

COMPUTER CONTROLLED BOT (USING CIPHER ALGORITHM)

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OVER VIEW

Our project aim is to control a robot using some sort of cipher text. We implemented ceasar cipher algorithm to achieve our goal.

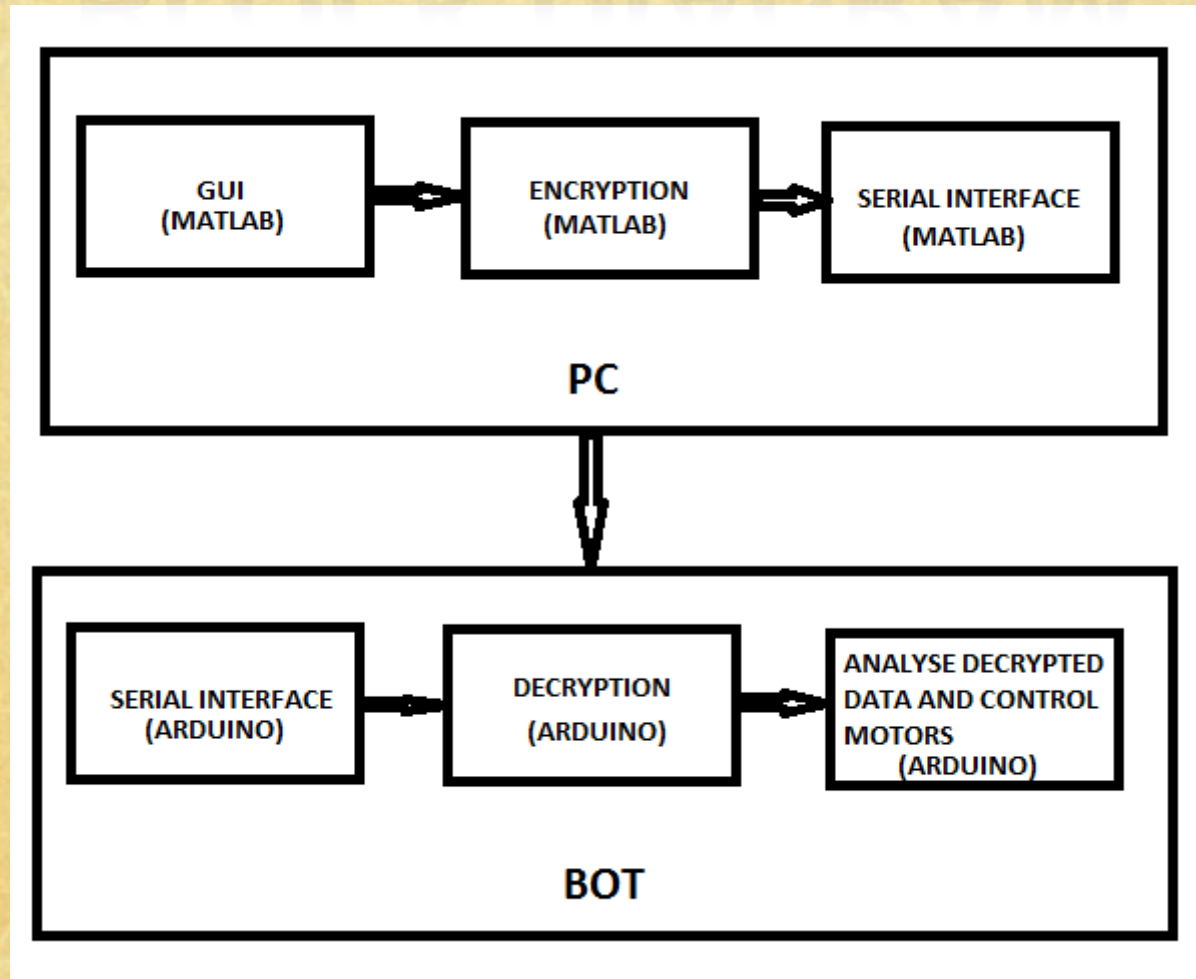
We designed a GUI using which the user can control the bot. There a code running behind the GUI that encrypts the plain text and transmits the encrypted text over the serial port.

The Bot receives these encrypted text, decrypts it and then performs the required action.

