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CERTIFICATE

This is to certify that Mr. **ROHAN UTTAM KHAPANE** of **MSC DATA ANALYTICS PART 1** has completed the project work in the Subject of **IMAGE AND VIDEO ANALYSIS** during the academic year 2023-24 under the guidance of Prof **YOGESH KANE** being the partial requirement for the fulfillment of the curriculum of **Degree of Masters Of Data Analytics , University of Mumbai**

Date:

Name & Signature of faculty

Name & Signature of external

Name & Signature of Co-ordinator

IMAGE STEGANOGRAPHY USING MATLAB

Abstract:

Image steganography is a technique used to hide secret information within an image, without altering the visual quality of the image significantly. This report provides an overview of image steganography, its techniques, applications, challenges.

Introduction:

Image steganography is the practice of hiding one image or some form of data (the "message") within another image (the "cover") in a way that is not visually perceptible. This is typically done by altering the least significant bits (LSBs) of the pixel values in the cover image to encode the message. Image steganography is often used for secure communication or to hide information in plain sight.

Techniques:

Image steganography techniques use is bit plane slicing form point processing in spatial domain .

Code:

```
clc;
clear all;
close all;
cover = imread(input('Enter cover image: ', 's'));
message = imread(input('Enter message image name: ', 's'));
n = input('Enter the no of LSB bits to be substituted- ');
x=rgb2gray(cover);
y=rgb2gray(message);

% Resize one of the images to match the size of the other
if ~isequal(size(x), size(y))
    % Determine which image needs resizing based on the desired size
    if numel(x) > numel(y)
        desiredSize = size(y);
        x = imresize(x,desiredSize);
        size(x)
    else
        y = imresize(y, size(x));
        size(y)
    end
end

S = uint8(bitxor(bitand(x,bitcmp(2^n-1,'uint8')),bitshift(y,n-8))); %Stego
imwrite(S, 'output.jpg');

E = uint8(bitand(255,bitshift(S,8-n))); %Extracted3
origImg = double(y); %message image
```

```
distImg = double(E); %extracted image
[M N] = size(origImg);
distImg1=imresize(distImg,[M N]);

error = origImg - distImg1;
MSE = sum(sum(error .* error)) / (M * N);
disp('MSE is')
disp(abs(MSE))
figure(1),subplot(2,1,1);imshow(x);title('1.Cover image')
figure(1),subplot(2,1,2);imshow(y);title('2.Message to be hide')

figure(3),imshow((abs(S)),[]);title('3.Stegnographic image')
figure(4),imshow(real(E),[]); title('4.Extracted image')

figure(5),subplot(2,1,1);imhist(x);title('Histogram of cover image')
figure(5),subplot(2,1,2);imhist(S); title('Histogram of transformed stego image')
```

Output:

Entering the cover and message image

Command Window

```
Enter cover image:
flower.jpg
Enter message image name:
school.jpg
Enter the no of LSB bits to be substituted-
4
```

