Ahsanullah University of Science & Technology

Department of Computer Science & Engineering

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Project Proposal

CSE 3216
Microcontroller Based System Design Lab

Project Name: Home Security System

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Objective:

The main purpose of a home security system is to minimize break-ins from the burglars. Home security system also provides protection of our possessions of things and also our protection of ourselves. Again, Home security system helps us to avoid danger from all types of circumstances.

Social Values:

When we look at our family, and our home, we know we want them to be safe, always out of harm's way. When we leave for work, we expect to come back to a smiling family, and to a home that is secure. But as they say, hope is not a strategy. The growing crime rates across cities reflects the bitter reality. Many people overlook, ignore, and underestimate the need of taking appropriate home security measures. A burglary or theft can lead to devastating consequences, both emotionally and financially. Having a security system in place often provides family members with enough warning to get to a safe location in our outside the home while the alarm system dispatches local authorities.

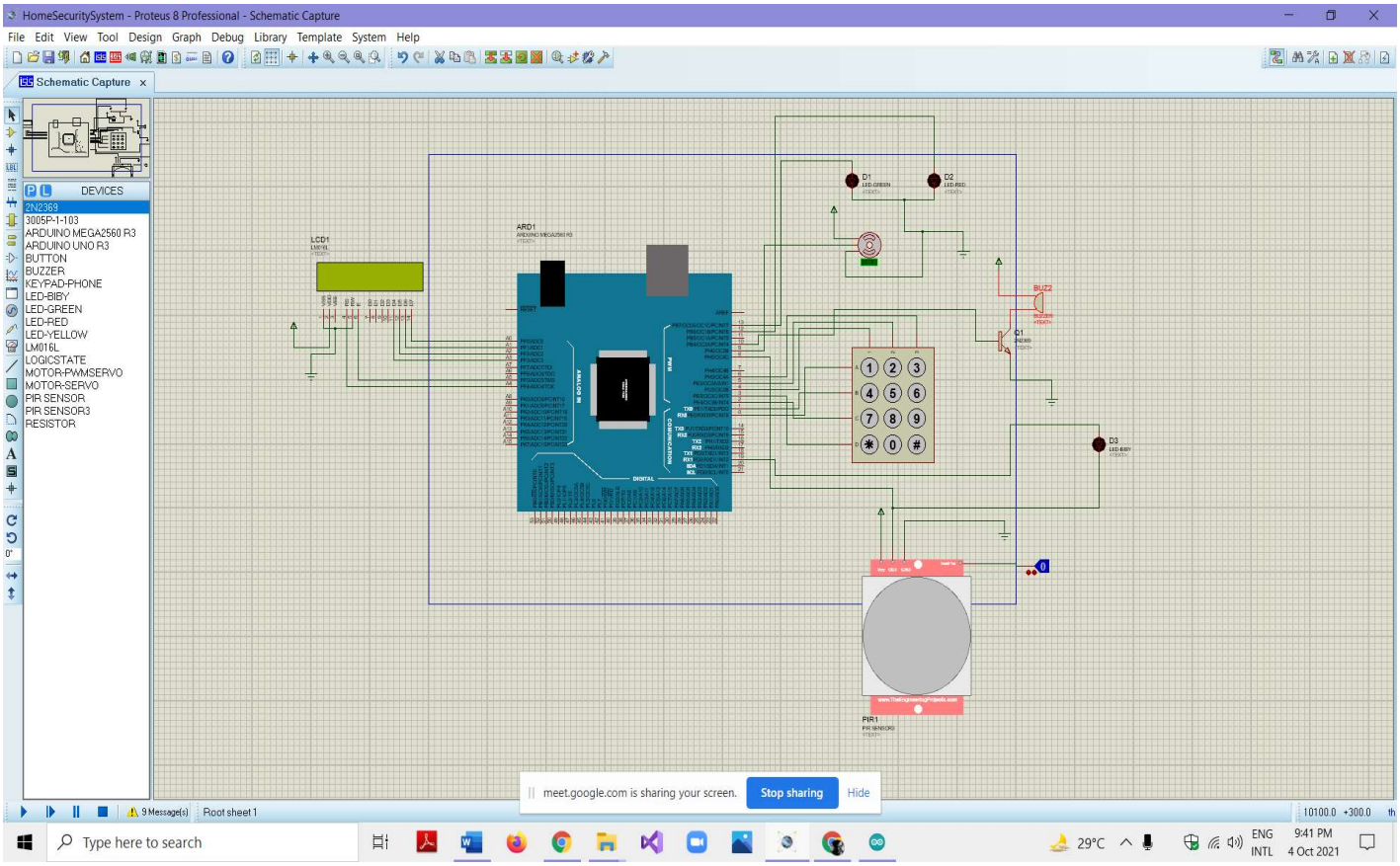
Required Components:

These following parts and tools are required for building this project

- Arduino Mega 2560
- PIR Motion Sensor
- LCD 16*2
- Keypad 4*3

- ❖ Servo Motor
- ❖ Buzzer
- ❖ Jumper Wire
- ❖ LED
- ❖ Breadboard
- ❖ Transistor

Design:



Working Procedure:

The basic components that react to the input are

- **Servo motor**
  It controls the movement of door to be opened or closed.
- **LCD display**
  To show the message of current status.
- **Keypad**
  To provide password for locking door.
- **PIR Sensor**
  Senses any movement of unwanted intruder.
- **Buzzer**
  Alarm rings for the consequence of unwanted event.

