

# LAB:7

Name: Soundarya G

Register Number: 2048057

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## 1. Extract the frame from video

```
% Extracting frames from video
tomjerry = VideoReader('TomandJerry.mp4');

for img = 3:500:tomjerry.NumFrames;
    filename=strcat('frame',num2str(img),'.jpg');
    b = read(tomjerry, img);
    imwrite(b,filename);
end
```

```
% Displaying the Extracted frames
figure;
subplot(2,2,1), imshow('frame3.jpg'), title('Frame3');
subplot(2,2,2), imshow('frame503.jpg'), title('Frame503');
subplot(2,2,3), imshow('frame1003.jpg'), title('Frame1003');
subplot(2,2,4), imshow('frame1503.jpg'), title('Frame1503');
```



## 2. Apply enhancement methods as per the requirement

- Built-In Functions

```
img1 = imread('frame3.jpg');
```

```

% Contrast Stretching
s_img1 = imadjust(img1,stretchlim(img1),[]);

% Mean Filter
H = fspecial('average', 3);
s_img2 = imfilter(img1,H);

% Max Filter
s_img3 = imdilate(img1,true(3));

% Min Filter
s_img4 = imerode(img1,true(3));

% Smoothing
s_img5 = imgaussfilt(img1,2);

% Sharpen
s_img6 = imsharpen(img1);

% Sobel
J2 = fspecial('sobel');
s_img8 = imfilter(img1,J2,'replicate');

figure;
subplot(2,2,1), imshow(img1), title('Original Image');
subplot(2,2,2), imshow(s_img2), title('Mean Filter');
subplot(2,2,3), imshow(s_img3), title('Max Filter');
subplot(2,2,4), imshow(s_img4), title('Min Filter');

```



```

figure;
subplot(2,2,1), imshow(s_img5), title('Smoothened');
subplot(2,2,2), imshow(s_img6), title('Sharpen image');

```

```
subplot(2,2,3), imshow(s_img1), title('Contrst stretching');
subplot(2,2,4), imshow(s_img8), title('Sobel');
```

**Smoothened**



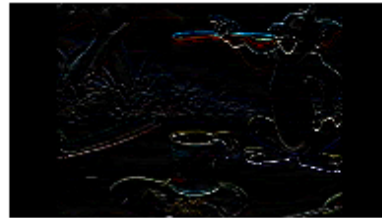
**Sharpen image**



**Contrst stretching**



**Sobel**



- User Defined Functions

```
fprintf("Total Number of Frames: %d",tomjerry.NumFrames);
```

Total Number of Frames: 1817

```
f=input("Enter the frame number:");
```

f = 666

```
figure;
f_num=uint8(read(tomjerry,f));
imshow(f_num);
```



=> Increasing Brightness video by 60 pixels

```
new_video=VideoWriter('Video1.avi');
open(new_video);

for i=1:tomjerry.NumFrames
    v_frame=uint8(read(tomjerry,i));
    for j=1:3
        v_frame(:,:,j)=v_frame(:,:,j)+60;
    end
    writeVideo(new_video,v_frame);
end
close(new_video);

figure;
n1=VideoReader('Video1.avi');
imshow(uint8(read(n1,f))),title("Frame- Brightness Increased");
```

### Frame- Brightness Increased



=> Power Law

```
new_video1=VideoWriter('Video2.avi');
open(new_video1);
for i=1:tomjerry.NumFrames
    v_frame=double(read(tomjerry,i));
    for j=1:3
        v_frame(:,:,j)=0.8*(v_frame(:,:,j).^0.8);
    end
    writeVideo(new_video1,v_frame/255);
end
close(new_video1);

figure;
n2=VideoReader('Video2.avi');
imshow(uint8(read(n2,f))),title("Frame- Power Law");
```

## Frame- Power Law



### => Sharpening

```
A= uint8(read(tomjerry,f));

%Preallocate the matrices with zeros
I1=uint8(read(tomjerry,f));;
I=zeros(size(A));
I2=zeros(size(A));

%Filter Masks
F1=[0 1 0;1 -4 1; 0 1 0];
F2=[1 1 1;1 -8 1; 1 1 1];

%Padarray with zeros
A=padarray(A,[1,1]);
A=double(A);

for i=1:size(A,1)-2
    for j=1:size(A,2)-2
        I(i,j)=sum(sum(F1.*A(i:i+2,j:j+2)));
    end
end

I=uint8(I);

%Sharpenend Image
K=I1-I;
imshow(uint8(K));title('Frame- Sharpening');
```

### Frame- Sharpening



### 3. Demonstrate wavelets decomposition ( 2 levels)

```
new_video3=VideoWriter('Video3.avi');
open(new_video3);
for i=1:tomjerry.NumFrames
    v_frame=double(read(tomjerry,i));
    for j=1:3
        U=v_frame(:,:,j);
        [C,S] = wavedec2(U,2,'haar');
    end
    writeVideo(new_video3,U/255);
end
close(new_video3);
figure;
n4=VideoReader('Video3.avi');
imshow(uint8(read(n4,f))),title("Frame- Wavelets Decomposition");
```

## Frame- Wavelett Decomposition



```
filename=strcat('frame',num2str(f),'.jpg');
b = read(tomjerry, f);
imwrite(b,filename);

X = imread(filename);
I = rgb2gray(X);
[c,s]=wavedec2(I,2,'haar');

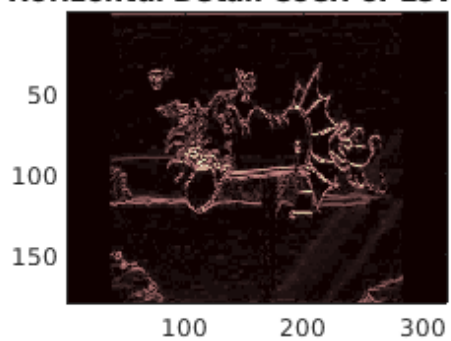
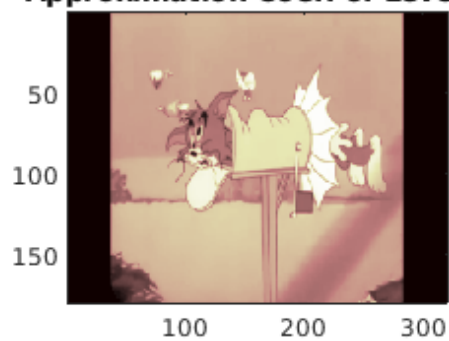
[H1,V1,D1] = detcoef2('all',c,s,2);
A1 = appcoef2(c,s,'haar',2);

V1img = wcodemat(V1,255,'mat',1);
H1img = wcodemat(H1,255,'mat',1);
D1img = wcodemat(D1,255,'mat',1);
A1img = wcodemat(A1,255,'mat',1);

subplot(2,2,1);imagesc(A1img);colormap pink(255);title('Approximation Coef. of Level 2')
subplot(2,2,2);imagesc(H1img);title('Horizontal Detail Coef. of Level 2')
subplot(2,2,3);imagesc(V1img);title('Vertical Detail Coef. of Level 2')
subplot(2,2,4);imagesc(D1img);title('Diagonal Detail Coef. of Level 2')
```



**Approximation Coef. of Level 2      Horizontal Detail Coef. of Level 2**



**Vertical Detail Coef. of Level 2      Diagonal Detail Coef. of Level 2**