Applications:

Can be used in applications that require security (Military)

BLOCK DIAGRAM



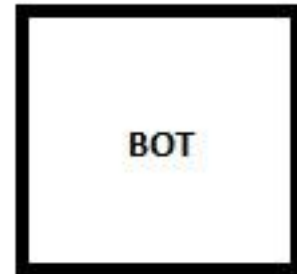
HOW WE DID IT

1. Decided on an encryption and decryption algorithm
2. Created decryption code for arduino and tested with LEDs
3. Created control code for bot.
4. Used control code with encryption and decryption and implemented on arduino to control bot.
5. Created encryption code in matlab.
6. Implemented the encryption code and used serial communication to send encrypted data to arduino.
7. tested controlling bot with encryption in matlab and decryption in arduino.
8. created GUI for easy user interaction.
9. tested the GUI to control bot.
10. Tested that the command signals encrypted with only the proper key which is same as the key in arduino work no other key works.

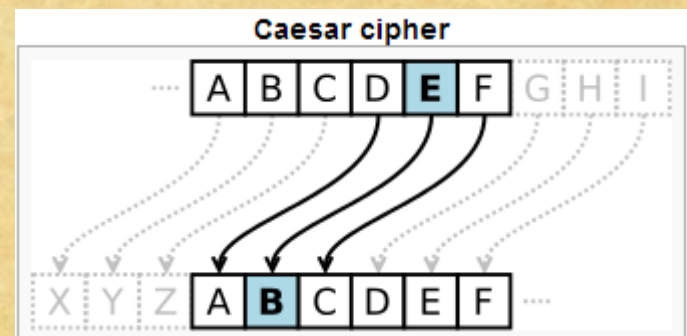
Encryption



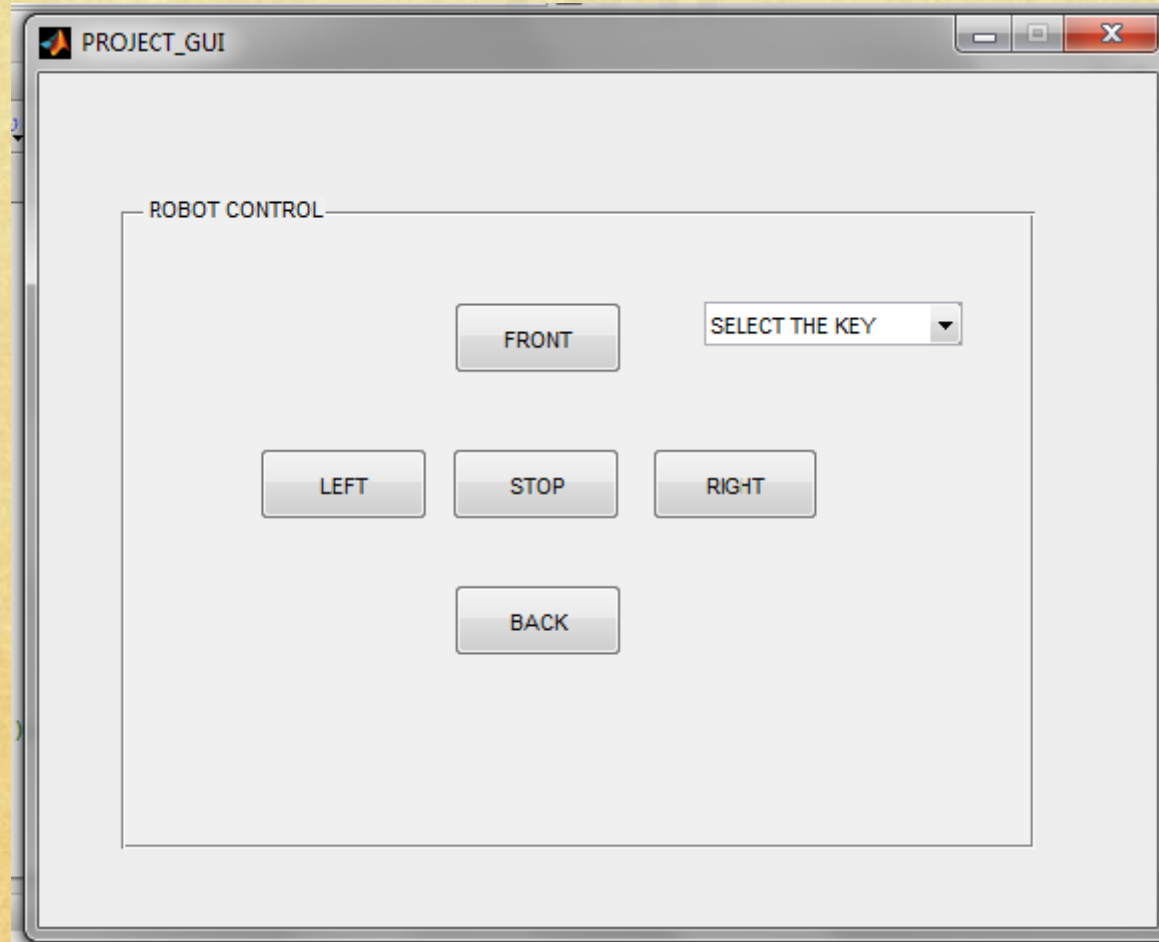
Decryption



EXPLANATION



GUI



SOFTWARE TOOLS

- ARDUINO IDE
- MATLAB
- MATLAB GUIDE
- COM-o-COM (Virtual serial port emulator)

CODE FOR ARDUINO

```
#include <Servo.h>
```

```
Servo myservo;
```

```
Servo myservo1;
```

```
byte rightPIN = 9;
```

```
byte leftPIN = 10;
```

```
int txt = 0;
```

```
int key = 0;
```

```
String signal;
```

```
void setup()
```

```
{
```

```
    key=2;
```

```
    Serial.begin(9600);
```

```
    myservo.attach(rightPIN);
```

```
    myservo1.attach(leftPIN);
```

```
    myservo.writeMicroseconds(1480);
```

```
    myservo1.writeMicroseconds(1485);
```

```
}
```

```
void loop()
```

```
{
```

```
    String x;
```

```
    if (Serial.available() > 0)
```

```
    {
```

```
        txt = Serial.read();
