Baruch College, STA-CIS 3920, Exercise#4 Anil Poonai 37

21 July 2020

**Exercise 4.1**

A screenshot of a cell phone

Description automatically generated

Same results as the one you got.

Code is in the appendix.

**Exercise 4.2**

A screenshot of a social media post

Description automatically generated

Got pretty much the same results as the example you shown but for AOS. I am fairly certain this is useless in practice.

Code is in the appendix.

**Example 4.3**

**A screenshot of a cell phone

Description automatically generated**

First thing I want to mention is that the code is in the appendix and that I did not bother doing any other trials as the percentage is insanely high already. I also want to point out I’m not sure why there’s a row called “8.5668e-05” as that should be counted as a low risk but it didn’t affect anything so I just left it there. The numbers still add up to the amount in the outsample, 1620. So first I imported the data and got rid of the first 6 rows and any row after 3630 as they are missing data. Then I made a sample function that would just help divide up the rows into two different parts later just to get rid of the affect of natural time on the stock market data. Then I made two more data frames with one having the Lag 1 and 2 columns and the other having the Lag range column. I found the median of the lag range and changed that column from numeric to categoric depending on if the number was greater than or less than and equal to the median. After that it’s just a KNN function with the train and test data. The train data goes from rows 1-2000 and the Test is 2001-3620. The x train and test are the Lag 1 and 2 columns while the y train and test is the new risk column. After that is calculated and put in a table, the percentage of correct classifications comes out to be 97%.

**Appendix**

**For 4.1**

R version 4.0.0 (2020-04-24) -- "Arbor Day"

Copyright (C) 2020 The R Foundation for Statistical Computing

Platform: x86\_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.

You are welcome to redistribute it under certain conditions.

Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.

Type 'contributors()' for more information and

'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or

'help.start()' for an HTML browser interface to help.

Type 'q()' to quit R.

[Previously saved workspace restored]

> q()

> cd()

Error in cd() : could not find function "cd"

> getwd()

[1] "C:/Users/poona/Documents"

> dogcat = read.csv("CIS-STA 3920 LN4 Dogs.csv")

> head(dogcat)

Index Weight Whisker Class Study

1 1 12.1 3.02 Dog Train

2 2 7.2 1.50 Cat Train

3 3 6.8 2.10 Dog Train

4 4 12.2 3.81 Cat Train

5 5 13.2 2.30 Dog Train

6 6 11.3 1.90 Dog Train

> Trainx= dogcat[1:15,2:3]

> Testx=dogcat[16:25,2:3]

> Trainy=dogcat[1:15,4]

> Testx=dogcat[16:25,4]

> library(class)

> predictdc = knn.predict(Trainx,Testx,Trainy,3)

Error in knn.predict(Trainx, Testx, Trainy, 3) :

could not find function "knn.predict"

> predictdc = knn(Trainx,Testx,Trainy,3)

Error in knn(Trainx, Testx, Trainy, 3) :

dims of 'test' and 'train' differ

> predictdc = knn(train=Trainx,test=Testx,cl=Trainy,3)

Error in knn(train = Trainx, test = Testx, cl = Trainy, 3) :

dims of 'test' and 'train' differ

> predictdc = knn(data.frame(Trainx),data.frame(Testx),data.frame(Trainy,3))

Error in knn(data.frame(Trainx), data.frame(Testx), data.frame(Trainy, :

'train' and 'class' have different lengths

> dim(Trainx)

[1] 15 2

> dim(Testx)

NULL

> dim(Traint)

Error: object 'Traint' not found

> dim(Trainy)

NULL

> head(Trainx)

Weight Whisker

1 12.1 3.02

2 7.2 1.50

3 6.8 2.10

4 12.2 3.81

5 13.2 2.30

6 11.3 1.90

> head(Trainy)

[1] "Dog" "Cat" "Dog" "Cat" "Dog" "Dog"

> head(Testx)

[1] "Dog" "Cat" "Cat" "Cat" "Cat" "Dog"

> Trainx= dogcat[1:15,2:3]

> Testx=dogcat[16:25,2:3]

> Trainy=dogcat[1:15,4]

> Testy=dogcat[16:25,4]

> predictdc = knn(Trainx,Testx,Trainy,3)

> tabled=table(predictdc,Testt)

Error in table(predictdc, Testt) : object 'Testt' not found

> tabled=table(predictdc,Testy)

> tabled

Testy

predictdc Cat Dog

Cat 4 1

Dog 2 3

**For 4.2**

R version 4.0.0 (2020-04-24) -- "Arbor Day"

Copyright (C) 2020 The R Foundation for Statistical Computing

Platform: x86\_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.

