Arab Academy For Science and Technology & Maritime Transport

College of Engineering & Technology

Computer Engineering Department

EXAMINATION PAPER – Week 7

Course Title: Pattern Recognition

Course Code: CC716

Date: Tues. Dec, 15-2015 Lecturer: Dr. Manal Helal

Time allowed: 4 Days Start Time: 06:00 p.m.

Student's name:	Reg.# :

Question #	Marks	
	Available	Actual
Data Exploration	6	
Bayes Classification	7	
Linear Classification	7	
Total	**20**	
Lecturer	Name : Dr. Manal Helal	
	Signature :	
	Date:	

MPC6/1-1

Exam Instructions:

- Download the exam dataset from the moodle web site, from week 10 section.
- The dataset is composed of 160 observations (rows), of 2 features each (column 1 and column 2), and a class label in the third.
- In all exam questions, submit all generated plots, figures, and results generated to answer the question.
- The exam will be curve graded on best effort, and worth 15% of your final mark.

Data Exploration: **[6 points]**

1) Experiment with the data exploration techniques studied to find out the following:

a. Analyze the data and submit information describing it.

b. Submit a scatter plot for the data showing different icons for all classes.

c. Fit the 2 features (column 1 and 2) to know their probability density functions, then estimate the parameters to find out the best fit.

d. If the data is non-parametric, specify how to handle this type of data.

Hints: Matlab functions: skewness, kurtosis, mean, median, mode, gscatter, fitdist, mle, dfittool, ksdensity.

Bayes Classification: **[7 points]**

2) Apply a Bayes classifier on 80% of the data as a training data set, and use the remaining data set to test the accuracy of the classifier.

Hints: Book Example 1.9.1 , or easier use Matlab function fitNaiveBayes and dfittool to visualize.

Linear Classification: **[7 points]**

3) If the dataset is linearly separable, apply a linear classifier on 80% of the data as a training data set, and use the remaining data set to test the accuracy of the classifier. Show the decision boundary image.

Hints: Book Examples 2.2.1 & 2.4.1, and easier to use matlab classify function, and Basic fitting tool to visualise.