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LAB 7

1. Extract the frame from video

Reading the Video file using VideoReader function

```
a = VideoReader('Seed.mp4');
```

Finding the Total number of Frames in the selected video

```
TotalFrames = 0;

while hasFrame(a)
    readFrame(a);
    TotalFrames = TotalFrames+1;
end

fprintf("THE SEED Inspirational Short Film has totally %d Frames",TotalFrames);
```

```
THE SEED Inspirational Short Film has totally 1946 Frames
```

Generating few frames from the video using random pattern,

Eample:

500 taken as interval between 1 and Total no. of Frames in the video

```
for img = 1:200:a.NumFrames

    filename=strcat('frame',num2str(img),'.jpg');
    b = read(a, img);
    imwrite(b,filename);

end
```

Plotting generated frames using subplot function

```
figure;
subplot(2,1,1), imshow('frame201.jpg'), title('Frame-201');
subplot(2,1,2), imshow('frame401.jpg'), title('Frame-401');
```


```
figure;
subplot(2,1,1), imshow('frame601.jpg'), title('Frame-601');
subplot(2,1,2), imshow('frame801.jpg'), title('Frame-801');
```


```
figure;
subplot(2,1,1), imshow('frame1001.jpg'), title('Frame-1001');
subplot(2,1,2), imshow('frame1201.jpg'), title('Frame-1201');
```

Frame-1001

Frame-1201

2. Apply enhancement methods as per the requirement

Getting required Frame number as the input from the user

```
%userinput = input(" Specific required Frame : ");
userinput = 201;

filename=strcat('frame',num2str(userinput),'.jpg');
b = read(a, userinput);
imwrite(b,filename);

image_pick = strcat('frame',num2str(userinput),'.jpg');
chosen_image = imread(image_pick);

figure;
imshow(chosen_image), title(image_pick);
```

Applying required enhancement methods

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

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

% Sharpen
s_img6 = imsharpen(chosen_image);

figure;
subplot(2,2,1), imshow(chosen_image), title('Chosen Image');
subplot(2,2,2), imshow(s_img3), title('Max Filter');
subplot(2,2,3), imshow(s_img6), title('Sharpen Image');
subplot(2,2,4), imshow(s_img1), title('Contrast stretching');
```

Increasing brightness a bit

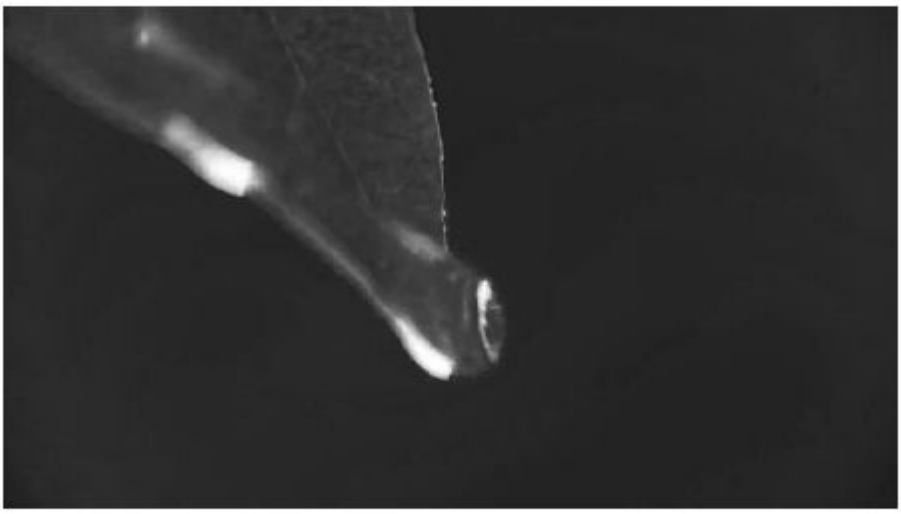
```
Brightness_video=VideoWriter('Brightness_video.avi');

open(Brightness_video);

for i=1:a.NumFrames
    v_frame=uint8(read(a,i));