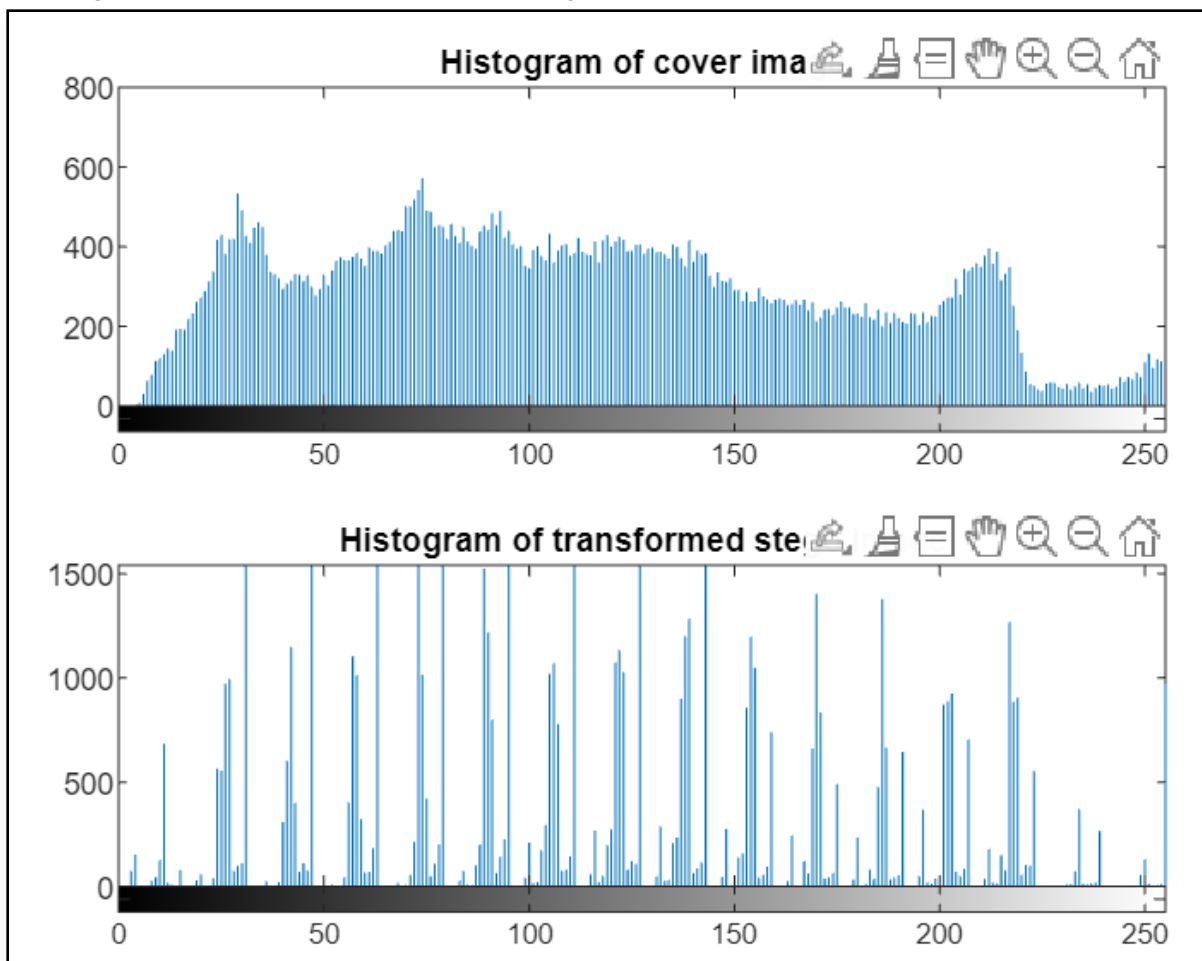
Displaying cover image an message image



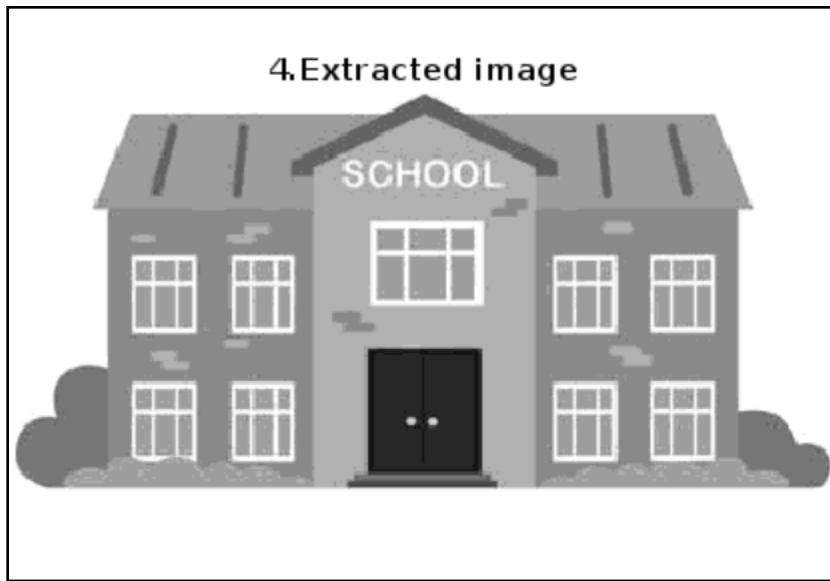
Stenographic image



Histogram of cover and steno image



Extracted image form steno image



The Mean absolute error of message image and extracted image

```
MSE is  
108.3619
```

```
>> |
```

Conclusion:

Steganography is the art and science of writing hidden message that no one apart from the sender and receiver, suspect the existence of the message.

The MSE error in the extracted image the lower mse the better output we can get. It is a vital tool for securing data and protecting digital media. As technology continues to advance, so do the techniques and challenges of image steganography.