

NIS-LAB12

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Aim: Write a program to demonstrate Image Steganography operations: Embed and Extract Hide 1 bit per pixel. Compute MSE (Mean Squared Error) and PSNR (Peak Signal to Noise Ratio) values.

Program1: Write a program to demonstrate Image Steganography operations

```
import random
import math
def Embed(image,text):
    k=0
    result = [[0 for i in range(len(image))] for i in range(len(image[0]))]
    for i in range(len(image)):
        for j in range(len(image[0])):
            binary_element=bin(image[i][j])[2:].zfill(8)
            temp = binary_element[:7] + text[k]
```

```
        result[i][j]=int(temp,2)
        k+=1
    return result
```

```
def Extract(Maxrix):
    str=""
    for i in range(len(Maxrix)):
        for j in range(len(Maxrix[0])):
            binary_element=bin(Maxrix[i][j])[2:].zfill(8)
            str+=binary_element[7]
    return str
```

```
def MSE(i1,i2):
    sum=0
    for i in range(len(i1)):
        for j in range(len(i2)):
            temp=i1[i][j]-i2[i][j]
            sum+=(temp*temp)
    return sum/(len(i1)*len(i2))
```

```

def PSNR(mse):
    return 10*math.log10( (255*255)/mse )

if __name__ == '__main__':
    demo=[]
    image_binary=[]
    for i in range(64):
        demo.append(random.randint(0, 255))
        if(len(demo)%8==0):
            image_binary.append(demo)
            demo=[]
    print("Binary of image:",image_binary)
    number=98765432198765432987
    text=bin(number)[2:].zfill(64)
    print("Text is:",text)
    stego_image=Embed(image_binary,text)
    print("Embed Matrix:",stego_image)
    extract=Extract(stego_image)
    print("original text is:",extract)
    mse=MSE(image_binary,stego_image)
    print("MSE value is:",mse)
    print("PSNR value is:",PSNR(mse))

```

Testcase:

```
PS C:\Users\HP\OneDrive\Desktop\prince\sem 6\NIS\LAB> python -u "c:\Users\HP\OneDrive\Desktop\prince\sem 6\NIS\LAB\Lab12\1.py"
Binary of image: [[237, 83, 163, 49, 2, 11, 170, 80], [7, 214, 102, 117, 105, 23, 183, 41], [108, 36, 85, 15, 1, 237, 61, 88, 241], [125, 130, 44, 212, 185, 81, 140, 235], [59, 11, 93, 159, 26, 87, 101, 241], [208, 188, 239, 142, 200, 254, 47, 135], [251, 58, 161, 40, 167, 232, 107, 170], [246, 207, 24, 8, 118, 60, 16, 39]]
Text is: 000011011011010011011010010111110111110111101000001001010110001
Embed Matrix: [[236, 82, 162, 48, 3, 11, 170, 81], [7, 214, 103, 117, 104, 23, 182, 40], [109, 37, 84, 151, 237, 60, 89, 240], [124, 131, 44, 213, 185, 81, 141, 235], [58, 11, 93, 159, 27, 87, 101, 240], [209, 189, 239, 143, 200, 255, 46, 134], [250, 58, 160, 41, 166, 232, 107, 170], [247, 206, 25, 9, 118, 60, 16, 39]]
original text is: 000011011011010011011010010111110111110111101000001001010110001
MSE value is: 0.578125
PSNR value is: 50.51058610784803
PS C:\Users\HP\OneDrive\Desktop\prince\sem 6\NIS\LAB>
```

```
> python -u "c:\Users\HP\OneDrive\Desktop\prince\sem 6\NIS\LAB\Lab12\1.py"
Binary of image: [[134, 153, 184, 180, 16, 70, 253, 169], [101, 37, 81, 120, 236, 226, 249, 69], [226, 4, 11, 2, 53, 120, 53, 150, 97], [196, 163, 154, 96, 136, 132, 193, 220], [108, 10, 164, 246, 195, 250, 51, 181], [140, 148, 124, 26, 107, 155, 85, 108], [225, 89, 24, 115, 193, 57, 179, 119], [12, 18, 3, 200, 42, 59, 139, 37]]
Text is: 1010101101010010101001101001101100101110101110101110101000010011011
Embed Matrix: [[135, 152, 185, 180, 17, 70, 253, 169], [100, 37, 80, 121, 236, 227, 248, 68], [227, 4, 113, 52, 121, 52, 150, 97], [197, 162, 155, 96, 137, 132, 192, 221], [109, 10, 165, 247, 194, 250, 51, 180], [141, 149, 125, 26, 107, 154, 85, 108], [225, 89, 25, 114, 193, 56, 179, 118], [12, 18, 2, 201, 42, 58, 139, 37]]
original text is: 10101011010100101010011010100110110010111010111010101101000010011
MSE value is: 0.578125
PSNR value is: 50.51058610784803
PS C:\Users\HP\OneDrive\Desktop\prince\sem 6\NIS\LAB> |
```