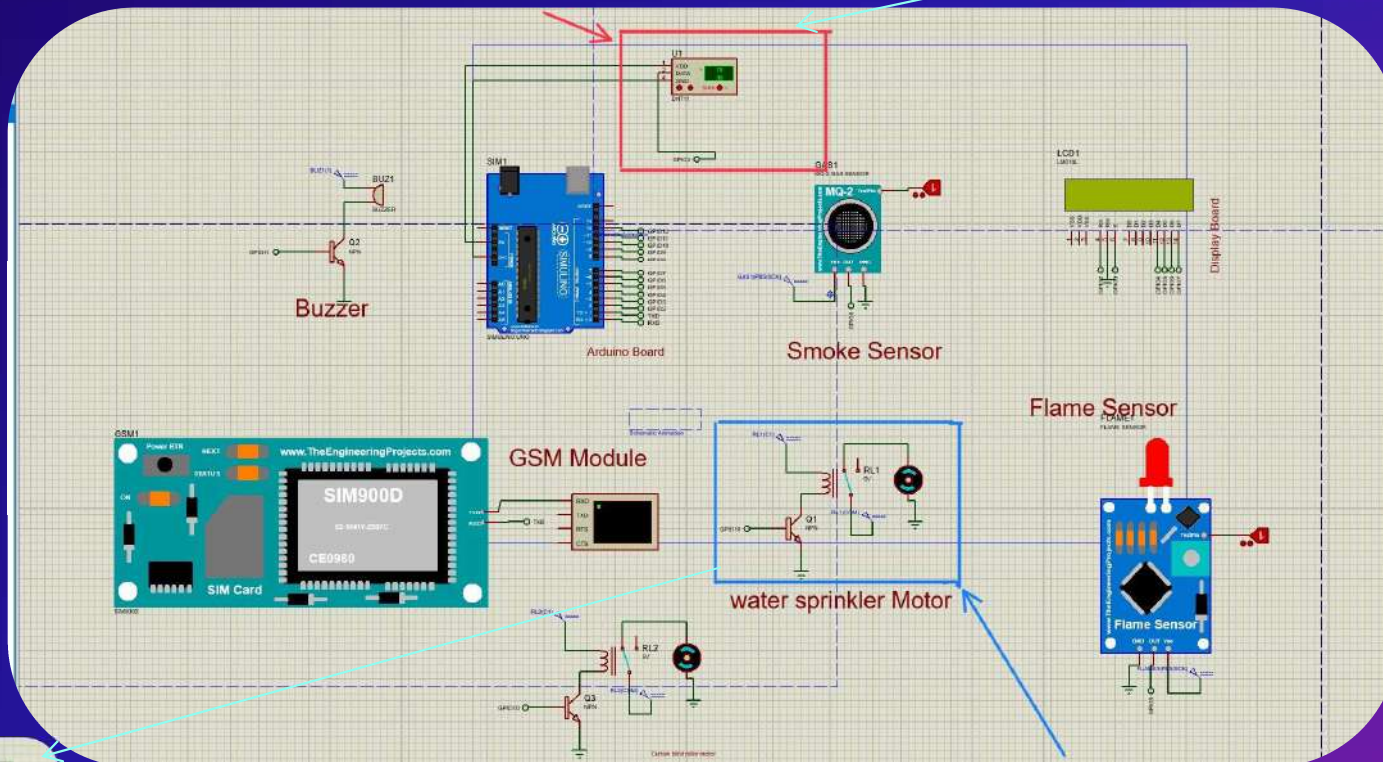
Curtain Automation

This feature uses a temperature / UV sensor to detect the temperature and UV index. If the temperature is above a certain value (say 35°C), the curtains are closed using a stepper motor automatically, which is switched on using a relay. Same for the UV index, if it exceeds a certain value, the curtains would be closed . The step size of the stepper motor would be set according to the length of the curtain.

