Program

library (class)

install.packages("class")

train <-rbind(iris3[1:25,,1], iris3[1:25,,2], iris3[1:25,,3])

train

test <-rbind(iris3[26:50,,1], iris3[26:50,,2], iris3[26:50,,3])

test

dim(iris3)

dim(train)

dim(test)

cl <- factor(c(rep("s",25), rep("c",25), rep("v",25)))

myknn<-knn(train,test, cl,k = 3)

myknn

attributes(.Last.value)

tab<-table(myknn, cl)

tab

Output

> train <-rbind(iris3[1:25,,1], iris3[1:25,,2], iris3[1:25,,3])

> train

Sepal L. Sepal W. Petal L. Petal W.

[1,] 5.1 3.5 1.4 0.2

[2,] 4.9 3.0 1.4 0.2

[3,] 4.7 3.2 1.3 0.2

[4,] 4.6 3.1 1.5 0.2

[5,] 5.0 3.6 1.4 0.2

[6,] 5.4 3.9 1.7 0.4

[7,] 4.6 3.4 1.4 0.3

[8,] 5.0 3.4 1.5 0.2

[9,] 4.4 2.9 1.4 0.2

[10,] 4.9 3.1 1.5 0.1

[11,] 5.4 3.7 1.5 0.2

[12,] 4.8 3.4 1.6 0.2

[13,] 4.8 3.0 1.4 0.1

[14,] 4.3 3.0 1.1 0.1

[15,] 5.8 4.0 1.2 0.2

[16,] 5.7 4.4 1.5 0.4

[17,] 5.4 3.9 1.3 0.4

[18,] 5.1 3.5 1.4 0.3

[19,] 5.7 3.8 1.7 0.3

[20,] 5.1 3.8 1.5 0.3

[21,] 5.4 3.4 1.7 0.2

[22,] 5.1 3.7 1.5 0.4

[23,] 4.6 3.6 1.0 0.2

[24,] 5.1 3.3 1.7 0.5

[25,] 4.8 3.4 1.9 0.2

[26,] 7.0 3.2 4.7 1.4

[27,] 6.4 3.2 4.5 1.5

[28,] 6.9 3.1 4.9 1.5

[29,] 5.5 2.3 4.0 1.3

[30,] 6.5 2.8 4.6 1.5

[31,] 5.7 2.8 4.5 1.3

[32,] 6.3 3.3 4.7 1.6

[33,] 4.9 2.4 3.3 1.0

[34,] 6.6 2.9 4.6 1.3

[35,] 5.2 2.7 3.9 1.4

[36,] 5.0 2.0 3.5 1.0

[37,] 5.9 3.0 4.2 1.5

[38,] 6.0 2.2 4.0 1.0

[39,] 6.1 2.9 4.7 1.4

[40,] 5.6 2.9 3.6 1.3

[41,] 6.7 3.1 4.4 1.4

[42,] 5.6 3.0 4.5 1.5

[43,] 5.8 2.7 4.1 1.0

[44,] 6.2 2.2 4.5 1.5

[45,] 5.6 2.5 3.9 1.1

[46,] 5.9 3.2 4.8 1.8

[47,] 6.1 2.8 4.0 1.3

[48,] 6.3 2.5 4.9 1.5

[49,] 6.1 2.8 4.7 1.2

[50,] 6.4 2.9 4.3 1.3

[51,] 6.3 3.3 6.0 2.5

[52,] 5.8 2.7 5.1 1.9

[53,] 7.1 3.0 5.9 2.1

[54,] 6.3 2.9 5.6 1.8

[55,] 6.5 3.0 5.8 2.2

[56,] 7.6 3.0 6.6 2.1

[57,] 4.9 2.5 4.5 1.7

[58,] 7.3 2.9 6.3 1.8

[59,] 6.7 2.5 5.8 1.8

[60,] 7.2 3.6 6.1 2.5

[61,] 6.5 3.2 5.1 2.0

[62,] 6.4 2.7 5.3 1.9

[63,] 6.8 3.0 5.5 2.1

[64,] 5.7 2.5 5.0 2.0

[65,] 5.8 2.8 5.1 2.4

[66,] 6.4 3.2 5.3 2.3

[67,] 6.5 3.0 5.5 1.8

[68,] 7.7 3.8 6.7 2.2

[69,] 7.7 2.6 6.9 2.3

[70,] 6.0 2.2 5.0 1.5

[71,] 6.9 3.2 5.7 2.3

[72,] 5.6 2.8 4.9 2.0

[73,] 7.7 2.8 6.7 2.0

[74,] 6.3 2.7 4.9 1.8

[75,] 6.7 3.3 5.7 2.1

> test <-rbind(iris3[26:50,,1], iris3[26:50,,2], iris3[26:50,,3])

> test

Sepal L. Sepal W. Petal L. Petal W.