You are welcome to redistribute it under certain conditions.

Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.

Type 'contributors()' for more information and

'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or

'help.start()' for an HTML browser interface to help.

Type 'q()' to quit R.

> AOD = read.csv("AOS.csv")

> AOS = read.csv("AOS.csv")

> AOD=NULL

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Daily.Range

1 1/3/2006 5.870000 6.146667 5.863333 6.141667 2.620321 1702800 NA 0.283334

2 1/4/2006 6.141667 6.230000 6.120000 6.175000 2.634542 1293600 0.5427198 0.110000

3 1/5/2006 6.258333 6.280000 6.085000 6.116667 2.609655 1296400 -0.9446424 0.195000

4 1/6/2006 6.283333 6.375000 6.266667 6.326667 2.699250 2917200 3.4332124 0.108333

5 1/9/2006 6.308333 6.601666 6.308333 6.541667 2.790979 2010400 3.3983143 0.293333

6 1/10/2006 6.541667 6.780000 6.490000 6.698333 2.857820 2080800 2.3948944 0.290000

> AOD=NULL

> setwd("C:/Users/poona/Desktop/School

+ )

+ )

+

+

+ > AOS=read.csv("AOS.csv")

>

>

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Daily.Range

1 1/3/2006 5.870000 6.146667 5.863333 6.141667 2.620321 1702800 NA 0.283334

2 1/4/2006 6.141667 6.230000 6.120000 6.175000 2.634542 1293600 0.5427198 0.110000

3 1/5/2006 6.258333 6.280000 6.085000 6.116667 2.609655 1296400 -0.9446424 0.195000

4 1/6/2006 6.283333 6.375000 6.266667 6.326667 2.699250 2917200 3.4332124 0.108333

5 1/9/2006 6.308333 6.601666 6.308333 6.541667 2.790979 2010400 3.3983143 0.293333

6 1/10/2006 6.541667 6.780000 6.490000 6.698333 2.857820 2080800 2.3948944 0.290000

> setwd("C:/Users/poona/Desktop/School")

> AOS=read.csv("AOS.csv")

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

1 1/3/2006 5.870000 6.146667 5.863333 6.141667 2.620321 1702800 NA NA NA NA NA NA 0.283334 DOWN

2 1/4/2006 6.141667 6.230000 6.120000 6.175000 2.634542 1293600 0.5427198 NA NA NA NA NA 0.110000 UP

3 1/5/2006 6.258333 6.280000 6.085000 6.116667 2.609655 1296400 -0.9446424 0.5427198 NA NA NA NA 0.195000 DOWN

4 1/6/2006 6.283333 6.375000 6.266667 6.326667 2.699250 2917200 3.4332124 -0.9446424 0.5427198 NA NA NA 0.108333 UP

5 1/9/2006 6.308333 6.601666 6.308333 6.541667 2.790979 2010400 3.3983143 3.4332124 -0.9446424 0.5427198 NA NA 0.293333 UP

6 1/10/2006 6.541667 6.780000 6.490000 6.698333 2.857820 2080800 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 NA 0.290000 UP

> AOS[1:6]=NULL

> head(AOS)

Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

1 1702800 NA NA NA NA NA NA 0.283334 DOWN

2 1293600 0.5427198 NA NA NA NA NA 0.110000 UP

3 1296400 -0.9446424 0.5427198 NA NA NA NA 0.195000 DOWN

4 2917200 3.4332124 -0.9446424 0.5427198 NA NA NA 0.108333 UP

5 2010400 3.3983143 3.4332124 -0.9446424 0.5427198 NA NA 0.293333 UP

6 2080800 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 NA 0.290000 UP

> AOS=read.csv("AOS.csv")

> AOS[1:6,]=NULL

Error in x[[jj]][iseq] <- vjj : replacement has length zero

> AOS[,1:6]=NULL

> head(AOS)

Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

1 1702800 NA NA NA NA NA NA 0.283334 DOWN

2 1293600 0.5427198 NA NA NA NA NA 0.110000 UP

3 1296400 -0.9446424 0.5427198 NA NA NA NA 0.195000 DOWN

4 2917200 3.4332124 -0.9446424 0.5427198 NA NA NA 0.108333 UP

5 2010400 3.3983143 3.4332124 -0.9446424 0.5427198 NA NA 0.293333 UP

6 2080800 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 NA 0.290000 UP

> AOS=read.csv("AOS.csv")

