

## Computer Vision -- Fall 2015

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### Homework 2 - Rank K Approximation - Sharif Anani

```
close all
clear all
clc
```

#### Problem Statement:

In class we discussed using the singular value decomposition for computing best rank k approximations. In this assignment you will apply such techniques to illustrate the level of "compression" seen when different rank k approximations on images

```
img = imread('house.jpg');
img = rgb2gray(img);
img = double(img);
[U,S,V] = svd(img);
```

#### Using the SVD of the image to re-build is using smaller rank matrices

For purposes of illustration, we first display our "uncompressed" image

```
i=1;
figure(i)
imshow(img,[]);
title('Image without using rank K approximation');
```

Warning: Image is too big to fit on screen; displaying at 67%

**Image without using rank K approximation**



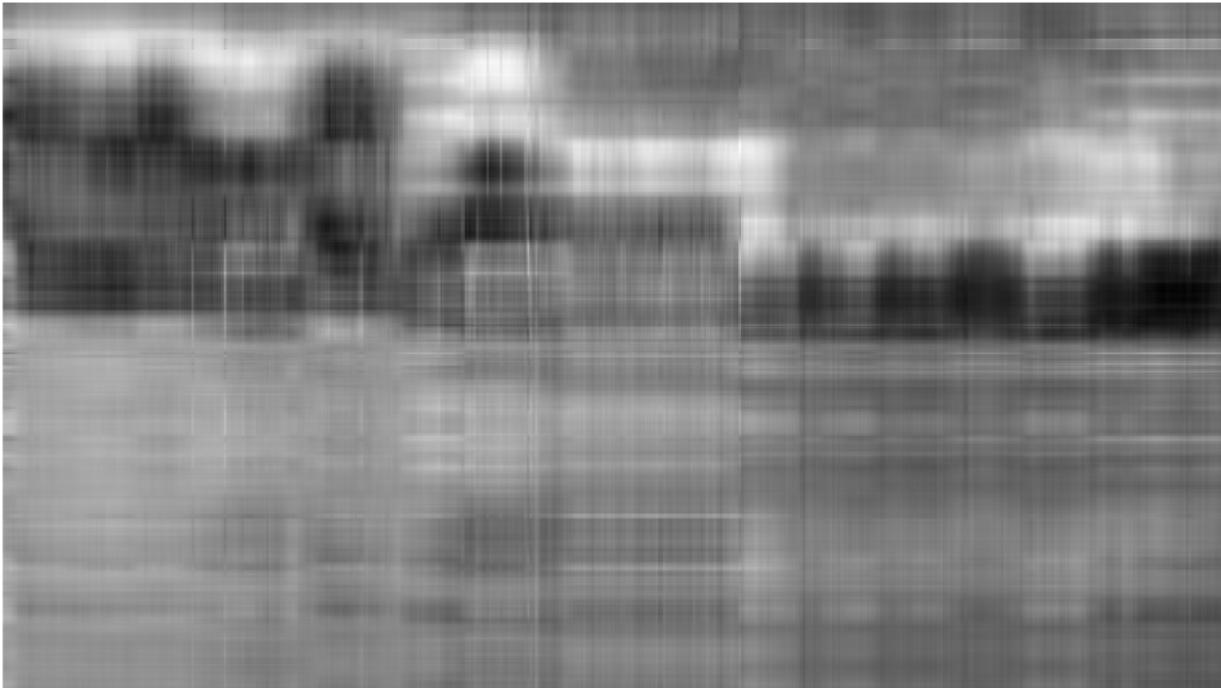
The next series of figures illustrates images reconstructed from K singular values as indicated in the title of each image.

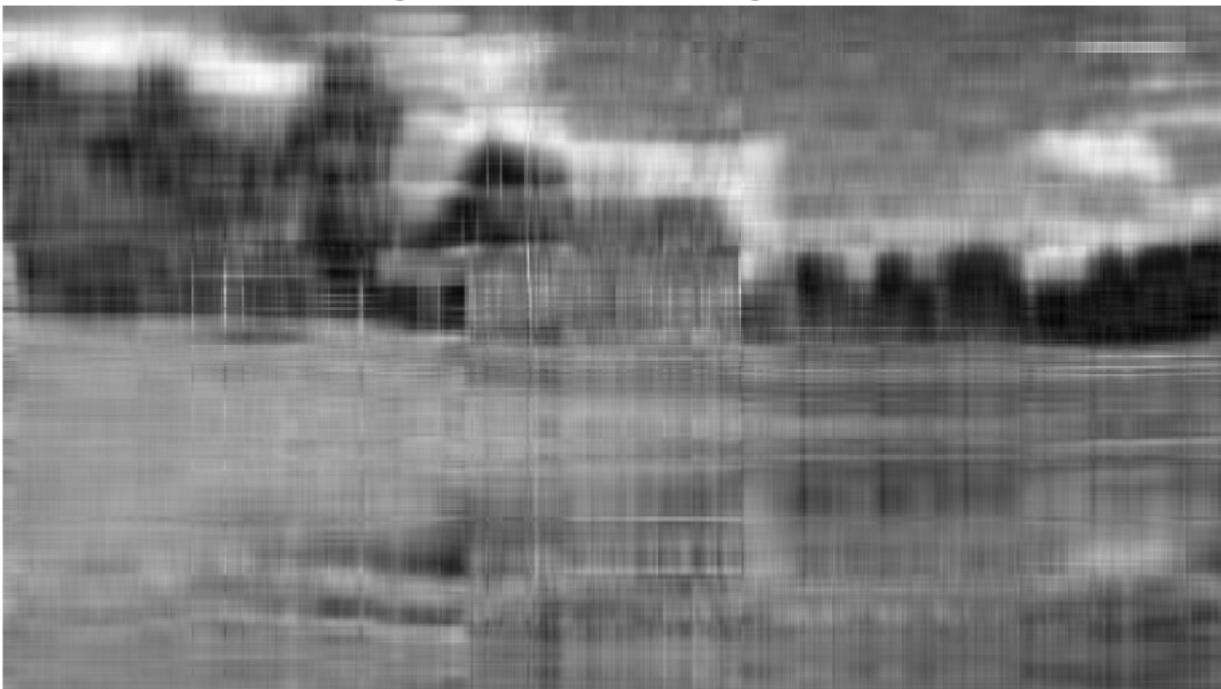
```
for k=5:5:60
i=i+1;
figure(i)
img2 = U(:,1:k)*S(1:k,1:k)*V(:,1:k)';
imshow(img2,[]);
```

```
str= sprintf('Image reconstructed from the first %i singular values',k);
title(str);
end
```

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**Image reconstructed from the first 5 singular values**



**Image reconstructed from the first 10 singular values****Image reconstructed from the first 15 singular values**

**Image reconstructed from the first 20 singular values****Image reconstructed from the first 25 singular values**

**Image reconstructed from the first 30 singular values****Image reconstructed from the first 35 singular values**

**Image reconstructed from the first 40 singular values****Image reconstructed from the first 45 singular values**

**Image reconstructed from the first 50 singular values****Image reconstructed from the first 55 singular values**

**Image reconstructed from the first 60 singular values**

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