[1,] 5.0 3.0 1.6 0.2

[2,] 5.0 3.4 1.6 0.4

[3,] 5.2 3.5 1.5 0.2

[4,] 5.2 3.4 1.4 0.2

[5,] 4.7 3.2 1.6 0.2

[6,] 4.8 3.1 1.6 0.2

[7,] 5.4 3.4 1.5 0.4

[8,] 5.2 4.1 1.5 0.1

[9,] 5.5 4.2 1.4 0.2

[10,] 4.9 3.1 1.5 0.2

[11,] 5.0 3.2 1.2 0.2

[12,] 5.5 3.5 1.3 0.2

[13,] 4.9 3.6 1.4 0.1

[14,] 4.4 3.0 1.3 0.2

[15,] 5.1 3.4 1.5 0.2

[16,] 5.0 3.5 1.3 0.3

[17,] 4.5 2.3 1.3 0.3

[18,] 4.4 3.2 1.3 0.2

[19,] 5.0 3.5 1.6 0.6

[20,] 5.1 3.8 1.9 0.4

[21,] 4.8 3.0 1.4 0.3

[22,] 5.1 3.8 1.6 0.2

[23,] 4.6 3.2 1.4 0.2

[24,] 5.3 3.7 1.5 0.2

[25,] 5.0 3.3 1.4 0.2

[26,] 6.6 3.0 4.4 1.4

[27,] 6.8 2.8 4.8 1.4

[28,] 6.7 3.0 5.0 1.7

[29,] 6.0 2.9 4.5 1.5

[30,] 5.7 2.6 3.5 1.0

[31,] 5.5 2.4 3.8 1.1

[32,] 5.5 2.4 3.7 1.0

[33,] 5.8 2.7 3.9 1.2

[34,] 6.0 2.7 5.1 1.6

[35,] 5.4 3.0 4.5 1.5

[36,] 6.0 3.4 4.5 1.6

[37,] 6.7 3.1 4.7 1.5

[38,] 6.3 2.3 4.4 1.3

[39,] 5.6 3.0 4.1 1.3

[40,] 5.5 2.5 4.0 1.3

[41,] 5.5 2.6 4.4 1.2

[42,] 6.1 3.0 4.6 1.4

[43,] 5.8 2.6 4.0 1.2

[44,] 5.0 2.3 3.3 1.0

[45,] 5.6 2.7 4.2 1.3

[46,] 5.7 3.0 4.2 1.2

[47,] 5.7 2.9 4.2 1.3

[48,] 6.2 2.9 4.3 1.3

[49,] 5.1 2.5 3.0 1.1

[50,] 5.7 2.8 4.1 1.3

[51,] 7.2 3.2 6.0 1.8

[52,] 6.2 2.8 4.8 1.8

[53,] 6.1 3.0 4.9 1.8

[54,] 6.4 2.8 5.6 2.1

[55,] 7.2 3.0 5.8 1.6

[56,] 7.4 2.8 6.1 1.9

[57,] 7.9 3.8 6.4 2.0

[58,] 6.4 2.8 5.6 2.2

[59,] 6.3 2.8 5.1 1.5

[60,] 6.1 2.6 5.6 1.4

[61,] 7.7 3.0 6.1 2.3

[62,] 6.3 3.4 5.6 2.4

[63,] 6.4 3.1 5.5 1.8

[64,] 6.0 3.0 4.8 1.8

[65,] 6.9 3.1 5.4 2.1

[66,] 6.7 3.1 5.6 2.4

[67,] 6.9 3.1 5.1 2.3

[68,] 5.8 2.7 5.1 1.9

[69,] 6.8 3.2 5.9 2.3

[70,] 6.7 3.3 5.7 2.5

[71,] 6.7 3.0 5.2 2.3

[72,] 6.3 2.5 5.0 1.9

[73,] 6.5 3.0 5.2 2.0

[74,] 6.2 3.4 5.4 2.3

[75,] 5.9 3.0 5.1 1.8

>

> dim(iris3)

[1] 50 4 3

> dim(train)

[1] 75 4

> dim(test)