> AOS=AOS[-c(1:6)]

> head(AOS)

Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

1 1702800 NA NA NA NA NA NA 0.283334 DOWN

2 1293600 0.5427198 NA NA NA NA NA 0.110000 UP

3 1296400 -0.9446424 0.5427198 NA NA NA NA 0.195000 DOWN

4 2917200 3.4332124 -0.9446424 0.5427198 NA NA NA 0.108333 UP

5 2010400 3.3983143 3.4332124 -0.9446424 0.5427198 NA NA 0.293333 UP

6 2080800 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 NA 0.290000 UP

> AOS=read.csv("AOS.csv")

> AOS=AOS[-c(1:6,)]

Error in c(1:6, ) : argument 2 is empty

> AOS=AOS[-c(1:6),]

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

7 1/11/2006 6.680000 6.708333 6.565000 6.598333 2.815156 1474800 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 0.143333 DOWN

8 1/12/2006 6.601666 6.665000 6.436666 6.455000 2.754004 1913200 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.228334 DOWN

9 1/13/2006 6.475000 6.505000 6.445000 6.468333 2.759692 1042800 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 0.060000 UP

10 1/17/2006 6.483333 6.581666 6.458333 6.531667 2.786712 1850400 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 0.123333 UP

11 1/18/2006 6.530000 6.738333 6.511667 6.738333 2.874886 2258800 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 0.226666 UP

12 1/19/2006 6.741667 6.780000 6.618333 6.631667 2.829377 1537200 -1.5829845 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 0.161667 DOWN

> library(tidyverse)

-- Attaching packages -------------------------------------------------------------------------------------------------------------------------------------------- tidyverse 1.3.0 --

v ggplot2 3.3.0 v purrr 0.3.4

v tibble 3.0.1 v dplyr 0.8.5

v tidyr 1.0.2 v stringr 1.4.0

v readr 1.3.1 v forcats 0.5.0

-- Conflicts ----------------------------------------------------------------------------------------------------------------------------------------------- tidyverse\_conflicts() --

x dplyr::filter() masks stats::filter()

x dplyr::lag() masks stats::lag()

> class(AOS)

[1] "data.frame"

> class(AOS$Date)

[1] "character"

> AOS$Date=Date(AOS$Date)

Error in Date(AOS$Date) : could not find function "Date"

> library(utils)

> AOS$Date=Date(AOS$Date)

Error in Date(AOS$Date) : could not find function "Date"

> AOS$Date=as.date(AOS$Date)

Error in as.date(AOS$Date) : could not find function "as.date"

> AOS$Date=as.Date(AOS$Date)

> class(AOS$Date)

[1] "Date"

> AOS=AOS[c(1:3630)]

Error in `[.data.frame`(AOS, c(1:3630)) : undefined columns selected

> AOS=AOS[c(1:3630),]

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

7 0001-11-20 6.680000 6.708333 6.565000 6.598333 2.815156 1474800 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 0.143333 DOWN

8 0001-12-20 6.601666 6.665000 6.436666 6.455000 2.754004 1913200 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.228334 DOWN

9 <NA> 6.475000 6.505000 6.445000 6.468333 2.759692 1042800 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 0.060000 UP

10 <NA> 6.483333 6.581666 6.458333 6.531667 2.786712 1850400 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 0.123333 UP

11 <NA> 6.530000 6.738333 6.511667 6.738333 2.874886 2258800 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 0.226666 UP

12 <NA> 6.741667 6.780000 6.618333 6.631667 2.829377 1537200 -1.5829845 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 0.161667 DOWN

> AOS=read.csv("AOS.csv")

> AOS=AOS[-c(1:6),]

> AOS=AOS[c(1:3630),]

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

7 1/11/2006 6.680000 6.708333 6.565000 6.598333 2.815156 1474800 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 0.143333 DOWN

8 1/12/2006 6.601666 6.665000 6.436666 6.455000 2.754004 1913200 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.228334 DOWN

9 1/13/2006 6.475000 6.505000 6.445000 6.468333 2.759692 1042800 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 0.060000 UP

10 1/17/2006 6.483333 6.581666 6.458333 6.531667 2.786712 1850400 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 0.123333 UP

