Assignment No – B13 (KNN Approach)

Roll no -4234

import csv

import random

import math

import operator

def loadDataset(filename, split, trainingSet=[] , testSet=[]):

with open(filename, 'rb') as csvfile:

lines = csv.reader(csvfile)

dataset = list(lines)

for x in range(len(dataset)-1):

for y in range(4):

dataset[x][y] = float(dataset[x][y])

if random.random() < split:

trainingSet.append(dataset[x])

else:

testSet.append(dataset[x])

def euclideanDistance(instance1, instance2, length):

distance = 0

for x in range(length):

distance += pow((instance1[x] - instance2[x]), 2)

return math.sqrt(distance)

def getNeighbors(trainingSet, testInstance, k):

distances = []

length = len(testInstance)-1

for x in range(len(trainingSet)):

dist = euclideanDistance(testInstance, trainingSet[x], length)

distances.append((trainingSet[x], dist))

distances.sort(key=operator.itemgetter(1))

neighbors = []

for x in range(k):

neighbors.append(distances[x][0])

return neighbors

def getResponse(neighbors):

classVotes = {}

for x in range(len(neighbors)):

response = neighbors[x][-1]

if response in classVotes:

classVotes[response] += 1

else:

classVotes[response] = 1

sortedVotes = sorted(classVotes.iteritems(), key=operator.itemgetter(1), reverse=True)

return sortedVotes[0][0]

def getAccuracy(testSet, predictions):

correct = 0

for x in range(len(testSet)):

if testSet[x][-1] == predictions[x]:

correct += 1

return (correct/float(len(testSet))) \* 100.0

def main():

# prepare data

trainingSet=[]

testSet=[]

split = 0.67

loadDataset('iris.data', split, trainingSet, testSet)

print 'Train set: ' + repr(len(trainingSet))

print 'Test set: ' + repr(len(testSet))

# generate predictions

predictions=[]

k = 3

for x in range(len(testSet)):

neighbors = getNeighbors(trainingSet, testSet[x], k)

result = getResponse(neighbors)

predictions.append(result)

print('> predicted=' + repr(result) + ', actual=' + repr(testSet[x][-1]))

accuracy = getAccuracy(testSet, predictions)

print('Accuracy: ' + repr(accuracy) + '%')

main()

