Name:

STN:

In The Name of Almighty
Machine Learning
Computer Assignment #3

۱) هدف این تکلیف طبقه‌بندی داده‌های گل‌های زنبق با استفاده از چند طبقه‌بند مختلف است. مشخصات داده‌ها و خواسته‌های ما در زیر مشخص‌شده است.

Title	Classification of Van Gogh's Irises
Predicting	We aim to classify the kind of irises in Van Gogh's garden
Data	Data are publicly available here . There are (150) rows, each representing a unique example flower. There are (5) columns: Sepal Length (continuous), Sepal Width (continuous), Petal Length (continuous), Petal Width (continuous), and Species (class). Species is labeled and represent our ground-truth data with which we will train our model.
Features	We have a 10-dimensional feature space consisting of: [the first (4) columns of the raw input data, 3 features based on PCA, 3 features based on gaussian kernels]. Our literature review has indicated that a lower dimensional representation of these data will improve the model more than the raw inputs alone.
Models	We have continuous inputs and have a categorical output which go well with only three methods of Linear Discrimination, Logistic Discrimination, SVM, Naive Bayes, Neural Network and Decision Trees classifiers.
Results	Training set = 75 random samples, Test Set = remaining 75 samples

Model	Training MSE	Test MSE	# of Iterations until Convergence
SVM	…	…	…
LDA	…	…	…
Naive Bayes	…	…	…
Neural Network	…	…	…
Decision Trees	…	…	…

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
5.1	3.5	1.4	0.2	*I. setosa*
4.9	3.0	1.4	0.2	*I. setosa*
4.7	3.2	1.3	0.2	*I. setosa*

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
4.6	3.1	1.5	0.2	*I. setosa*
5.0	3.6	1.4	0.2	*I. setosa*
5.4	3.9	1.7	0.4	*I. setosa*
4.6	3.4	1.4	0.3	*I. setosa*
5.0	3.4	1.5	0.2	*I. setosa*
4.4	2.9	1.4	0.2	*I. setosa*
4.9	3.1	1.5	0.1	*I. setosa*
5.4	3.7	1.5	0.2	*I. setosa*
4.8	3.4	1.6	0.2	*I. setosa*
4.8	3.0	1.4	0.1	*I. setosa*
4.3	3.0	1.1	0.1	*I. setosa*
5.8	4.0	1.2	0.2	*I. setosa*
5.7	4.4	1.5	0.4	*I. setosa*
5.4	3.9	1.3	0.4	*I. setosa*
5.1	3.5	1.4	0.3	*I. setosa*
5.7	3.8	1.7	0.3	*I. setosa*
5.1	3.8	1.5	0.3	*I. setosa*
5.4	3.4	1.7	0.2	*I. setosa*
5.1	3.7	1.5	0.4	*I. setosa*
4.6	3.6	1.0	0.2	*I. setosa*
5.1	3.3	1.7	0.5	*I. setosa*
4.8	3.4	1.9	0.2	*I. setosa*
5.0	3.0	1.6	0.2	*I. setosa*
5.0	3.4	1.6	0.4	*I. setosa*
5.2	3.5	1.5	0.2	*I. setosa*
5.2	3.4	1.4	0.2	*I. setosa*
4.7	3.2	1.6	0.2	*I. setosa*
4.8	3.1	1.6	0.2	*I. setosa*
5.4	3.4	1.5	0.4	*I. setosa*

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
5.2	4.1	1.5	0.1	*I. setosa*
5.5	4.2	1.4	0.2	*I. setosa*
4.9	3.1	1.5	0.2	*I. setosa*
5.0	3.2	1.2	0.2	*I. setosa*
5.5	3.5	1.3	0.2	*I. setosa*
4.9	3.6	1.4	0.1	*I. setosa*
4.4	3.0	1.3	0.2	*I. setosa*
5.1	3.4	1.5	0.2	*I. setosa*
5.0	3.5	1.3	0.3	*I. setosa*
4.5	2.3	1.3	0.3	*I. setosa*
4.4	3.2	1.3	0.2	*I. setosa*
5.0	3.5	1.6	0.6	*I. setosa*
5.1	3.8	1.9	0.4	*I. setosa*
4.8	3.0	1.4	0.3	*I. setosa*
5.1	3.8	1.6	0.2	*I. setosa*
4.6	3.2	1.4	0.2	*I. setosa*
5.3	3.7	1.5	0.2	*I. setosa*
5.0	3.3	1.4	0.2	*I. setosa*
7.0	3.2	4.7	1.4	*I. versicolor*
6.4	3.2	4.5	1.5	*I. versicolor*
6.9	3.1	4.9	1.5	*I. versicolor*
5.5	2.3	4.0	1.3	*I. versicolor*
6.5	2.8	4.6	1.5	*I. versicolor*
5.7	2.8	4.5	1.3	*I. versicolor*
6.3	3.3	4.7	1.6	*I. versicolor*
4.9	2.4	3.3	1.0	*I. versicolor*
6.6	2.9	4.6	1.3	*I. versicolor*
5.2	2.7	3.9	1.4	*I. versicolor*
5.0	2.0	3.5	1.0	*I. versicolor*

