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## LAB TEST - 2

Q. Write a matlab program to perform the following operations.

1. Median filtering using 3 X 3 and 5 X 5 mask. (7 + 3 Marks)

```
im=imread("cameraman.tif")  
im2=im2gray(im)  
im3=medfilt2(im2)  
im4=medfilt2(im2,[5 5])  
imshow(im3)  
imshow(im4)
```



Original Image



Using 3\*3 Filter



Using 5\*5 Filter

### **Observations**

Median Filtering is a type of Non-Linear Filtering used for Image Enhancement. From the results we can infer that:

- Using a 3\*3 filter, we can observe that the image has become smooth retaining some features very efficiently.
- Using a 5\*5 filter, we can observe that the images have become very smooth capable of recognising the image but specific features have faded away due to the large filter size.

2. Extract frame from the video as per the user input and display the diagonal coefficients using wavelets. (10 + 5 Marks)

```
clc;
clear all;
close all;
a=VideoReader('C:\Users\Admin\OneDrive\Desktop\jad milke baithenge.mp4');
for img = 1:a.NumberOfFrames;
    filename=strcat('frame',num2str(img),'.jpg');
    b = read(a, img);
    imwrite(b,filename);
end
n=5
imgN=randi([1,n],1);
im=imread(strcat('frame',num2str(imgN),'.jpg'));
imshow(im);

wname='haar';
no_levels=1;
% Wavelet 2 function is for 2D wavelet analysis
% C contains decomposition vector which has A(N), H(N), V(N), D(N) ie
% approximation, horizontal, vertical, diagonal co-efficients
% S is for Book keeping vector
[C, S]=wavedec2(im2double(im),no_levels,wname);

% appcoef2 computes the approximation coefficients at level 2 using
% decomposition structure [C S]
A1=appcoef2(C,S,wname,1);

% detcoef2 computes the horizontal, vertical, diagonal coefficients at level 2 using
% decomposition structure [C S]
[H1, V1, D1 ] = detcoef2('all', C, S, 1);

% Extract the coefficients from level 21
%[H1, V1, D1 ] = detcoef2('all', C, S, 2);
% Display the images
im1 = [A1 H1; V1,D1]
imshow(im1);
```



*Original Image at the 5<sup>th</sup> frame*



*Multi-Resolution Image Decomposition  
after applying Wavelets*

- Out of the 4 images being displayed the 4<sup>th</sup> image represents the diagonal coefficients found using Haar Wavelet Decomposition.



### **Observations**

From the image we can observe very tiny details from the neck to the head forming some kind of a facial structure i.e removing lower frequencies and preserving higher frequency changes. Since the line is thin hence the changes in frequency values is sharp.