11 1/18/2006 6.530000 6.738333 6.511667 6.738333 2.874886 2258800 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 0.226666 UP

12 1/19/2006 6.741667 6.780000 6.618333 6.631667 2.829377 1537200 -1.5829845 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 0.161667 DOWN

> tail(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction

3631 6/5/2020 51.58 52.40 51.46 52.00 52.00 2078500 2.8277635 1.444337 4.114446 1.183434 -0.3789474 1.9532088 0.940003 UP

3632 6/8/2020 51.87 52.70 50.74 50.88 50.88 1618600 -2.1538442 2.827763 1.444337 4.114446 1.1834341 -0.3789474 1.959999 DOWN

3633 6/9/2020 50.11 50.52 49.12 49.27 49.27 1709600 -3.1643101 -2.153844 2.827763 1.444337 4.1144464 1.1834341 1.400001 DOWN

3634 6/10/2020 49.23 49.30 48.36 48.39 48.39 1302600 -1.7860787 -3.164310 -2.153844 2.827763 1.4443371 4.1144464 0.939998 DOWN

3635 6/11/2020 47.45 47.69 46.66 46.82 46.82 1167200 -3.2444700 -1.786079 -3.164310 -2.153844 2.8277635 1.4443371 1.029999 DOWN

3636 6/12/2020 48.03 48.16 45.88 46.95 46.95 1163500 0.2776613 -3.244470 -1.786079 -3.164310 -2.1538442 2.8277635 2.279999 UP

> Trainaos=AOS[1:2000]

Error in `[.data.frame`(AOS, 1:2000) : undefined columns selected

> dim(AOS)

[1] 3630 15

> Trainaos=AOS[1:2000,9:10]

> head(Trainaos)

Lag1 Lag2

7 2.3948944 3.3983143

8 -1.4928862 2.3948944

9 -2.1722420 -1.4928862

10 0.2065356 -2.1722420

11 0.9790948 0.2065356

12 3.1640873 0.9790948

> Trainaos2=AOS[2001:3630,9:10]

> Testaos=AOS[1:2000,15)

Error: unexpected ')' in "Testaos=AOS[1:2000,15)"

> Testaos=AOS[1:2000,15]

> Testaos2=AOS[2001:3630,15]

> knn(Trainaos,Testaos,Trainaos2,1

+ )

Error in knn(Trainaos, Testaos, Trainaos2, 1) :

'train' and 'class' have different lengths

> Trainaos=AOS[1:2000,9:10]

> Testaos=AOS[1:2000,15)

Error: unexpected ')' in "Testaos=AOS[1:2000,15)"

> Testaos=AOS[1:2000,15]

> Trainaos=AOS[1:2000,9:10]

> Testaos=AOS[2001:3630,9:10)

Error: unexpected ')' in "Testaos=AOS[2001:3630,9:10)"

> Testaos=AOS[2001:3630,9:10]

> Trainaos2=AOS[1:2000,15]

> Testaos2=AOS[2001:3630,15]

> knn(Trainaos,Testaos,Trainaos2,1)

[1] DOWN DOWN UP DOWN UP UP UP UP DOWN DOWN DOWN UP DOWN UP UP DOWN UP DOWN UP UP UP UP DOWN UP UP DOWN UP DOWN DOWN UP DOWN UP DOWN UP UP

[36] DOWN UP DOWN UP DOWN DOWN UP DOWN UP DOWN DOWN DOWN UP DOWN UP DOWN UP UP DOWN DOWN UP DOWN DOWN UP DOWN UP UP DOWN UP DOWN DOWN DOWN UP DOWN DOWN

[71] UP DOWN DOWN DOWN DOWN UP DOWN UP UP UP DOWN UP DOWN UP DOWN UP DOWN UP UP UP DOWN UP DOWN DOWN UP DOWN DOWN UP UP UP UP UP UP UP DOWN

[106] DOWN UP UP DOWN DOWN DOWN DOWN DOWN UP UP DOWN DOWN DOWN DOWN DOWN UP UP DOWN UP UP UP DOWN UP DOWN UP UP DOWN UP UP DOWN DOWN UP UP DOWN UP

[141] DOWN UP UP UP UP DOWN DOWN DOWN UP UP DOWN DOWN UP UP DOWN UP UP UP UP UP UP DOWN UP DOWN UP UP DOWN DOWN DOWN DOWN DOWN DOWN UP UP UP

