

Activity-3

Comparison of various supervised learnings

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Section: K22BW

1) KNN

Code:

RStudio interface showing the beginning of a KNN script. The code reads a dataset from 'winequality_red.xlsx' and performs some initial data exploration and preparation.

```
1 # Knn
2 setwd("C:/College PPTs/5th SEM/INT234")
3 library(readxl)
4 data=read_excel("winequality_red.xlsx")
5 view(data)
6 three_count<-sum(data$quality=="3")
7 four_count <- sum(data$quality == "4")
8 five_count <- sum(data$quality == "5")
9 six_count <- sum(data$quality == "6")
10 seven_count <- sum(data$quality == "7")
11 eight_count <- sum(data$quality == "8")
12 three_count
13 four_count
14 five_count
15 six_count
16 seven_count
17 eight_count
18 table(data$quality)
19 install.packages("dplyr")
20 library(dplyr)
21 mutating<- data %>%
22   mutate(quality = recode(quality, "3"="three", "4" = "four", "5"
23   ="five", "6"="six", "7"="seven", "8"="eight"))
24 mutating
25 View(mutating)
26 summary(data$density)
27 summary(data$ph)
28 summary(data$sulphates)
29 install.packages("gmodels")
30 library(gmodels)
31 normalize<-function(x){
32   return ((x-min(x))/max(x)-min(x))
33 }
```

RStudio interface showing the continuation of the KNN script. It includes data normalization, setting a random seed, and training a KNN model.

```
21 mutating<- data %>%
22   mutate(quality = recode(quality, "3"="three", "4" = "four", "5"
23   ="five", "6"="six", "7"="seven", "8"="eight"))
24 mutating
25 View(mutating)
26 summary(data$density)
27 summary(data$ph)
28 summary(data$sulphates)
29 install.packages("gmodels")
30 library(gmodels)
31 normalize<-function(x){
32   return ((x-min(x))/max(x)-min(x))
33 }
34 data$density <- normalize(data$density)
35 data$ph <- normalize(data$ph)
36 data$sulphates <- normalize(data$sulphates)
37 View(data)
38 library(class)
39 set.seed(123)
40
41 trainIndex <- sample(1: nrow(data), 0.7*nrow(data))
42 trainIndex
43 train <- data[trainIndex,]
44 test <- data[-trainIndex,]
45 train
46 test
47 knn_pred <- knn(train[,-1],test[,-1],train$quality,k=162)
48
49 table(knn_pred,test$quality,dnn = c("prediction","actual"))
50 Accuracy<- sum(knn_pred==test$quality)/nrow(test)
51 Accuracy
52
```

Output:

RStudio Environment pane:

```
> three_count<-sum(data$quality=="3")
> four_count <- sum(data$quality == "4")
> five_count <- sum(data$quality == "5")
> six_count <- sum(data$quality == "6")
> seven_count <- sum(data$quality == "7")
> eight_count <- sum(data$quality == "8")
> three_count
[1] 10
> four_count
[1] 53
> five_count
[1] 681
> six_count
[1] 638
> seven_count
[1] 199
> eight_count
[1] 18
> table(data$quality)

  3   4   5   6   7   8 
10  53 681 638 199 18 

>
```

RStudio Global Environment pane:

	Value	Type
eight_count	18L	
emp	chr [1:6] "m" "m" "f" "m" "f" "f"	
emp_id	num [1:3] 2 3 4	
emp_name	chr [1:3] "arun" "sam" "sammy"	
energy	chr [1:5] "coal" "gas" "petrol" "nuclear" "o...	
five_count	681L	
four_count	53L	
h2	num [1:5] 12 34 56 67 44	
hsiz	4	

RStudio Files pane:

Name	Size	Modified
RData	1.4 MB	Sep 24, 2024, 3:56 PM
Rhistory	5.7 KB	Sep 27, 2024, 10:56 AM
abc.csv	172 B	Sep 12, 2024, 7:14 PM
akka presentation.pptx	1.7 MB	May 12, 2023, 6:30 AM
akshay python project (1).docx	344 KB	Dec 6, 2022, 8:58 PM
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C1.docx	1.9 MB	Sep 17, 2024, 1:07 PM
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CHEGG		
Community development Presentation.pptx	4.1 MB	Oct 29, 2023, 1:12 PM
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Conditional formatting.xlsx	197 KB	May 6, 2024, 7:01 PM
cse 121 presentation.pptx	114 KB	Mar 9, 2023, 3:59 PM
Custom Office Templates		
desktop.ini	418 B	Sep 23, 2024, 10:35 AM
Doc1.docx	1.2 MB	Aug 30, 2024, 7:23 AM
Excel 1.xlsx	11.1 KB	Jan 23, 2024, 4:54 PM

