

## ASSIGNMENT 2

CS5691 Pattern Recognition and Machine Learning

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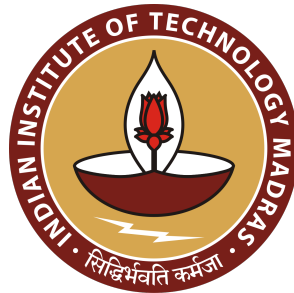
### CS5691 Assignment 2

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# Contents

<b>1</b>	<b>Dataset 1A</b>	<b>2</b>
1.1	K-nearest Neighbors Classifier	2
1.2	Naive-Bayes classifier	2
1.2.1	Same Covariance Matrix ( $\sigma^2 I$ )	2
1.2.2	Same Covariance Matrix ( $C$ )	2
1.2.3	Different Covariance Matrix	2
<b>2</b>	<b>Dataset 1B</b>	<b>3</b>
2.1	K-nearest Neighbors Classifier	3
2.2	Bayes Classifier, GMM, full covariance	3
2.2.1	Training and Validation Accuracy	3
2.2.2	Testing Accuracy	3
2.2.3	Contour Maps and Decision Surfaces	3
2.3	Bayes Classifier, GMM, diagonal covariance	4
2.4	Bayes Classifier, KNN	4
<b>3</b>	<b>Dataset 2A</b>	<b>5</b>
3.1	Bayes Classifier, GMM, full covariance	5
3.2	Bayes Classifier, GMM, diagonal covariance	5
<b>4</b>	<b>Dataset 2B</b>	<b>6</b>
4.1	Bayes Classifier, GMM, full covariance	6
4.2	Bayes Classifier, GMM, diagonal covariance	6

# **1 Dataset 1A**

## **1.1 K-nearest Neighbors Classifier**

## **1.2 Naive-Bayes classifier**

### **1.2.1 Same Covariance Matrix ( $\sigma^2 I$ )**

### **1.2.2 Same Covariance Matrix ( $C$ )**

### **1.2.3 Different Covariance Matrix**

## 2 Dataset 1B

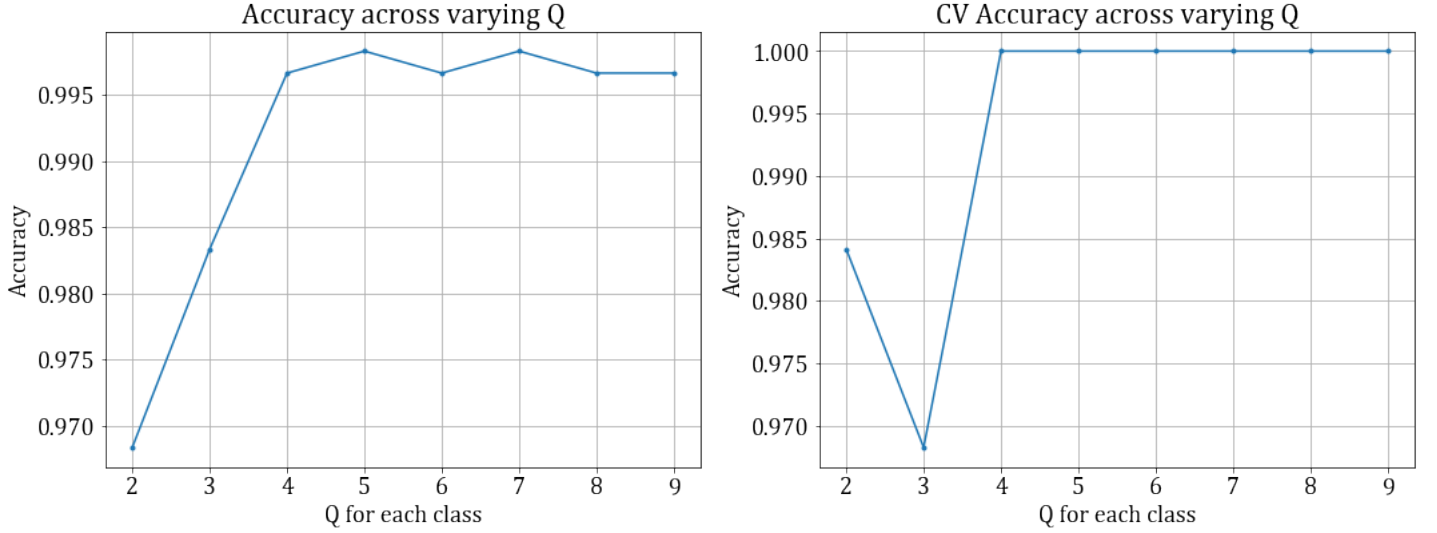
### 2.1 K-nearest Neighbors Classifier

### 2.2 Bayes Classifier, GMM, full covariance

Based on the accuracies obtained on the training, validation and test dataset, the best  $q_i$  for the three classes has been chosen as 5.