[176] UP DOWN UP UP DOWN UP UP UP UP UP UP UP DOWN DOWN UP DOWN UP DOWN DOWN DOWN DOWN UP DOWN DOWN UP UP DOWN DOWN DOWN UP DOWN UP DOWN DOWN UP

[211] DOWN DOWN UP DOWN DOWN DOWN UP DOWN DOWN UP UP DOWN UP DOWN UP UP DOWN UP DOWN UP DOWN UP UP DOWN UP DOWN DOWN UP DOWN UP UP DOWN DOWN UP UP

[246] UP UP UP DOWN UP DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN UP UP DOWN DOWN UP UP UP DOWN DOWN DOWN UP UP DOWN UP DOWN UP UP DOWN DOWN UP UP

[281] UP UP DOWN DOWN UP UP DOWN DOWN UP DOWN DOWN DOWN DOWN DOWN UP DOWN UP DOWN UP UP UP UP UP UP UP UP UP UP UP DOWN DOWN UP UP UP UP

[316] UP DOWN UP DOWN UP DOWN DOWN UP DOWN DOWN UP DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN DOWN UP DOWN DOWN UP DOWN DOWN DOWN DOWN UP

[351] UP DOWN DOWN DOWN DOWN DOWN UP UP UP UP UP DOWN UP UP UP UP DOWN DOWN UP UP DOWN DOWN DOWN UP DOWN UP UP DOWN DOWN DOWN DOWN DOWN UP UP UP

[386] UP DOWN DOWN DOWN UP UP DOWN UP DOWN DOWN DOWN DOWN UP DOWN DOWN UP DOWN UP UP DOWN DOWN DOWN UP DOWN DOWN UP DOWN UP UP UP UP UP DOWN UP UP

[421] UP UP DOWN DOWN DOWN UP UP DOWN DOWN DOWN UP DOWN UP DOWN UP UP DOWN UP UP UP DOWN DOWN UP UP DOWN DOWN DOWN UP DOWN UP UP UP DOWN UP UP

[456] DOWN UP UP UP UP DOWN UP DOWN UP DOWN DOWN DOWN UP UP DOWN UP UP DOWN DOWN DOWN UP UP UP UP DOWN DOWN UP DOWN UP UP UP UP UP UP UP

[491] UP UP UP UP DOWN DOWN UP DOWN UP DOWN UP UP UP UP DOWN UP DOWN DOWN UP UP DOWN DOWN DOWN DOWN UP UP DOWN DOWN DOWN DOWN DOWN UP DOWN UP UP

[526] DOWN UP UP UP UP DOWN DOWN UP DOWN DOWN DOWN DOWN UP DOWN DOWN UP DOWN DOWN DOWN DOWN UP UP DOWN DOWN DOWN DOWN UP UP UP UP DOWN UP UP UP UP

[561] DOWN DOWN UP UP UP UP DOWN UP DOWN UP DOWN DOWN DOWN UP UP UP DOWN DOWN DOWN UP UP UP DOWN UP DOWN DOWN DOWN DOWN UP UP UP UP UP UP DOWN

[596] UP UP DOWN UP DOWN DOWN DOWN DOWN DOWN DOWN DOWN UP DOWN UP UP DOWN UP DOWN DOWN DOWN UP DOWN UP UP UP UP UP UP UP UP UP UP DOWN DOWN UP

[631] UP UP UP UP DOWN DOWN DOWN DOWN DOWN UP DOWN DOWN UP DOWN UP DOWN DOWN UP UP DOWN DOWN DOWN UP DOWN UP UP DOWN UP DOWN UP DOWN UP DOWN DOWN UP

[666] DOWN UP UP DOWN DOWN DOWN UP UP DOWN UP UP UP DOWN DOWN DOWN DOWN UP UP UP UP DOWN DOWN UP DOWN UP DOWN UP DOWN UP UP DOWN UP UP DOWN DOWN

[701] UP UP DOWN DOWN DOWN UP UP UP DOWN UP DOWN DOWN UP UP UP UP UP UP DOWN DOWN UP UP UP DOWN DOWN DOWN DOWN DOWN DOWN DOWN DOWN DOWN DOWN DOWN UP

[736] UP UP DOWN DOWN UP UP UP DOWN UP UP UP DOWN UP DOWN DOWN UP UP DOWN DOWN DOWN UP UP UP UP UP UP UP DOWN UP DOWN DOWN DOWN DOWN DOWN DOWN

