

Name: _____

CSE 634

Computer Vision for HCI

AU'11

Homework Assignment #5

Due: Tuesday 11/1

- 1) **Using the datafile (eigdata.txt) provided on the WWW site, perform the following Matlab commands [1 pt]:**

```
%% Load the data
Matlab>> clear; close all;
Matlab>> load eigdata.txt;
Matlab>> X = eigdata;
Matlab>> subplot(2,1,1);
Matlab>> plot(X(:,1),X(:,2),'b. ');
Matlab>> axis('equal');

%% mean-subtract data
Matlab>> m = mean(X);
Matlab>> Y = X - ones(size(X,1),1)*m;
Matlab>> subplot(2,1,2);
Matlab>> plot(Y(:,1),Y(:,2),'r. ');
Matlab>> axis('equal');
```

- 2) **Compute the eigenvalues (V) and eigenvectors (U) of the data (stored in Y). Plot Y and the (rotated) axes for the basis coordinate system in U. Use the eigenvalues in V (Note: did you compute the eigenvalues from the covariance or inverse covariance of Y?) to give the appropriate 3σ (standard deviation!) length to each axis. (Note: it would also be nice to draw the 3σ ellipse *around* Y if you can.) [4 pts]**
- 3) **Rotate Y using the eigenvectors to be uncorrelated (see class slides). Plot the results. [2 pts]**
- 4) **Turn in all code, printouts of images, and discussion of results. Make a HW5.m script to do the above tasks and call needed functions. Email your code to the grader. [2 pts]**