[1] 75 4

>

> cl <- factor(c(rep("s",25), rep("c",25), rep("v",25)))

> # KNN for K=3

>

> myknn3<-knn(train,test, cl,k = 3)

> myknn3

[1] s s s s s s s s s s s s s s s s s s s s s s s s s c c v c c c c c v c c c c c c

[41] c c c c c c c c c c v c c v v v v v v v v v v c v v v v v v v v v v v

Levels: c s v

> attributes(.Last.value)

$levels

[1] "c" "s" "v"

$class

[1] "factor"

>

> tab<-table(myknn3, cl)

> tab

cl

myknn3 c s v

c 23 0 3

s 0 25 0

v 2 0 22

>

>

> # is there nay impact of value of k on ouput of kNN classfier algorithm .. let us check

> # KNN for K=5

> myknn5<-knn(train,test, cl,k = 5)

> myknn5

[1] s s s s s s s s s s s s s s s s s s s s s s s s s c c v c c c c c v c c c c c c

[41] c c c c c c c c c c v c c v v v v v c v v v v c v v v v v v v v v v v

Levels: c s v

> attributes(.Last.value)

$levels

[1] "c" "s" "v"

$class

[1] "factor"

>

> tab<-table(myknn5, cl)

> tab

cl

myknn5 c s v

c 23 0 4

s 0 25 0

v 2 0 21

>

>

> # KNN for K=10

> myknn10<-knn(train,test, cl,k = 10)

> myknn10

[1] s s s s s s s s s s s s s s s s s s s s s s s s s c c c c c c c c v c c c c c c

[41] c c c c c c c c c c v c c v v v v v c v v v v c v v v v v v v v v v v

Levels: c s v

> attributes(.Last.value)

$levels

[1] "c" "s" "v"

$class

[1] "factor"

>

> tab<-table(myknn10, cl)

> tab

cl

myknn10 c s v

c 24 0 4

s 0 25 0

v 1 0 21

>

>

> #OBERVE THE CROSS TABLE CREATES AND ALSO VALUES OF myknn3, myknn5, myknn10

> # TO ENSURE THAT VALUE OF K IMPACTS ON CLASSIFICATION RESULT OF KNN VCLASSIFIER

>

> # DEPENDING UPON K=1,K=5,K=10, ANY DATA INSTANCE CAN BE CLASSIFIED TO SAME OR DIFFERENT

> #CLASS

> # THE SAME IS ENSURED BY COMPARING ROWS OBATAINED AS OUT PUT OF kNN 5, KNN 3 AND KNN 10

> train <-rbind(iris3[1:25,,1], iris3[1:25,,2], iris3[1:25,,3])

> train

Sepal L. Sepal W. Petal L. Petal W.