[771] UP UP DOWN UP UP UP DOWN DOWN DOWN UP DOWN UP UP UP DOWN DOWN DOWN UP DOWN DOWN UP DOWN UP DOWN UP DOWN DOWN DOWN UP DOWN DOWN UP DOWN DOWN DOWN

[806] UP UP UP DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN UP UP DOWN UP UP UP UP UP DOWN DOWN UP DOWN DOWN UP UP UP UP DOWN DOWN UP UP UP DOWN

[841] UP UP DOWN UP DOWN UP DOWN DOWN UP UP UP UP UP UP DOWN UP UP DOWN DOWN UP UP DOWN UP UP UP UP DOWN UP UP DOWN UP UP UP DOWN DOWN

[876] DOWN DOWN UP DOWN DOWN UP DOWN DOWN DOWN UP DOWN DOWN UP UP DOWN UP UP UP UP DOWN DOWN UP DOWN UP DOWN DOWN DOWN DOWN UP UP UP DOWN DOWN DOWN DOWN

[911] UP DOWN UP DOWN UP DOWN DOWN DOWN DOWN DOWN DOWN DOWN DOWN UP UP UP UP DOWN UP UP UP DOWN DOWN DOWN DOWN UP UP DOWN DOWN UP UP UP DOWN DOWN DOWN

[946] UP UP UP DOWN UP UP UP UP DOWN UP DOWN DOWN DOWN DOWN DOWN UP DOWN UP UP UP UP UP UP UP DOWN UP DOWN DOWN DOWN UP DOWN UP UP DOWN UP

[981] UP UP DOWN UP DOWN DOWN DOWN UP DOWN UP DOWN DOWN UP UP UP DOWN UP UP UP UP DOWN UP DOWN DOWN UP UP DOWN DOWN UP UP UP UP DOWN DOWN DOWN

[1016] DOWN DOWN UP DOWN DOWN UP UP DOWN UP UP UP UP UP DOWN DOWN UP UP UP DOWN UP UP UP DOWN UP UP DOWN UP UP DOWN UP UP UP DOWN UP DOWN

[1051] UP UP DOWN DOWN UP UP DOWN UP DOWN DOWN DOWN UP DOWN UP UP DOWN UP UP DOWN DOWN UP UP UP DOWN UP DOWN UP UP UP DOWN DOWN UP UP UP UP

[1086] UP UP UP DOWN UP DOWN DOWN UP UP UP DOWN UP DOWN UP UP UP DOWN UP DOWN UP DOWN DOWN DOWN DOWN DOWN DOWN UP UP DOWN UP UP UP DOWN UP DOWN

[1121] UP UP DOWN DOWN UP DOWN UP DOWN UP DOWN UP UP UP UP UP DOWN DOWN UP DOWN UP DOWN UP UP UP UP UP UP DOWN DOWN UP UP DOWN UP DOWN UP

[1156] DOWN UP DOWN DOWN UP UP UP DOWN DOWN DOWN UP DOWN DOWN DOWN DOWN DOWN DOWN UP UP DOWN UP DOWN UP DOWN DOWN DOWN UP DOWN UP UP DOWN UP DOWN UP UP

[1191] UP DOWN DOWN UP DOWN UP UP DOWN DOWN DOWN UP UP UP DOWN DOWN DOWN UP UP DOWN DOWN DOWN UP UP UP DOWN UP DOWN UP DOWN DOWN DOWN UP UP DOWN UP

[1226] UP DOWN UP DOWN UP DOWN UP UP UP UP UP DOWN UP DOWN DOWN UP DOWN DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN UP UP DOWN UP UP DOWN UP DOWN UP

[1261] DOWN UP DOWN UP DOWN DOWN DOWN UP UP DOWN DOWN UP DOWN DOWN UP UP UP UP DOWN UP DOWN DOWN DOWN UP DOWN DOWN DOWN UP UP UP DOWN UP DOWN UP UP

[1296] DOWN UP DOWN DOWN UP DOWN UP DOWN UP DOWN UP UP DOWN UP UP UP UP UP UP UP UP UP UP UP UP UP DOWN UP UP UP UP DOWN UP DOWN DOWN

[1331] DOWN UP UP UP UP DOWN DOWN DOWN UP UP UP UP DOWN UP UP UP DOWN UP UP UP UP UP UP DOWN DOWN DOWN UP UP DOWN UP UP UP UP UP UP

