

IMAGE STEGANOGRAPHY

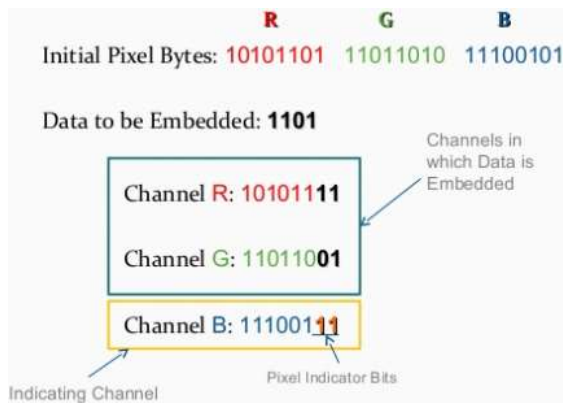
Image Processing Project Report

Image steganography is an encryption technique that can be used for hiding data in pixels. There are several steganography techniques used for hiding data, and we are focusing on **Pixel Indicator (PI)**

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Pixel Indicator



Encoder Code:

```
% channel 1: green
% channel 2: blue
clc;
clear;
close all;
img=imread('lenna.bmp');
img2=imread('test.png');
img2=rgb2gray(img2);
figure(1)
imshow(img2);
%test image
% msg1=[1 0 1 1 0 1 1 0
%       1 1 0 1 1 0 1 0
%       1 1 1 1 0 0 1 0
%       1 0 1 0 1 0 1 0
%       1 1 1 1 0 1 0 1
%       1 1 1 1 1 0 1 1];
img2=img2';
msg1=dec2bin(img2);

red=img(:, :, 1); %red plane
green=img(:, :, 2); %green plane
blue=img(:, :, 3); %blue plane
W_img= length(img);
```

```

code=input('enter the code: ');

si=size(msg1);

si=si(1);

j=1;
k=1;
mask=252;

for c=1:si

    msg=msg1(c,:);

    if(code==1 || code==2 || code==0)
%       case 2
        for i=1:4
            if(k>W_img)
                k=1;
                j=j+1;
            end

            if (code ==0)
                % not hiding anything
                temp=bitand(red(j,k),mask);
                red(j,k)=bitor(temp,0);
                k=k+1;

                elseif(code==1)
                %No hidden data in green,2 bits of hidden data in blue
                %Mdec=msg(2*i-1)*2+msg(2*i)*1;
                Mdec=str2num(msg(2*i-1))*2+str2num(msg(2*i))*1;
                temp=bitand(blue(j,k),mask);
                blue(j,k)=bitor(temp,Mdec);

                temp=bitand(red(j,k),mask);
                red(j,k)=bitor(temp,1);

                elseif(code==2)
                %2 bits of hidden data in green 1
                %Mdec=msg(2*i-1)*2+msg(2*i)*1;
                Mdec=str2num(msg(2*i-1))*2+str2num(msg(2*i))*1;
                temp=bitand(green(j,k),mask);
                green(j,k)=bitor(temp,Mdec);

                temp=bitand(red(j,k),mask);
                red(j,k)=bitor(temp,2);
            end
            k=k+1;
        end
    end

    if(code==3)

        for i=1:2

            if(k>W_img)
                k=1;
                j=j+1;
            end