The proteus Simulation for the same is shown in the next slide

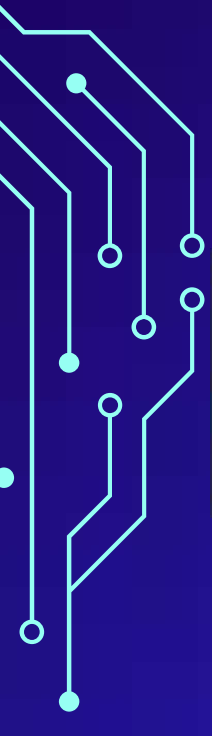


The temperature sensor detects the temperature. In our case, if it exceeds 36 degree C, the relay switch for the motor would be turned on



The stepper motor when turned on would close the curtains automatically

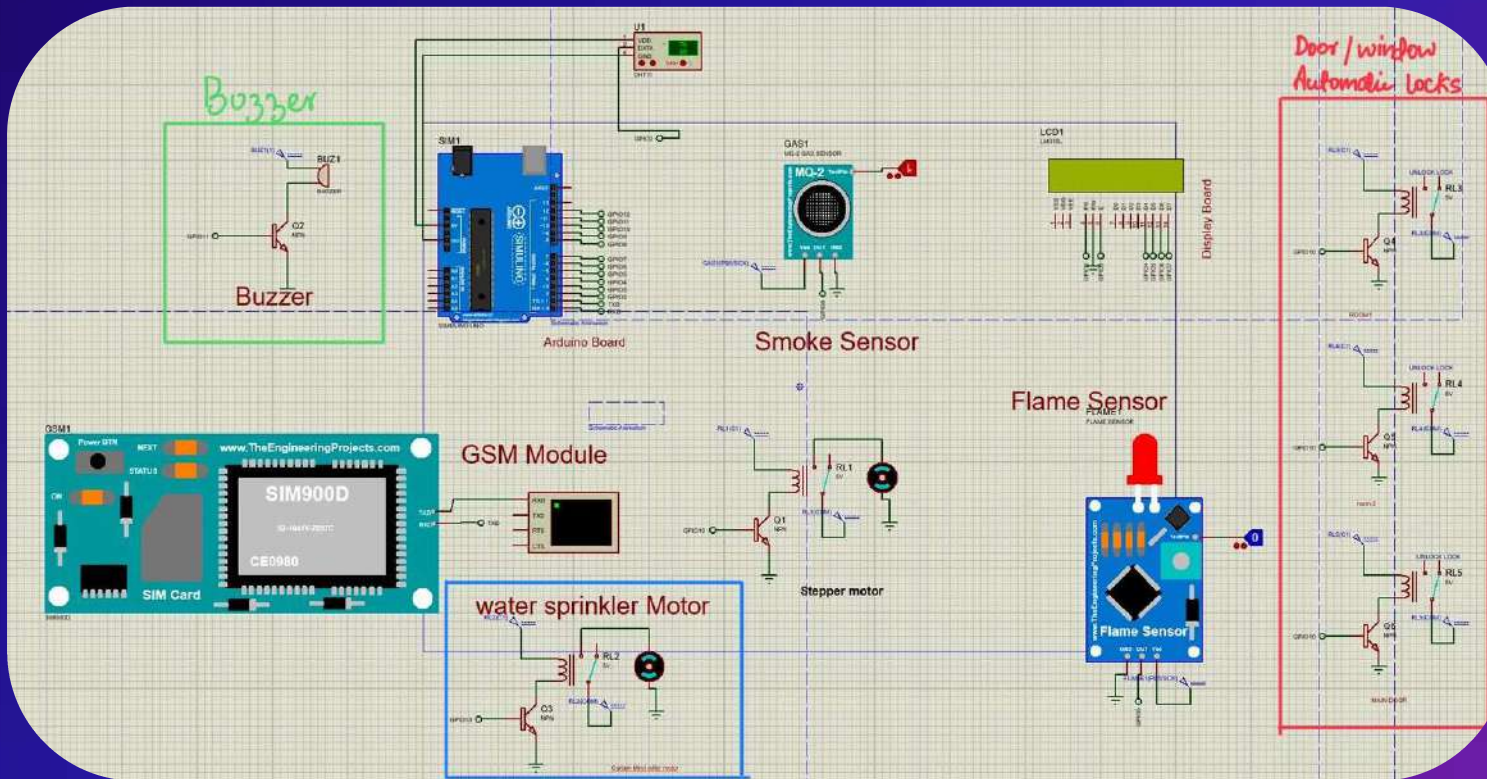
Arduino Code For Curtain Automation