[1366] DOWN DOWN UP UP UP DOWN DOWN DOWN DOWN DOWN DOWN DOWN UP UP UP DOWN UP DOWN UP UP UP DOWN UP UP UP UP UP UP DOWN DOWN DOWN UP DOWN DOWN DOWN

[1401] UP DOWN UP UP UP UP DOWN DOWN UP DOWN UP DOWN DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN DOWN DOWN UP DOWN UP DOWN UP DOWN UP DOWN UP DOWN DOWN UP

[1436] UP UP UP DOWN UP DOWN UP UP UP DOWN UP UP UP DOWN UP DOWN UP UP DOWN DOWN UP UP UP DOWN UP UP UP DOWN UP UP DOWN UP UP DOWN UP

[1471] UP UP UP UP UP UP UP UP DOWN UP DOWN DOWN UP DOWN UP UP DOWN UP DOWN UP UP UP UP UP DOWN UP DOWN UP DOWN DOWN UP UP DOWN DOWN UP

[1506] UP UP DOWN UP DOWN DOWN UP UP DOWN UP DOWN UP UP DOWN UP DOWN DOWN UP UP UP DOWN UP UP UP UP DOWN UP UP UP DOWN DOWN DOWN UP UP UP

[1541] UP DOWN UP DOWN UP DOWN DOWN DOWN UP UP UP DOWN UP DOWN DOWN DOWN DOWN UP UP UP UP UP DOWN DOWN UP UP DOWN UP UP UP UP UP DOWN DOWN DOWN

[1576] UP UP UP UP DOWN DOWN UP UP UP DOWN UP UP UP UP UP DOWN UP UP UP DOWN UP UP DOWN DOWN UP UP UP DOWN DOWN UP UP UP UP UP DOWN

[1611] DOWN UP DOWN UP DOWN DOWN UP DOWN UP DOWN DOWN UP DOWN DOWN DOWN UP DOWN DOWN UP UP

Levels: DOWN UP

> p1=knn(Trainaos,Testaos,Trainaos2,1)

> p1table=table(p1,Testaos1)

Error in table(p1, Testaos1) : object 'Testaos1' not found

> p1table=table(p1,Testaos2)

> p1table

Testaos2

p1 DOWN UP

DOWN 352 397

UP 402 479

> perc1=(352+479)/(352+479+397+402)

> perc1

[1] 0.509816

> p2=knn(Trainaos,Testaos,Trainaos2,3)

> p2table=(p2,Testaos2)

Error: unexpected ',' in "p2table=(p2,"

> p2table=table(p2,Testaos2)

> p2table

Testaos2

p2 DOWN UP

DOWN 365 399

UP 389 477

> perc2=(365+477)/(365+477+389+399)

> perc2

[1] 0.5165644

**For 4.3**

> getwd()

[1] "C:/Users/poona/Desktop/School"

> AOS=read.csv("AOS.csv")

> AOS=AOS[-c(1:6),]

> AOs=AOS[c(1:3620)]

Error in `[.data.frame`(AOS, c(1:3620)) : undefined columns selected

> AOs=AOS[c(1:3620),]

> AOS=AOS[c(1:3620),]

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction L1.L2Range

7 1/11/2006 6.680000 6.708333 6.565000 6.598333 2.815156 1474800 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 0.143333 DOWN 1.0034199

8 1/12/2006 6.601666 6.665000 6.436666 6.455000 2.754004 1913200 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.228334 DOWN 3.8877806

9 1/13/2006 6.475000 6.505000 6.445000 6.468333 2.759692 1042800 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 0.060000 UP 0.6793558

10 1/17/2006 6.483333 6.581666 6.458333 6.531667 2.786712 1850400 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 0.123333 UP 2.3787776

11 1/18/2006 6.530000 6.738333 6.511667 6.738333 2.874886 2258800 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 0.226666 UP 0.7725591

12 1/19/2006 6.741667 6.780000 6.618333 6.631667 2.829377 1537200 -1.5829845 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 0.161667 DOWN 2.1849925

> tail(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction L1.L2Range

3621 5/21/2020 42.27 42.94 42.25 42.68 42.68 835300 0.5181371 1.1433992 -3.4942529 7.6466221 0.3227433 0.7503727 0.689999 UP 4.6376521

3622 5/22/2020 42.81 42.81 41.90 42.22 42.22 1103500 -1.0777858 0.5181371 1.1433992 -3.4942529 7.6466221 0.3227433 0.909999 DOWN 0.6252622