    for j=1:3
       v_frame(:,:,j)=v_frame(:,:,j)+60;
    end

    writeVideo(Brightness_video,v_frame);
end

close(Brightness_video);

m=VideoReader('Brightness_video.avi');
figure;
imshow(uint8(read(m,userinput))),title("Brightness Increased");
```

3. Demonstrate wavelets decomposition (2 to 3 levels)

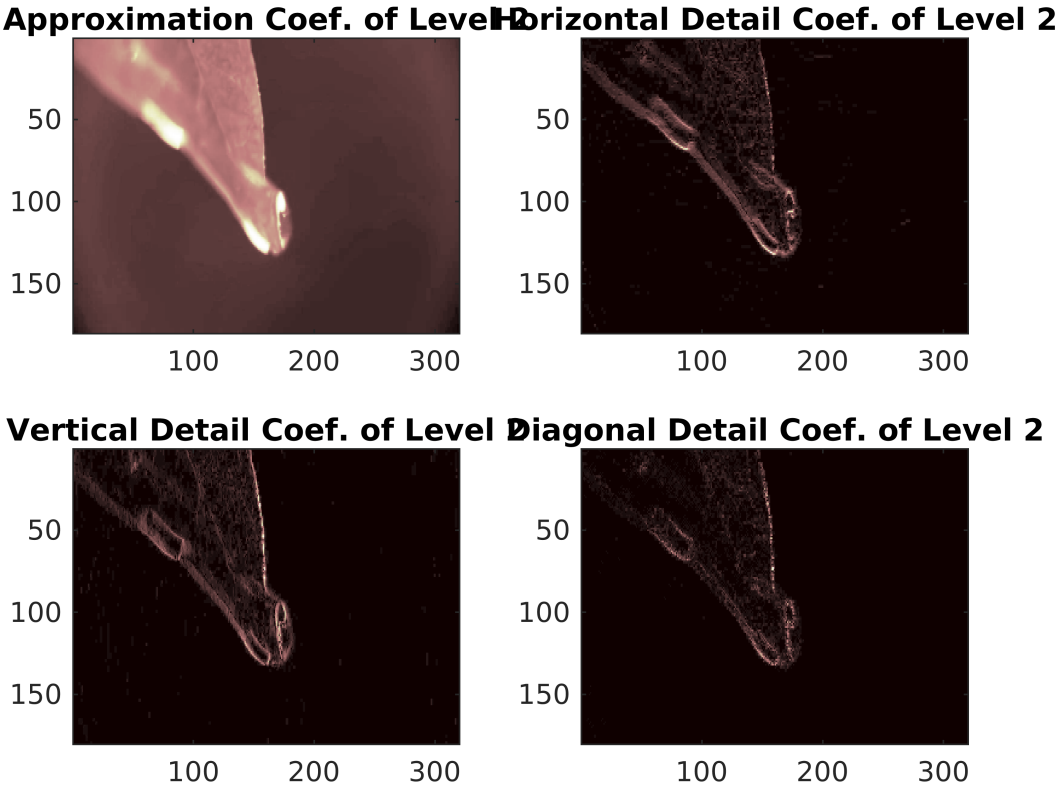
Creating a new .avi video to demonstrate wavelets decomposition

```
% new video file name
wavelets_decomposition = VideoWriter('wavelets decomposition.avi');


open(wavelets_decomposition);

for i=1:a.NumFrames
    v_frame=double(read(a,i));

    for j=1:3
        U=v_frame(:,:,j);
        [C,S] = wavedec2(U,2,'haar');
    end

    writeVideo(wavelets_decomposition,U/255);
end

close(wavelets_decomposition);

c=VideoReader('wavelets decomposition.avi');
figure;
imshow(uint8(read(c,userinput))),title("Frame- Wavelets Decomposition");
```

Frame- Wavelets Decomposition



```
filename=strcat('frame',num2str(userinput),'.jpg');
b = read(a, userinput);
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);

figure;
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
50
100
150
100
200
300