```

```

        %2 bits of hidden data in blue and green
        % Mdec1=msg(4*i-3)*2+msg(4*i-2)*1;
        % Mdec2=msg(4*i-1)*2+msg(4*i)*1;
        Mdec1=str2num(msg(4*i-3))*2+str2num(msg(4*i-2))*1;
        Mdec2=str2num(msg(4*i-1))*2+str2num(msg(4*i))*1;
        temp=bitand(blue(j,k),mask);
        blue(j,k)=bitor(temp,Mdec1);
        temp=bitand(green(j,k),mask);
        green(j,k)=bitor(temp,Mdec2);

        temp=bitand(red(j,k),mask);
        red(j,k)=bitor(temp,3);
        k=k+1;
    end
end

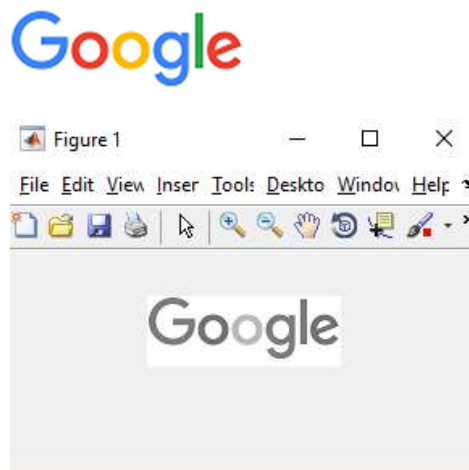
% Recombine separate color channels into an RGB image.
rgbImage = cat(3, red, green, blue);
figure(2)
imshow(rgbImage);
figure(3)
imshow(img);
title('Stego Image');

% writing the file
folder = 'C:\Users\Abhijeet Prem\Documents\Image Processing\Matlab\porject';
imwrite(rgbImage,fullfile(folder,'lenna1.bmp'));

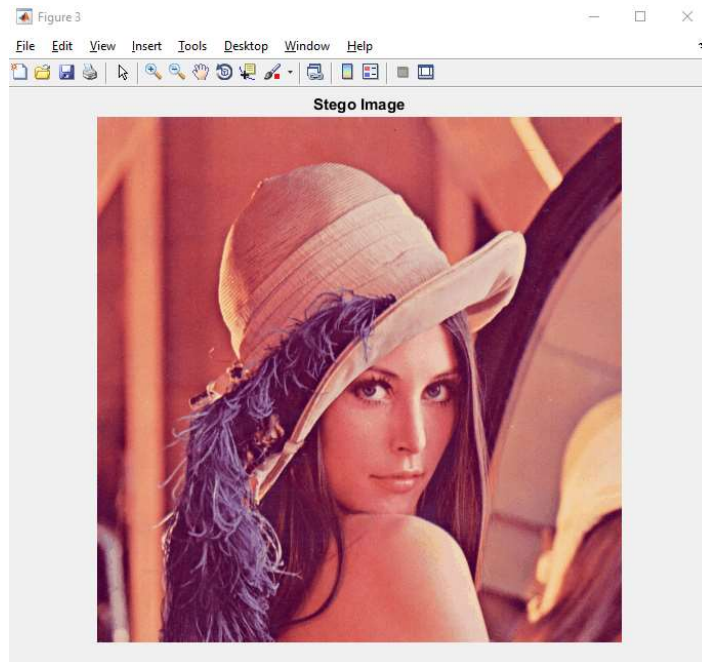
```



Original image



Message



Decoder Code

```
% PI decoder
clc
clear
%reading the strgo image
img=imread('lennal.bmp');

%splitting to 3 channel

red_T=img(:, :, 1); %red plane
green_T=img(:, :, 2); %green plane
blue_T=img(:, :, 3); %blue plane

%extract the code from the r channel
%code=bitand(red_T(1,1),3);
% buf=blanks(1,8);
k=1;
c=1;
code=bitand(red_T(1,1),3);
for j=1:40

    for i=1:512
        if(k>4)
            k=1;
            c=c+1;
        end

        if(code==1)
            %blue
            temp=dec2bin(bitand(blue_T(j,i),3));
            if(strcmp(temp,'1'))
                buf(c,(2*k)-1:2*k)={0 1};
            elseif(strcmp(temp,'0'))
                buf(c,(2*k)-1:2*k)={0 0};
            elseif(strcmp(temp,'10'))
                buf(c,(2*k)-1:2*k)={1 0};
```

```

elseif(strcmp(temp,'11'))
    buf(c,(2*k)-1:2*k)={1 1};
end
k=k+1;
end

if(code==2)
    %green
    temp=dec2bin(bitand(green_T(j,i),3));
    if(strcmp(temp,'1'))
        buf(c,(2*k)-1:2*k)={0 1};
    elseif(strcmp(temp,'0'))
        buf(c,(2*k)-1:2*k)={0 0};
    elseif(strcmp(temp,'10'))
        buf(c,(2*k)-1:2*k)={1 0};
    elseif(strcmp(temp,'11'))
        buf(c,(2*k)-1:2*k)={1 1};
    end
    k=k+1;
end

if(code==3)
    %blue & green
    temp=dec2bin(bitand(blue_T(j,i),3));
    if(strcmp(temp,'1'))
        buf(c,(2*k)-1:2*k)={0 1};
    elseif(strcmp(temp,'0'))
        buf(c,(2*k)-1:2*k)={0 0};
    elseif(strcmp(temp,'10'))
        buf(c,(2*k)-1:2*k)={1 0};
    elseif(strcmp(temp,'11'))
        buf(c,(2*k)-1:2*k)={1 1};
    end
    k=k+1;
    %extracting from green channel
    temp2=dec2bin(bitand(green_T(j,i),3));
    if(strcmp(temp2,'1'))
        buf(c,(2*k)-1:2*k)={0 1};
    elseif(strcmp(temp2,'0'))
        buf(c,(2*k)-1:2*k)={0 0};
    elseif(strcmp(temp2,'10'))
        buf(c,(2*k)-1:2*k)={1 0};
    elseif(strcmp(temp2,'11'))
        buf(c,(2*k)-1:2*k)={1 1};
    end
    k=k+1;
end

end

end
c=1;

```

```

for l=1:40
    for m=1:120
        temp=buf(c,:);
        temp=cell2mat(temp);
        val=0;
        for n=0:7
            val=val+((2^n)*temp(8-n)) ;
        end
        img2(l,m)=val;
        c=c+1;
        if(c==5120)
            break;
        end
    end
    if(c==5120)
        break;
    end
end
img4=uint8(img2);
imshow(img4);

```