Estimated Budget:

Equipment	Quantity	Budget
Arduino Mega 2560	1	900
PIR Motion Sensor	1	90
LCD 16*2	1	160
Keypad 4*3	1	75
Servo Motor	1	225
Buzzer	1	15
Transistor	1	30
LED	3	15
Jumper Wire	As required	100
Total		**1610**

Code:

```
#include<Keypad.h>
#include<LiquidCrystal.h>
#include<Servo.h>
#include<Wire.h>

Servo myservo;
int pos=0;
int readPIR=0;
int motionflag=0;
int pirPin = 8;

LiquidCrystal lcd(A4, A5, A3, A2, A1, A0);
const byte rows=4;
const byte cols=3;

char key[rows][cols]={
 {'1','2','3'},
 {'4','5','6'},
 {'7','8','9'},
 {'*','0','#'},
};
```

```
byte rowPins[rows]={0,1,2,3};
byte colPins[cols]={4,5,6};
Keypad keypad = Keypad(makeKeymap(key),rowPins,colPins,rows,cols);
char* password="7255";
int currentposition=0;

int red = 12;
int green = 13;
int buzzer = 10;
int blue = 19;
int wrong = 0;
int pir=0;
int total = 0;


void setup() {
  lcd.begin(16,2);
  pinMode(8, INPUT);
  //pinMode(9, OUTPUT);
  //digitalWrite(9, HIGH);
  pinMode(2, INPUT);
  pinMode(3, OUTPUT);
  digitalWrite(3, HIGH);
  pinMode(13,OUTPUT);
```

```
  pinMode(12,OUTPUT);
  pinMode(10,OUTPUT);
  pinMode(19,OUTPUT);
  myservo.attach(9);
  lcd.begin(16,2);
  lcd.print("HOME SECURITY");
  lcd.setCursor(0,1);
  lcd.print("SYSTEM");
  lcd.setCursor(0,2);
  delay(3000);
  lcd.clear();
  readPIR = digitalRead(pirPin);

  if (readPIR == 1){
    motion_detected_1();
  }
  else{
    motion_detected_2();
  }
}

void loop() {
  if(currentposition==0){
  displayscreen();
```

```
}
int n;
char code=keypad.getKey();
if(code!=NO_KEY){
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print("PASSWORD:");
 lcd.setCursor(7,1);
 lcd.print(" ");
 lcd.setCursor(7,1);
 for(n=0;n<=currentposition;++n){
  lcd.print("*");
 }

 if(code==password[currentposition]){
  ++currentposition;
 }
 else if(code != password[currentposition]){
  wrong++;
  currentposition++;
 }
 if(currentposition==4){

    if(wrong > 0){
```

```
        total++;
        wrong = 0;
        currentposition = 0;
        incorrect();
      }

      else if(currentposition==4 && wrong == 0){
        currentposition = 0;
        wrong = 0;
        unlockdoor();
      }
      if(total == 3){
        total = 0;
        buzzer_beep();
        delay(500);
        motion_detected_2();
      }
    }

  }

}

void motion_detected_1()
```

```
{

  if (readPIR == 1) {
    motionflag=0;
    lcd.home();
    //digitalWrite(readPIR,HIGH);
    lcd.println("Someone Here");
    delay(500);
    lcd.clear();

    loop();
    delay(500);
    lcd.clear();

  }

}

void motion_detected_2()
{
  readPIR = digitalRead(pirPin);

  if (readPIR==0&&motionflag== 0) {
```

```
   lcd.clear();
   lcd.println("No one here..");
   //motionflag=1;
   delay(1000);

   setup();

  }
  else{
   if (readPIR == 1){
    if(motionflag== 0){
     lcd.clear();
     lcd.println("No one here..");
     delay(1000);
     //motion_detected_2();
      setup();
    }
    else{
     motion_detected_1();
    }

   }
  }
}
```

```
void displayscreen(){
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.println("ENTER THE CODE");
  lcd.setCursor(1,1);
  lcd.println("TO OPEN DOOR!!");
}

void incorrect(){
  digitalWrite(red,HIGH);
  delay(1000);
  digitalWrite(red,LOW);
  delay(500);
  lcd.clear();
  lcd.setCursor(1,0);
  lcd.print("CODE");
  lcd.setCursor(6,0);
  lcd.print("INCORRECT");
  lcd.println(" ");
  lcd.setCursor(3,1);
  lcd.println("GET AWAY!!!");
  delay(2000);
```

```
  lcd.clear();
  displayscreen();
}

void unlockdoor(){


  digitalWrite(green,HIGH);
  delay(2000);
  digitalWrite(green,LOW);
  delay(1000);

  lcd.setCursor(0,0);
  lcd.println(" ");
  lcd.setCursor(1,0);
  lcd.print("Access Granted");
  lcd.setCursor(4,1);
  lcd.println("WELCOME!!");
  lcd.setCursor(16,1);