[1,] 5.1 3.5 1.4 0.2

[2,] 4.9 3.0 1.4 0.2

[3,] 4.7 3.2 1.3 0.2

[4,] 4.6 3.1 1.5 0.2

[5,] 5.0 3.6 1.4 0.2

[6,] 5.4 3.9 1.7 0.4

[7,] 4.6 3.4 1.4 0.3

[8,] 5.0 3.4 1.5 0.2

[9,] 4.4 2.9 1.4 0.2

[10,] 4.9 3.1 1.5 0.1

[11,] 5.4 3.7 1.5 0.2

[12,] 4.8 3.4 1.6 0.2

[13,] 4.8 3.0 1.4 0.1

[14,] 4.3 3.0 1.1 0.1

[15,] 5.8 4.0 1.2 0.2

[16,] 5.7 4.4 1.5 0.4

[17,] 5.4 3.9 1.3 0.4

[18,] 5.1 3.5 1.4 0.3

[19,] 5.7 3.8 1.7 0.3

[20,] 5.1 3.8 1.5 0.3

[21,] 5.4 3.4 1.7 0.2

[22,] 5.1 3.7 1.5 0.4

[23,] 4.6 3.6 1.0 0.2

[24,] 5.1 3.3 1.7 0.5

[25,] 4.8 3.4 1.9 0.2

[26,] 7.0 3.2 4.7 1.4

[27,] 6.4 3.2 4.5 1.5

[28,] 6.9 3.1 4.9 1.5

[29,] 5.5 2.3 4.0 1.3

[30,] 6.5 2.8 4.6 1.5

[31,] 5.7 2.8 4.5 1.3

[32,] 6.3 3.3 4.7 1.6

[33,] 4.9 2.4 3.3 1.0

[34,] 6.6 2.9 4.6 1.3

[35,] 5.2 2.7 3.9 1.4

[36,] 5.0 2.0 3.5 1.0

[37,] 5.9 3.0 4.2 1.5

[38,] 6.0 2.2 4.0 1.0

[39,] 6.1 2.9 4.7 1.4

[40,] 5.6 2.9 3.6 1.3

[41,] 6.7 3.1 4.4 1.4

[42,] 5.6 3.0 4.5 1.5

[43,] 5.8 2.7 4.1 1.0

[44,] 6.2 2.2 4.5 1.5

[45,] 5.6 2.5 3.9 1.1

[46,] 5.9 3.2 4.8 1.8

[47,] 6.1 2.8 4.0 1.3

[48,] 6.3 2.5 4.9 1.5

[49,] 6.1 2.8 4.7 1.2

[50,] 6.4 2.9 4.3 1.3

[51,] 6.3 3.3 6.0 2.5

[52,] 5.8 2.7 5.1 1.9

[53,] 7.1 3.0 5.9 2.1

[54,] 6.3 2.9 5.6 1.8

[55,] 6.5 3.0 5.8 2.2

[56,] 7.6 3.0 6.6 2.1

[57,] 4.9 2.5 4.5 1.7

[58,] 7.3 2.9 6.3 1.8

[59,] 6.7 2.5 5.8 1.8

[60,] 7.2 3.6 6.1 2.5

[61,] 6.5 3.2 5.1 2.0

[62,] 6.4 2.7 5.3 1.9

[63,] 6.8 3.0 5.5 2.1

[64,] 5.7 2.5 5.0 2.0

[65,] 5.8 2.8 5.1 2.4

[66,] 6.4 3.2 5.3 2.3

[67,] 6.5 3.0 5.5 1.8

[68,] 7.7 3.8 6.7 2.2

[69,] 7.7 2.6 6.9 2.3

[70,] 6.0 2.2 5.0 1.5

[71,] 6.9 3.2 5.7 2.3

[72,] 5.6 2.8 4.9 2.0

[73,] 7.7 2.8 6.7 2.0

[74,] 6.3 2.7 4.9 1.8

[75,] 6.7 3.3 5.7 2.1

> test <-rbind(iris3[26:50,,1], iris3[26:50,,2], iris3[26:50,,3])

> test

Sepal L. Sepal W. Petal L. Petal W.