A decorative graphic on the left side of the slide, consisting of white lines and circles on a dark blue background, resembling a circuit board or a stylized 'E' shape.

```
float temp = DHT11.temperature; // read temperature from DHT11 sensor
if(temp > 35 && (float)DHT11.humidity>20){
    digitalWrite(motor_pin,HIGH);
}
```

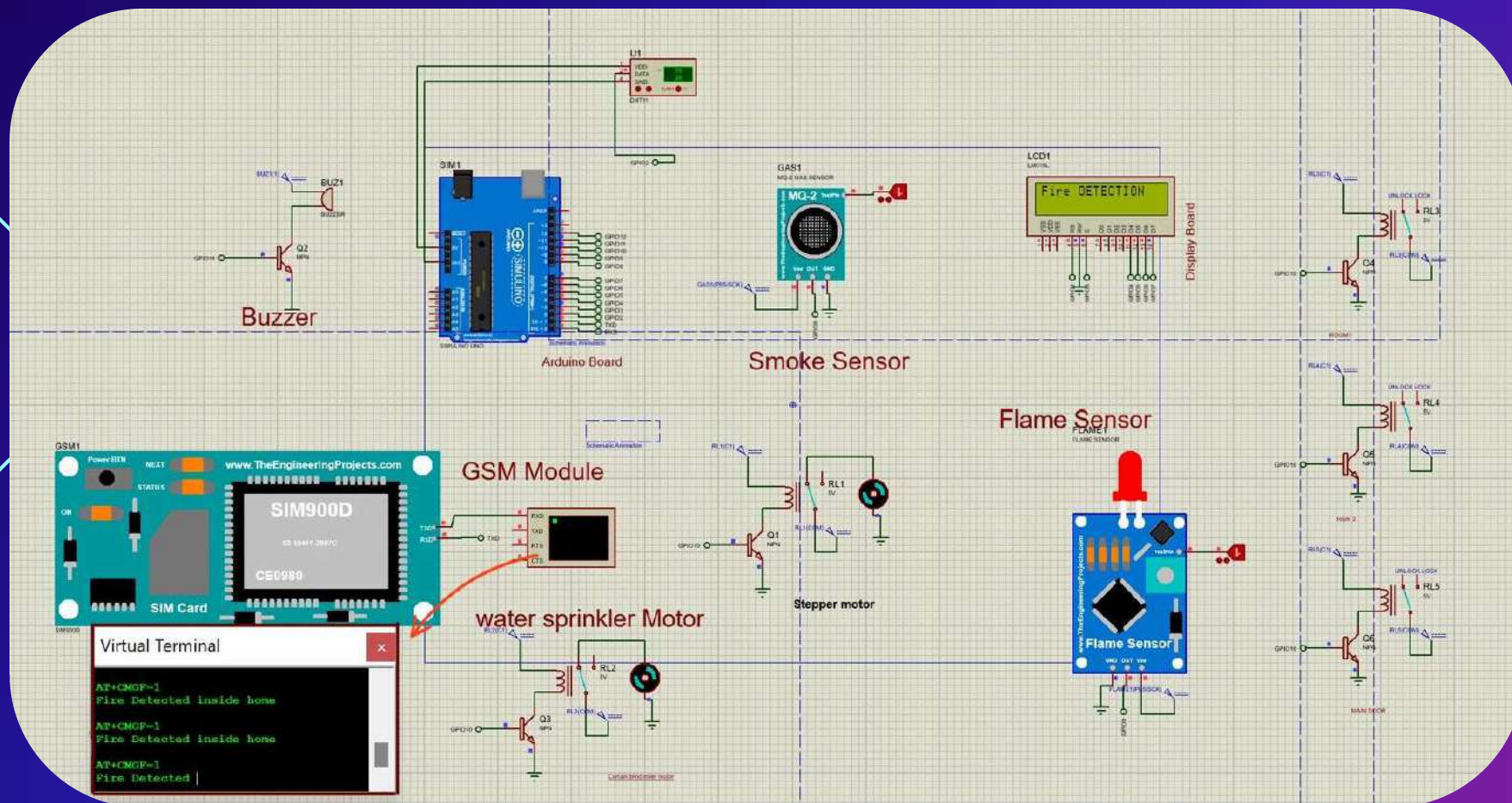
Whenever the fire sensor detects fire or the smoke sensor detects smoke, the curtain motor is turned on & the buzzer goes on