------------------------------------------------INPUT DATA--------------------------------------------------------

5.1,3.5,1.4,0.2,Iris-setosa

4.9,3.0,1.4,0.2,Iris-setosa

4.7,3.2,1.3,0.2,Iris-setosa

4.6,3.1,1.5,0.2,Iris-setosa

5.0,3.6,1.4,0.2,Iris-setosa

5.4,3.9,1.7,0.4,Iris-setosa

4.6,3.4,1.4,0.3,Iris-setosa

5.0,3.4,1.5,0.2,Iris-setosa

4.4,2.9,1.4,0.2,Iris-setosa

4.9,3.1,1.5,0.1,Iris-setosa

5.4,3.7,1.5,0.2,Iris-setosa

4.8,3.4,1.6,0.2,Iris-setosa

4.8,3.0,1.4,0.1,Iris-setosa

4.3,3.0,1.1,0.1,Iris-setosa

5.8,4.0,1.2,0.2,Iris-setosa

5.7,4.4,1.5,0.4,Iris-setosa

5.4,3.9,1.3,0.4,Iris-setosa

5.1,3.5,1.4,0.3,Iris-setosa

5.7,3.8,1.7,0.3,Iris-setosa

5.1,3.8,1.5,0.3,Iris-setosa

5.4,3.4,1.7,0.2,Iris-setosa

5.1,3.7,1.5,0.4,Iris-setosa

4.6,3.6,1.0,0.2,Iris-setosa

5.1,3.3,1.7,0.5,Iris-setosa

4.8,3.4,1.9,0.2,Iris-setosa

5.0,3.0,1.6,0.2,Iris-setosa

5.0,3.4,1.6,0.4,Iris-setosa

5.2,3.5,1.5,0.2,Iris-setosa

5.2,3.4,1.4,0.2,Iris-setosa

4.7,3.2,1.6,0.2,Iris-setosa

4.8,3.1,1.6,0.2,Iris-setosa

5.4,3.4,1.5,0.4,Iris-setosa

5.2,4.1,1.5,0.1,Iris-setosa

5.5,4.2,1.4,0.2,Iris-setosa

4.9,3.1,1.5,0.1,Iris-setosa

5.0,3.2,1.2,0.2,Iris-setosa

5.5,3.5,1.3,0.2,Iris-setosa

4.9,3.1,1.5,0.1,Iris-setosa

4.4,3.0,1.3,0.2,Iris-setosa

5.1,3.4,1.5,0.2,Iris-setosa

5.0,3.5,1.3,0.3,Iris-setosa

4.5,2.3,1.3,0.3,Iris-setosa

4.4,3.2,1.3,0.2,Iris-setosa

5.0,3.5,1.6,0.6,Iris-setosa

5.1,3.8,1.9,0.4,Iris-setosa

4.8,3.0,1.4,0.3,Iris-setosa

5.1,3.8,1.6,0.2,Iris-setosa

4.6,3.2,1.4,0.2,Iris-setosa

5.3,3.7,1.5,0.2,Iris-setosa

5.0,3.3,1.4,0.2,Iris-setosa

7.0,3.2,4.7,1.4,Iris-versicolor

6.4,3.2,4.5,1.5,Iris-versicolor

6.9,3.1,4.9,1.5,Iris-versicolor

5.5,2.3,4.0,1.3,Iris-versicolor

6.5,2.8,4.6,1.5,Iris-versicolor

5.7,2.8,4.5,1.3,Iris-versicolor

6.3,3.3,4.7,1.6,Iris-versicolor

4.9,2.4,3.3,1.0,Iris-versicolor

6.6,2.9,4.6,1.3,Iris-versicolor

5.2,2.7,3.9,1.4,Iris-versicolor

5.0,2.0,3.5,1.0,Iris-versicolor

5.9,3.0,4.2,1.5,Iris-versicolor

6.0,2.2,4.0,1.0,Iris-versicolor

6.1,2.9,4.7,1.4,Iris-versicolor

5.6,2.9,3.6,1.3,Iris-versicolor

6.7,3.1,4.4,1.4,Iris-versicolor

5.6,3.0,4.5,1.5,Iris-versicolor

5.8,2.7,4.1,1.0,Iris-versicolor

6.2,2.2,4.5,1.5,Iris-versicolor

5.6,2.5,3.9,1.1,Iris-versicolor

5.9,3.2,4.8,1.8,Iris-versicolor

6.1,2.8,4.0,1.3,Iris-versicolor

6.3,2.5,4.9,1.5,Iris-versicolor

6.1,2.8,4.7,1.2,Iris-versicolor

6.4,2.9,4.3,1.3,Iris-versicolor

6.6,3.0,4.4,1.4,Iris-versicolor

6.8,2.8,4.8,1.4,Iris-versicolor

6.7,3.0,5.0,1.7,Iris-versicolor

6.0,2.9,4.5,1.5,Iris-versicolor

5.7,2.6,3.5,1.0,Iris-versicolor

5.5,2.4,3.8,1.1,Iris-versicolor

5.5,2.4,3.7,1.0,Iris-versicolor

5.8,2.7,3.9,1.2,Iris-versicolor

6.0,2.7,5.1,1.6,Iris-versicolor

5.4,3.0,4.5,1.5,Iris-versicolor

6.0,3.4,4.5,1.6,Iris-versicolor

