CS 557 STATISTICAL PATTERN RECOGNITION AND LEARNING
FALL 2016
ASSIGNMENT 3: NON PARAMETRIC DENSITY ESTIMATION

DUE: Friday, 07 October, 2016.
PROBLEM

1. Read the jaffe dataset in Matlab. This is the faces dataset is taken from:
Michael J. Lyons, Miyuki Kamachi, Jiro Gyoba. Japanese Female Facial Expressions (JAFFE), Database of digital images (1997).

Information about the JAFFE database is available at:

http://www.kasrl.org/jaffe.html

Kaggle Link
https://inclass.kaggle.com/c/face-recognition2

2. Write down the log of the kernel density functions of the following kernels
   - Gaussian kernel
   - Epanechnikov kernel
   - A kernel of your choice

3. Implement the following using the log function above for the first three:
   - Gaussian kernel
   - Epanechnikov kernel
   - A kernel of your choice
   - K-Nearest neighbor

4. For the training set results, make a plot of the AUC for at least 3 values of the bandwidth/tuning parameter

5. Report your accuracy on the test set as well by submitting your predictions on kaggle

5. Note: For kernel density if you get NaN or Inf then make sure you are not taking the log of a zero value. For extremely small values (say, less than 1e-10), change them to 1 before taking log .

TO VIEW A FACE
In Matlab you can enter the following to view the type of data you are classifying. If x has training data stored in it then try this:
        figure,imagesc(reshape(x(1,:),64,64)), colormap gray;
The above command will display the face contained in the first row. Change the row number for x to display the face stored in a different row.

TO SUBMIT
1. Make a folder with your roll number as folder name. Put Matlab's source code in it and place it in the 'submit assign3' folder on xeon. I am also trying to make a slate folder for submission. In that case you can submit it there.
2. **Hard copy** of a report which is **not more than two pages** long that describes your experiments and your results along with graphs. It must contain the table

of results as well the graph and YOUR comments and conclusions about the different methods.