load('teapots.mat')

data = teapotImages;

u = mean(data);

X = data - u;

C = cov(X);

[Var, D] = eig(C);

[dg, ind] = sort(diag(D),'descend');

dg = dg(1:3,:);

v = Var(:,ind(1:3));

c = X\*v;

X\_hat = u+c\*v';

for i = 1:10

figure(i);

colormap gray;

subplot(1,2,1);

imagesc(reshape(data(i,:),38,50));

title('Original image');

axis image;

subplot(1,2,2)

imagesc(reshape(X\_hat(i,:),38,50));

title('PCA image');

axis image;

end

norm(data-X\_hat)