#### 2.2.1 Training and Validation Accuracy

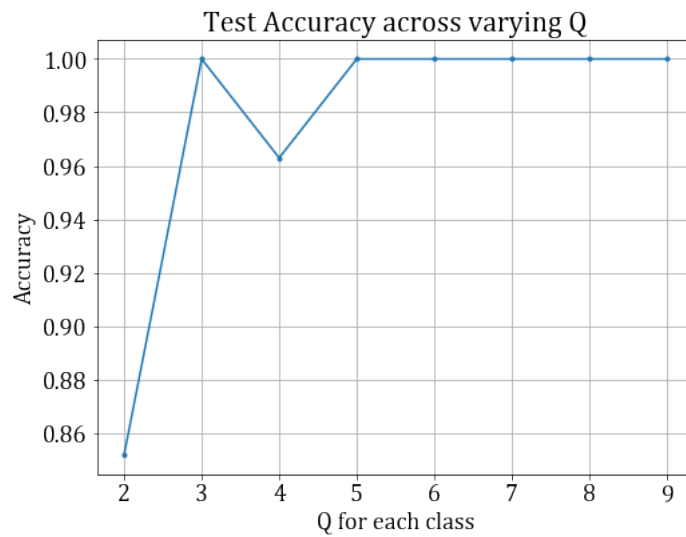
The training and validation accuracies obtained for varying  $q_i$  for each class is as follows:



**Figure 1:** Training and Validation accuracy across  $q_i$ , on the left and right respectively

#### 2.2.2 Testing Accuracy

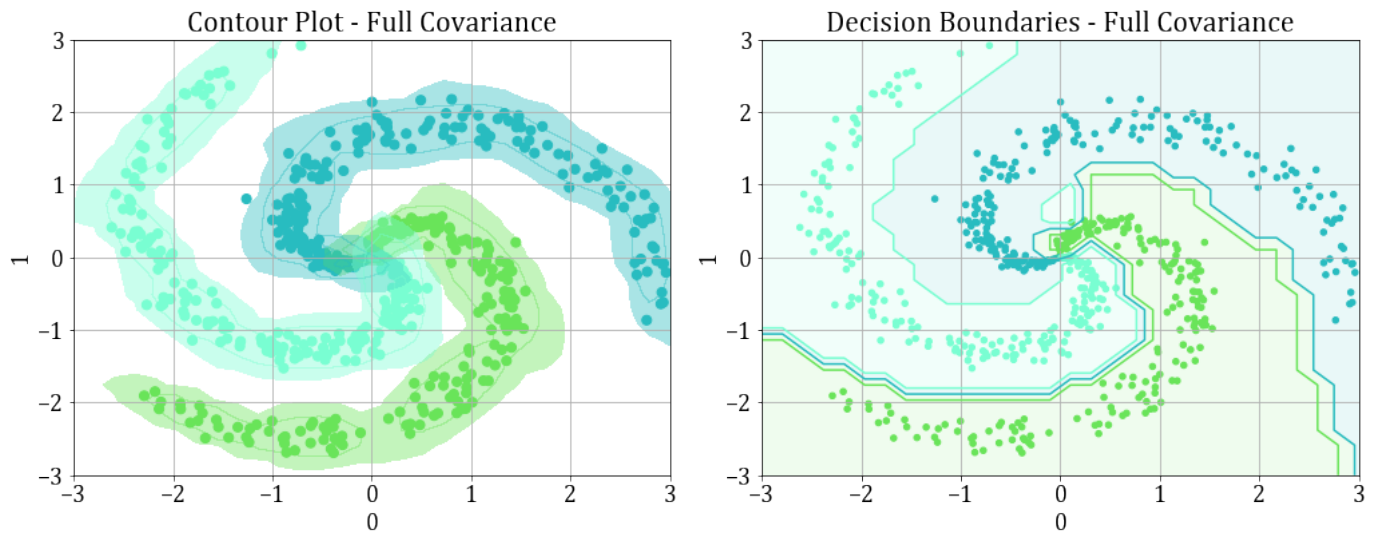
The testing accuracy obtained for varying  $q_i$  for each class is as follows:



**Figure 2:** Testing accuracy across  $q_i$

#### 2.2.3 Contour Maps and Decision Surfaces

The contour maps and decision surfaces obtained, with  $q_i = 5$  are as follows:



**Figure 3:** Contour Maps and Decision Surfaces obtained for  $q_i = 5$ , on the left and right respectively

### 2.3 Bayes Classifier, GMM, diagonal covariance

### 2.4 Bayes Classifier, KNN

### **3 Dataset 2A**

**3.1 Bayes Classifier, GMM, full covariance**

**3.2 Bayes Classifier, GMM, diagonal covariance**

## **4 Dataset 2B**

### **4.1 Bayes Classifier, GMM, full covariance**

### **4.2 Bayes Classifier, GMM, diagonal covariance**