The doors/ windows are opened using the electronic lock



SMS is sent to the registered mobile number using GSM

Also, the water sprinkler is turned on using a motor



Message that is sent to registered user's phone when fire is detected

Virtual Terminal

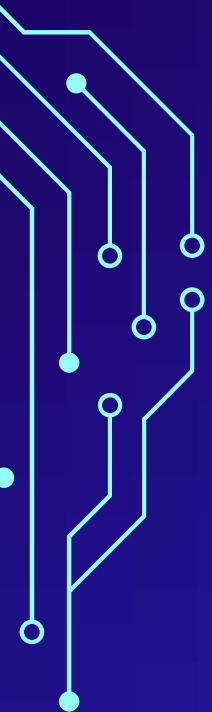
```
AT+CMGF=1
Fire Detected inside home

AT+CMGF=1
Fire Detected inside home

AT+CMGF=1
Fire|
```

Arduino Code

```
sem > Micro project > Fire_Detection_And_Alaram_System_Proteus > Fire_Detection_And_Al  
1  #include <LiquidCrystal.h>  
2  #include <dht11.h> // include DHT Library  
3  dht11 DHT11;  
4  #define DHT11PIN 2  
5  LiquidCrystal lcd(2, 3, 4, 5, 6,7);  
6  const int gas_Sensor = 8;  
7  const int flame_Sensor = 9;  
8  const int motor_pin = 10;  
9  const int buzzer_Pin = 11;  
10 bool fire_Status = LOW;  
11 bool flame_Status = LOW;  
12 void setup() {  
13   Serial.begin(9600);  
14   pinMode(buzzer_Pin, OUTPUT);  
15   pinMode(motor_pin, OUTPUT);  
16   pinMode(gas_Sensor, INPUT);  
17   pinMode(flame_Sensor, INPUT);  
18   lcd.begin(16, 2);  
19   lcd.print("Fire DETECTION");  
20   lcd.setCursor(0,2);  
21   lcd.print(" SYSTEM");  
22 }  
23 void loop() {  
24   int chk = DHT11.read(DHT11PIN);  
25   fire_Status = digitalRead(gas_Sensor);  
26   flame_Status = digitalRead(flame_Sensor);
```



```
float temp = DHT11.temperature; // read temperature from DHT11 sens
28 if(temp > 35 && (float)DHT11.humidity>20){
29     digitalWrite(motor_pin,HIGH);
30 }
31 if((fire_Status == HIGH) && (flame_Status == HIGH))
32 {
33     lcd.clear();
34     lcd.print("Fire Detected");
35     lcd.setCursor(3,2);
36     lcd.print("Sending msg");
37     digitalWrite(buzzer_Pin, HIGH);
38     digitalWrite(motor_pin, HIGH);
39     while(1)
40     {
41         SendMessage();
42     }
43 }
44 else
45 {
46     lcd.clear();
47     lcd.print("Fire not ");
48     lcd.setCursor(3,2);
49     lcd.print("detected");
50     digitalWrite(buzzer_Pin, LOW);
51     digitalWrite(motor_pin, LOW);
52     delay(100);
53 }
54 }
55 void SendMessage()
56 {
57     Serial.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
58     Serial.println("Fire Detected inside home");// The SMS text you want to send
59     Serial.println((char)26);// ASCII code of CTRL+Z
60 }
```

THANK YOU