```

```
        if(txt >= 'A' && txt <= 'Z')
```

```
        {
```

```
            int c1= txt - 'A';
```

```
            int c2 = (c1 - key)% 26;
```

```
            if(c2<0)
```

```
                c2+=26;
```

```
            int c3 = c2 + 'A';
```

```
            signal+=(char)c3;
```

```
        }
```


CODE FOR ARDUINO

```
else
{
  control(signal);
  signal="";
}
}
}
void control(String x)
{
  if(x == "front" || x == "FRONT")
  {
    myservo.writeMicroseconds(1800);
    myservo1.writeMicroseconds(1165);
  }
  else if (x == "back" || x == "BACK")
  {
    myservo.writeMicroseconds(1160);
    myservo1.writeMicroseconds(1805);
  }
}
```

```
else if (x == "right" || x == "RIGHT")
{
  myservo.writeMicroseconds(1800);
  myservo1.writeMicroseconds(1805);
}
else if (x == "left" || x == "LEFT")
{
  myservo.writeMicroseconds(1160);
  myservo1.writeMicroseconds(1165);
}
else if (x == "stop" || x == "STOP")
{
  myservo.writeMicroseconds(1480);
  myservo1.writeMicroseconds(1485);
}
}
```

CODE FOR MATLAB

```
function code(key,str)
str1=str+key;
l=length(str1);
for i=1:l
if((str(i)>='a')&&(str(i)<='z'))
    ch='a';
    str1(i)=str1(i)-'a';
elseif((str(i)>='A')&&(str(i)<='Z'))
    str1(i)=str1(i)-'A';
    ch='A';
end
if(str1(i)<0)
    str1(i)=str1(i)+26;
elseif(str1(i)>=26)
    str1(i)=str1(i)-26;
End
str1(i)=str1(i)+ch;
end
```

```
str1=char(str1);
s =
serial('/dev/cu.usbmodem1411','BaudRate
',9600);
fopen(s);
for i=1:110
fprintf(s,'%s\n' ,str1);
End
fclose(s);
delete(s);
clear s;
End
```

REFERENCES

- Matlab help and documentation
- <http://arduino.cc/en/Reference/HomePage>
- http://en.wikipedia.org/wiki/Caesar_cipher

THANK YOU