[1,] 5.0 3.0 1.6 0.2

[2,] 5.0 3.4 1.6 0.4

[3,] 5.2 3.5 1.5 0.2

[4,] 5.2 3.4 1.4 0.2

[5,] 4.7 3.2 1.6 0.2

[6,] 4.8 3.1 1.6 0.2

[7,] 5.4 3.4 1.5 0.4

[8,] 5.2 4.1 1.5 0.1

[9,] 5.5 4.2 1.4 0.2

[10,] 4.9 3.1 1.5 0.2

[11,] 5.0 3.2 1.2 0.2

[12,] 5.5 3.5 1.3 0.2

[13,] 4.9 3.6 1.4 0.1

[14,] 4.4 3.0 1.3 0.2

[15,] 5.1 3.4 1.5 0.2

[16,] 5.0 3.5 1.3 0.3

[17,] 4.5 2.3 1.3 0.3

[18,] 4.4 3.2 1.3 0.2

[19,] 5.0 3.5 1.6 0.6

[20,] 5.1 3.8 1.9 0.4

[21,] 4.8 3.0 1.4 0.3

[22,] 5.1 3.8 1.6 0.2

[23,] 4.6 3.2 1.4 0.2

[24,] 5.3 3.7 1.5 0.2

[25,] 5.0 3.3 1.4 0.2

[26,] 6.6 3.0 4.4 1.4

[27,] 6.8 2.8 4.8 1.4

[28,] 6.7 3.0 5.0 1.7

[29,] 6.0 2.9 4.5 1.5

[30,] 5.7 2.6 3.5 1.0

[31,] 5.5 2.4 3.8 1.1

[32,] 5.5 2.4 3.7 1.0

[33,] 5.8 2.7 3.9 1.2

[34,] 6.0 2.7 5.1 1.6

[35,] 5.4 3.0 4.5 1.5

[36,] 6.0 3.4 4.5 1.6

[37,] 6.7 3.1 4.7 1.5

[38,] 6.3 2.3 4.4 1.3

[39,] 5.6 3.0 4.1 1.3

[40,] 5.5 2.5 4.0 1.3

[41,] 5.5 2.6 4.4 1.2

[42,] 6.1 3.0 4.6 1.4

[43,] 5.8 2.6 4.0 1.2

[44,] 5.0 2.3 3.3 1.0

[45,] 5.6 2.7 4.2 1.3

[46,] 5.7 3.0 4.2 1.2

[47,] 5.7 2.9 4.2 1.3

[48,] 6.2 2.9 4.3 1.3

[49,] 5.1 2.5 3.0 1.1

[50,] 5.7 2.8 4.1 1.3

[51,] 7.2 3.2 6.0 1.8

[52,] 6.2 2.8 4.8 1.8

[53,] 6.1 3.0 4.9 1.8

[54,] 6.4 2.8 5.6 2.1

[55,] 7.2 3.0 5.8 1.6

[56,] 7.4 2.8 6.1 1.9

[57,] 7.9 3.8 6.4 2.0

[58,] 6.4 2.8 5.6 2.2

[59,] 6.3 2.8 5.1 1.5

[60,] 6.1 2.6 5.6 1.4

[61,] 7.7 3.0 6.1 2.3

[62,] 6.3 3.4 5.6 2.4

[63,] 6.4 3.1 5.5 1.8

[64,] 6.0 3.0 4.8 1.8

[65,] 6.9 3.1 5.4 2.1

[66,] 6.7 3.1 5.6 2.4

[67,] 6.9 3.1 5.1 2.3

[68,] 5.8 2.7 5.1 1.9

[69,] 6.8 3.2 5.9 2.3

[70,] 6.7 3.3 5.7 2.5

[71,] 6.7 3.0 5.2 2.3

[72,] 6.3 2.5 5.0 1.9

[73,] 6.5 3.0 5.2 2.0

[74,] 6.2 3.4 5.4 2.3

[75,] 5.9 3.0 5.1 1.8

>

> dim(iris3)

[1] 50 4 3

> dim(train)

[1] 75 4

> dim(test)

[1] 75 4

>

> cl <- factor(c(rep("s",25), rep("c",25), rep("v",25)))

> # KNN for K=3

>

> myknn3<-knn(train,test, cl,k = 3)

> myknn3

[1] s s s s s s s s s s s s s s s s s s s s s s s s s c c v c c c c c v c c c c c c

[41] c c c c c c c c c c v c c v v v v v v v v v v c v v v v v v v v v v v

Levels: c s v

> attributes(.Last.value)

$levels

[1] "c" "s" "v"

$class

[1] "factor"

>

> tab<-table(myknn3, cl)

> tab

cl

myknn3 c s v

c 23 0 3

s 0 25 0

v 2 0 22

>

>

> # is there nay impact of value of k on ouput of kNN classfier algorithm .. let us check

> # KNN for K=5

> myknn5<-knn(train,test, cl,k = 5)

> myknn5

[1] s s s s s s s s s s s s s s s s s s s s s s s s s c c v c c c c c v c c c c c c

[41] c c c c c c c c c c v c c v v v v v c v v v v c v v v v v v v v v v v

Levels: c s v

> attributes(.Last.value)

$levels

[1] "c" "s" "v"

$class

[1] "factor"

>

> tab<-table(myknn5, cl)

> tab

cl

myknn5 c s v

c 23 0 4

s 0 25 0

v 2 0 21

>

>

> # KNN for K=10

> myknn10<-knn(train,test, cl,k = 10)

> myknn10

[1] s s s s s s s s s s s s s s s s s s s s s s s s s c c c c c c c c v c c c c c c

[41] c c c c c c c c c c v c c v v v v v c v v v v c v v v v v v v v v v v

Levels: c s v

> attributes(.Last.value)

$levels

[1] "c" "s" "v"

$class

[1] "factor"

>

> tab<-table(myknn10, cl)

> tab

cl

myknn10 c s v

c 24 0 4

s 0 25 0

v 1 0 21

>

>

> #OBERVE THE CROSS TABLE CREATES AND ALSO VALUES OF myknn3, myknn5, myknn10

> # TO ENSURE THAT VALUE OF K IMPACTS ON CLASSIFICATION RESULT OF KNN VCLASSIFIER

>

> # DEPENDING UPON K=1,K=5,K=10, ANY DATA INSTANCE CAN BE CLASSIFIED TO SAME OR DIFFERENT

> #CLASS

> # THE SAME IS ENSURED BY COMPARING ROWS OBATAINED AS OUT PUT OF kNN 5, KNN 3 AND KNN 10