  lcd.println(" ");
  lcd.setCursor(15,1);
  lcd.println(" ");
  lcd.setCursor(14,1);
  lcd.println(" ");
```

```
  lcd.setCursor(13,1);
  lcd.println(" ");

  for(pos = 0; pos<=180; pos += 5){
    myservo.write(pos);
    delay(5);
  }
  delay(2000);
  delay(1000);
  counterbeep();

  delay(1000);

  for(pos = 180; pos >= 0; pos -= 5){
    myservo.write(pos);
    delay(15);
    currentposition=0;
    lcd.clear();
    displayscreen();
  }
}

void counterbeep(){
  delay(2000);
```

```
lcd.clear();
lcd.setCursor(2,0);
delay(200);
lcd.println("GET IN WITHIN:");
lcd.setCursor(4,1);
lcd.print("5");
delay(200);

lcd.clear();
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN::");
delay(1000);

lcd.setCursor(2,0);
lcd.println("GET IN WITHIN:");
lcd.setCursor(4,1);
lcd.print("4");
delay(200);

lcd.clear();
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN::");
delay(1000);
```

```
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN:");
lcd.setCursor(4,1);
lcd.print("3");
delay(200);

lcd.clear();
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN::");
delay(1000);

lcd.setCursor(2,0);
lcd.println("GET IN WITHIN:");
lcd.setCursor(4,1);
lcd.print("2");
delay(200);

lcd.clear();
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN::");
delay(1000);

lcd.setCursor(2,0);
```

```
lcd.println("GET IN WITHIN:");
lcd.setCursor(4,1);
lcd.print("1");
delay(200);

lcd.clear();
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN::");
delay(1000);

lcd.setCursor(2,0);
lcd.println("GET IN WITHIN");
lcd.setCursor(4,1);
lcd.print("0");
delay(200);

lcd.clear();
lcd.setCursor(2,0);
lcd.println("GET IN WITHIN");
delay(1000);

delay(40);
lcd.clear();
lcd.setCursor(2,0);
```

```
  lcd.print("RE-LOCKING");
  delay(500);
  lcd.setCursor(12,0);
  lcd.print(".");
  delay(500);
  lcd.setCursor(13,0);
  lcd.print(".");
  delay(500);
  lcd.setCursor(14,0);
  lcd.print(".");
  delay(400);
  lcd.setCursor(5,0);
  lcd.print("LOCKED!");
  delay(440);
  digitalWrite(red,HIGH);
  delay(2000);
  digitalWrite(red,LOW);
  delay(1000);

  motionflag=1;
  motion_detected_2();

}
```

```
void buzzer_beep(){
  lcd.clear();
  lcd.setCursor(0,1);
  lcd.print("WARNING!!");
  lcd.setCursor(0,2);
  lcd.print("Accses Denied");
  motionflag=0;
  for(int i=0;i<3;i++){
    digitalWrite(buzzer,HIGH);
    delay(1000);
    digitalWrite(buzzer,LOW);
    delay(1000);
  }
}
```

Members Contribution:

❖ID - 180104004:

- Door Lock/Unlock System (Servo motor, LED, Arduino Mega2560)
- Arduino coding logic

❖ID - 180104036:

- Password System (Keypad, LCD, Arduino mega2560)
- Arduino coding logic

❖ID - 180104037:

- Alarm System (Buzzer, Transistor, Arduino Mega2560)
- Arduino coding logic

❖ID - 180104043:

- Motion Detection System (PIR sensor, LCD, LED, Arduino Mega2560)
- Arduino coding logic

Difficulties:

Implementing the part of PIR sensor and buzzer was difficult. Overall, designing of the circuit was tough to sort out. We couldn't implement fingerprint sensor because of fingerprint sensor's library.

Future Work:

We have planned to implement mobile based OTP feature in future. We have also planned to add fingerprint sensor and fire alarm sensor in future.

Conclusion:

The sense of security and peace you gain with an alarm system is perhaps the greatest benefit of all. Next to being safe, the confidence of feeling safe will help you be a more productive, healthy, and focused person. When the value of security is elevated to the top of the collective priorities, it becomes a meta-frame, a reference point in relation to which other aspects of social life are articulated and organized. This project is cost effective. Nowadays this project will effectively provide a peace of mind to the residents.