3623 5/26/2020 43.24 45.21 43.13 44.83 44.83 1639200 6.1819065 -1.0777858 0.5181371 1.1433992 -3.4942529 7.6466221 2.079998 UP 1.5959229

3624 5/27/2020 45.43 47.31 45.37 47.21 47.21 2183300 5.3089380 6.1819065 -1.0777858 0.5181371 1.1433992 -3.4942529 1.940002 UP 7.2596924

3625 5/28/2020 47.44 47.74 46.37 46.59 46.59 2323200 -1.3132790 5.3089380 6.1819065 -1.0777858 0.5181371 1.1433992 1.370003 DOWN 0.8729686

3626 5/29/2020 46.49 47.57 46.01 47.50 47.50 2662000 1.9532088 -1.3132790 5.3089380 6.1819065 -1.0777858 0.5181371 1.560002 UP 6.6222170

> shuffle=sample(3620,3620)

> insample=shuffle(1:2000)

Error in shuffle(1:2000) : could not find function "shuffle"

> insample=shuffle[1:2000]

> outsample=shuffle[2001:3620]

> X.AOS=AOS[,9:10]

> Y.AOS=AOS[,16]

> median(Y.AOS)

[1] 1.425058

> Y.AOS[Y.AOS>1.425058]="HighRisk"

> Y.AOS[Y.AOS<1.425058]="LowRisk"

> head(AOS)

Date Open High Low Close Adj.Close Volume LGFet Lag1 Lag2 Lag3 Lag4 Lag5 Daily.Range Direction L1.L2Range

7 1/11/2006 6.680000 6.708333 6.565000 6.598333 2.815156 1474800 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.5427198 0.143333 DOWN 1.0034199

8 1/12/2006 6.601666 6.665000 6.436666 6.455000 2.754004 1913200 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 -0.9446424 0.228334 DOWN 3.8877806

9 1/13/2006 6.475000 6.505000 6.445000 6.468333 2.759692 1042800 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 3.4332124 0.060000 UP 0.6793558

10 1/17/2006 6.483333 6.581666 6.458333 6.531667 2.786712 1850400 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 3.3983143 0.123333 UP 2.3787776

11 1/18/2006 6.530000 6.738333 6.511667 6.738333 2.874886 2258800 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 2.3948944 0.226666 UP 0.7725591

12 1/19/2006 6.741667 6.780000 6.618333 6.631667 2.829377 1537200 -1.5829845 3.1640873 0.9790948 0.2065356 -2.1722420 -1.4928862 0.161667 DOWN 2.1849925

> head(Y.AOS)

[1] "LowRisk" "HighRisk" "LowRisk" "HighRisk" "LowRisk" "HighRisk"

> Y.AOS=as.factor(Y.AOS)

> Trainx=X>AOS[insample,]

Error: object 'X' not found

> Trainx=X.AOS[insample,]

> Testx=X.AOS[outsample,]

> Trainy=Y.AOS[insample,]

Error in `[.default`(Y.AOS, insample, ) : incorrect number of dimensions

> Y.AOS=AOS[,16]

> Y.AOS[Y.AOS>1.425058]="HighRisk"

> Y.AOS[Y.AOS<1.425058]="LowRisk"

> Trainy=Y.AOS[insample,]

Error in Y.AOS[insample, ] : incorrect number of dimensions

> Y.AOS[1:20]

[1] "LowRisk" "HighRisk" "LowRisk" "HighRisk" "LowRisk" "HighRisk" "HighRisk" "HighRisk" "HighRisk" "HighRisk" "HighRisk" "LowRisk" "HighRisk" "LowRisk" "HighRisk" "HighRisk" "HighRisk" "HighRisk" "HighRisk" "HighRisk"

> dim(Y.AOS)

NULL

> len(Y.AOS)

Error in len(Y.AOS) : could not find function "len"

> length(Y.AOS)

[1] 3620

> Y.AOS[Y.AOS<=1.425058]="LowRisk"

> Trainy=Y.AOS[insample,]

Error in Y.AOS[insample, ] : incorrect number of dimensions

> Trainy=Y.AOS[insample]

> Testy=Y.AOS[outsample]

> pred=knn(Trainx,Testx,Trainy,25)

> table(pred,Testy)

Testy

pred HighRisk LowRisk

8.5668e-05 0 0

HighRisk 803 12

LowRisk 31 774

> perc1=(803+774)/(803+774+31+12)

> perc1

[1] 0.9734568

>