



# CS6690 : Pattern Recognition

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Assignment-2 (Bayesian Classifier)

## Assignment-2 (Bayesian Classifier)

In this assignment, you are supposed to build the Bayesian classifiers for the datasets assigned to your group. This assignment is more focused on analysis of classification techniques and getting used to handling data in Machine Learning instead of getting classification accuracy (as you will be getting pretty well accuracy in most of the cases).

**Bayesian Classifiers:** Builds Bayesian model using the given dataset for the given case numbers.

CaseNumber: 1 -- Bayes with Covariance same for all classes

2 -- Bayes with Covariance different for all classes

3 -- Naive Bayes with  $C = \sigma^2 I$ .

4 -- Naive Bayes with C same for all classes.

5 -- Naive Bayes with C different for all classes.

### Datasets Details:

Dataset for each group can be found here. It also has the sample plots required.

#### 1. Linearly separable data:

2-dimensional artificial data for 3 classes is given for each group. The format is "groupNo\_ls.txt"

Each class has 500 data points (First 500 is class1, next 500 is class 2 and last 500 for class 3). Divide the points randomly for training(70%), validation(20%) and testing(10%)

#### 2. Non Linearly separable data:

Again each group has 3 classes to work with. It is already divided into training, validation and testing data and kept in a folder named with GroupNo.

#### 3. Real Data:

Real world data of 3 classes is given. The format is "group\_GroupNo.txt". Divide the points randomly for training(70%), validation(20%) and testing(10%)

**Plots Required (refer "Sample Plots" folder in the above link):**

- 1. Plot of PDF (Gaussians) for each of your class.
- 2. Decision boundary and decision surface.
- 3. Constant Density Curves and EigenVectors. (can be shown in plot1 or in plot2. No need for a separate plot. Refer images 1 and 2 in "Sample Plots" for details)
- 4. Confusion matrices. (you may not show all in report)
- 5. ROC and DET curves (they help you to compare your model). **Plot them in a comparative way** i.e the ROC for the models that you want to compare should be on the same plot. Similarly with DET. (Again, you may not show all of them in your report)

**Assignment Instructions:**

- Plot your data and analyze before proceeding.
- **Any sort of plagiarism/cheating will be dealt very very strictly. You may end up with U-grade.** All your reports and codes will be matched through Turnitin and Moss with each other and with all previous years submissions.
- Your report should be precise and you should put only relevant and best/worst results plot. Report size should be 10-15 pages. **You will get a heavy penalty if you make a longer report than this.**
- Your results and observation should match with what Mam has taught in class. You can refer Duda and Hart (uploaded on Moodle, page 19-28, Section 2.6) for theory.
- You can use any language for this assignment. Using MATLAB or Python would be easier."
- **The deadline is 20 September 11.55pm.** NO EXTENSION WILL BE GIVEN.
- Your assignment evaluation will follow immediately after that so save your dates.(21st - 23rd September)

**Submission Guidelines :**

- Upload your report on Turnitin with the name: "GroupNumber\_A2.pdf". You have already created your turnitin accounts for that. Please follow the naming convention strictly.
- Create a folder "GroupNumber\_A2". In this folder you should have your report and a subfolder "codes" which should have all your codes. Upload this folder(.zip) on Moodle.
- Please make sure that you follow these guidelines and submit on time. No emailed reports will be accepted this time. Please make only one submission for the team.

# Submission status

Submission status	No attempt
Grading status	Not graded
Due date	Wednesday, 20 September 2017, 11:55 PM
Time remaining	8 days 6 hours
Last modified	-
Submission comments	► Comments (0)

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Make changes to your submission

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