6.7,3.1,4.7,1.5,Iris-versicolor

6.3,2.3,4.4,1.3,Iris-versicolor

5.6,3.0,4.1,1.3,Iris-versicolor

5.5,2.5,4.0,1.3,Iris-versicolor

5.5,2.6,4.4,1.2,Iris-versicolor

6.1,3.0,4.6,1.4,Iris-versicolor

5.8,2.6,4.0,1.2,Iris-versicolor

5.0,2.3,3.3,1.0,Iris-versicolor

5.6,2.7,4.2,1.3,Iris-versicolor

5.7,3.0,4.2,1.2,Iris-versicolor

5.7,2.9,4.2,1.3,Iris-versicolor

6.2,2.9,4.3,1.3,Iris-versicolor

5.1,2.5,3.0,1.1,Iris-versicolor

5.7,2.8,4.1,1.3,Iris-versicolor

6.3,3.3,6.0,2.5,Iris-virginica

5.8,2.7,5.1,1.9,Iris-virginica

7.1,3.0,5.9,2.1,Iris-virginica

6.3,2.9,5.6,1.8,Iris-virginica

6.5,3.0,5.8,2.2,Iris-virginica

7.6,3.0,6.6,2.1,Iris-virginica

4.9,2.5,4.5,1.7,Iris-virginica

7.3,2.9,6.3,1.8,Iris-virginica

6.7,2.5,5.8,1.8,Iris-virginica

7.2,3.6,6.1,2.5,Iris-virginica

6.5,3.2,5.1,2.0,Iris-virginica

6.4,2.7,5.3,1.9,Iris-virginica

6.8,3.0,5.5,2.1,Iris-virginica

5.7,2.5,5.0,2.0,Iris-virginica

5.8,2.8,5.1,2.4,Iris-virginica

6.4,3.2,5.3,2.3,Iris-virginica

6.5,3.0,5.5,1.8,Iris-virginica

7.7,3.8,6.7,2.2,Iris-virginica

7.7,2.6,6.9,2.3,Iris-virginica

6.0,2.2,5.0,1.5,Iris-virginica

6.9,3.2,5.7,2.3,Iris-virginica

5.6,2.8,4.9,2.0,Iris-virginica

7.7,2.8,6.7,2.0,Iris-virginica

6.3,2.7,4.9,1.8,Iris-virginica

6.7,3.3,5.7,2.1,Iris-virginica

7.2,3.2,6.0,1.8,Iris-virginica

6.2,2.8,4.8,1.8,Iris-virginica

6.1,3.0,4.9,1.8,Iris-virginica

6.4,2.8,5.6,2.1,Iris-virginica

7.2,3.0,5.8,1.6,Iris-virginica

7.4,2.8,6.1,1.9,Iris-virginica

7.9,3.8,6.4,2.0,Iris-virginica

6.4,2.8,5.6,2.2,Iris-virginica

6.3,2.8,5.1,1.5,Iris-virginica

6.1,2.6,5.6,1.4,Iris-virginica

7.7,3.0,6.1,2.3,Iris-virginica

6.3,3.4,5.6,2.4,Iris-virginica

6.4,3.1,5.5,1.8,Iris-virginica

6.0,3.0,4.8,1.8,Iris-virginica

6.9,3.1,5.4,2.1,Iris-virginica

6.7,3.1,5.6,2.4,Iris-virginica

6.9,3.1,5.1,2.3,Iris-virginica

5.8,2.7,5.1,1.9,Iris-virginica

6.8,3.2,5.9,2.3,Iris-virginica

6.7,3.3,5.7,2.5,Iris-virginica

6.7,3.0,5.2,2.3,Iris-virginica

6.3,2.5,5.0,1.9,Iris-virginica

6.5,3.0,5.2,2.0,Iris-virginica

6.2,3.4,5.4,2.3,Iris-virginica

5.9,3.0,5.1,1.8,Iris-virginica

--------------------------------------------------OUTPUT-------------------------------------------------------

dell@shweta:~/fwdknn$ python knn.py

Train set: 94

Test set: 55

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-setosa', actual='Iris-setosa'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-virginica', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-virginica', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-virginica', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-versicolor', actual='Iris-versicolor'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

> predicted='Iris-virginica', actual='Iris-virginica'

Accuracy: 94.54545454545455%

dell@shweta:~/fwdknn$