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
5.9	3.0	4.2	1.5	*I. versicolor*
6.0	2.2	4.0	1.0	*I. versicolor*
6.1	2.9	4.7	1.4	*I. versicolor*
5.6	2.9	3.6	1.3	*I. versicolor*
6.7	3.1	4.4	1.4	*I. versicolor*
5.6	3.0	4.5	1.5	*I. versicolor*
5.8	2.7	4.1	1.0	*I. versicolor*
6.2	2.2	4.5	1.5	*I. versicolor*
5.6	2.5	3.9	1.1	*I. versicolor*
5.9	3.2	4.8	1.8	*I. versicolor*
6.1	2.8	4.0	1.3	*I. versicolor*
6.3	2.5	4.9	1.5	*I. versicolor*
6.1	2.8	4.7	1.2	*I. versicolor*
6.4	2.9	4.3	1.3	*I. versicolor*
6.6	3.0	4.4	1.4	*I. versicolor*
6.8	2.8	4.8	1.4	*I. versicolor*
6.7	3.0	5.0	1.7	*I. versicolor*
6.0	2.9	4.5	1.5	*I. versicolor*
5.7	2.6	3.5	1.0	*I. versicolor*
5.5	2.4	3.8	1.1	*I. versicolor*
5.5	2.4	3.7	1.0	*I. versicolor*
5.8	2.7	3.9	1.2	*I. versicolor*
6.0	2.7	5.1	1.6	*I. versicolor*
5.4	3.0	4.5	1.5	*I. versicolor*
6.0	3.4	4.5	1.6	*I. versicolor*
6.7	3.1	4.7	1.5	*I. versicolor*
6.3	2.3	4.4	1.3	*I. versicolor*
5.6	3.0	4.1	1.3	*I. versicolor*
5.5	2.5	4.0	1.3	*I. versicolor*

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
5.5	2.6	4.4	1.2	*I. versicolor*
6.1	3.0	4.6	1.4	*I. versicolor*
5.8	2.6	4.0	1.2	*I. versicolor*
5.0	2.3	3.3	1.0	*I. versicolor*
5.6	2.7	4.2	1.3	*I. versicolor*
5.7	3.0	4.2	1.2	*I. versicolor*
5.7	2.9	4.2	1.3	*I. versicolor*
6.2	2.9	4.3	1.3	*I. versicolor*
5.1	2.5	3.0	1.1	*I. versicolor*
5.7	2.8	4.1	1.3	*I. versicolor*
6.3	3.3	6.0	2.5	*I. virginica*
5.8	2.7	5.1	1.9	*I. virginica*
7.1	3.0	5.9	2.1	*I. virginica*
6.3	2.9	5.6	1.8	*I. virginica*
6.5	3.0	5.8	2.2	*I. virginica*
7.6	3.0	6.6	2.1	*I. virginica*
4.9	2.5	4.5	1.7	*I. virginica*
7.3	2.9	6.3	1.8	*I. virginica*
6.7	2.5	5.8	1.8	*I. virginica*
7.2	3.6	6.1	2.5	*I. virginica*
6.5	3.2	5.1	2.0	*I. virginica*
6.4	2.7	5.3	1.9	*I. virginica*
6.8	3.0	5.5	2.1	*I. virginica*
5.7	2.5	5.0	2.0	*I. virginica*
5.8	2.8	5.1	2.4	*I. virginica*
6.4	3.2	5.3	2.3	*I. virginica*
6.5	3.0	5.5	1.8	*I. virginica*
7.7	3.8	6.7	2.2	*I. virginica*
7.7	2.6	6.9	2.3	*I. virginica*

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
6.0	2.2	5.0	1.5	*I. virginica*
6.9	3.2	5.7	2.3	*I. virginica*
5.6	2.8	4.9	2.0	*I. virginica*
7.7	2.8	6.7	2.0	*I. virginica*
6.3	2.7	4.9	1.8	*I. virginica*
6.7	3.3	5.7	2.1	*I. virginica*
7.2	3.2	6.0	1.8	*I. virginica*
6.2	2.8	4.8	1.8	*I. virginica*
6.1	3.0	4.9	1.8	*I. virginica*
6.4	2.8	5.6	2.1	*I. virginica*
7.2	3.0	5.8	1.6	*I. virginica*
7.4	2.8	6.1	1.9	*I. virginica*
7.9	3.8	6.4	2.0	*I. virginica*
6.4	2.8	5.6	2.2	*I. virginica*
6.3	2.8	5.1	1.5	*I. virginica*
6.1	2.6	5.6	1.4	*I. virginica*
7.7	3.0	6.1	2.3	*I. virginica*
6.3	3.4	5.6	2.4	*I. virginica*
6.4	3.1	5.5	1.8	*I. virginica*
6.0	3.0	4.8	1.8	*I. virginica*
6.9	3.1	5.4	2.1	*I. virginica*
6.7	3.1	5.6	2.4	*I. virginica*
6.9	3.1	5.1	2.3	*I. virginica*
5.8	2.7	5.1	1.9	*I. virginica*
6.8	3.2	5.9	2.3	*I. virginica*
6.7	3.3	5.7	2.5	*I. virginica*
6.7	3.0	5.2	2.3	*I. virginica*
6.3	2.5	5.0	1.9	*I. virginica*
6.5	3.0	5.2	2.0	*I. virginica*

Fisher's *Iris* Data				
Sepal length	**Sepal width**	**Petal length**	**Petal width**	**Species**
6.2	3.4	5.4	2.3	*I. virginica*
5.9	3.0	5.1	1.8	*I. virginica*