RStudio Environment pane:

```
[1] 199
> eight_count
[1] 18
> table(data$quality)

  3   4   5   6   7   8 
10  53 681 638 199 18 

> mutating<- data %>%
+   mutate(quality = recode(quality, "3"="three" , "4" = "four", "5" ="fiv
e", "6"="six", "7"="seven", "8"="eight"))
Error in data %>% mutate(quality = recode(quality, "3" = "three", "4" = "fo
ur", :
  could not find function "%>%"
```

RStudio Global Environment pane:

	Value	Type
eight_count	18L	
emp	chr [1:6] "m" "m" "f" "m" "f" "f"	
emp_id	num [1:3] 2 3 4	
emp_name	chr [1:3] "arun" "sam" "sammy"	
energy	chr [1:5] "coal" "gas" "petrol" "nuclear" "o...	
five_count	681L	
four_count	53L	
h2	num [1:5] 12 34 56 67 44	
hsiz	4	

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RStudio

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Activity_3.R x mutating

d	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulphates	alcohol	quality
0.00	1.90	0.076	11	34	0.9978	3.51	0.56	9.4	five
0.00	2.60	0.098	25	67	0.9968	3.20	0.68	9.8	five
0.04	2.30	0.092	15	54	0.9970	3.26	0.65	9.8	five
0.56	1.90	0.075	17	60	0.9980	3.16	0.58	9.8	six
0.00	1.90	0.076	11	34	0.9978	3.51	0.56	9.4	five
0.06	1.60	0.069	15	59	0.9964	3.30	0.46	9.4	five
0.00	1.20	0.065	15	21	0.9946	3.39	0.47	10.0	seven
0.02	2.00	0.073	9	18	0.9968	3.36	0.57	9.5	seven
0.36	6.10	0.071	17	102	0.9978	3.35	0.80	10.5	five
0.06	1.80	0.097	15	65	0.9959	3.28	0.54	9.2	five
0.36	6.10	0.071	17	102	0.9978	3.35	0.80	10.5	five
0.00	1.60	0.089	16	59	0.9943	3.58	0.52	9.9	five
0.29	1.60	0.114	9	29	0.9974	3.26	1.56	9.1	five
0.18	3.80	0.176	52	145	0.9986	3.16	0.88	9.2	five
0.19	3.90	0.170	51	148	0.9986	3.17	0.93	9.2	five
0.56	1.80	0.092	35	103	0.9969	3.30	0.75	10.5	seven

Showing 1 to 17 of 1,599 entries. 12 total columns

R 4.3.3 C:\College PPTs\5th SEM\INT234/

```
[1] 199
> eight_count
[1] 18
> table(data$quality)

 3 4 5 6 7 8
10 53 681 638 199 18

> mutating<- data %>%
+   mutate(quality = recode(quality, "3"="three", "4" = "four", "5" ="five",
+ "6"="six", "7"="seven", "8"="eight"))
>Error in data %>% mutate(quality = recode(quality, "3" = "three", "4" = "fo
+ "

```

RStudio

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Source

R 4.3.3 C:\College PPTs\5th SEM\INT234/

```
'fixed acidity' 'volatile acidity' 'citric acid' 'residual sugar'
  <dbl> <dbl> <dbl> <dbl>
1 7.4 0.7 0 1.9
2 7.8 0.88 0 2.6
3 7.8 0.76 0.04 2.3
4 11.2 0.28 0.56 1.9
5 7.4 0.7 0 1.9
6 7.4 0.66 0 1.8
7 7.9 0.6 0.06 1.6
8 7.3 0.65 0 1.2
9 7.8 0.58 0.02 2
10 7.5 0.5 0.36 6.1
# i 1,589 more rows
# i 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
# `total sulfur dioxide` <dbl>, density <dbl>, pH <dbl>,
# sulphates <dbl>, alcohol <dbl>, quality <chr>
# i Use print(n = ...) to see more rows
> View(mutating)
> summary(data$density)
  Min. 1st Qu. Median Mean 3rd Qu. Max.
-0.9901 -0.9846 -0.9834 -0.9823 -0.9765
> summary(data$sulphates)
  Min. 1st Qu. Median Mean 3rd Qu. Max.
-0.3300 -0.2200 -0.1850 -0.1659 -0.1300 0.5050
> normalize<-function(x){
+   return ((x-min(x))/max(x)-min(x))
+ }
> data$density <- normalize(data$density)
> data$pH <- normalize(data$pH)
> data$sulphates <- normalize(data$sulphates)
>
```

Environment History Connections Tutorial

R - Global Environment

eight_count	18L
emp	chr [1:6] "m" "m" "f" "m" "f" "f"
emp_id	num [1:3] 2 3 4
emp_name	chr [1:3] "arun" "sam" "sammy"
energy	chr [1:5] "coal" "gas" "petrol" "nuclear" "o...
five_count	681L
four_count	53L
h2	num [1:5] 12 34 56 67 44
hszie	4

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Activity.RR x data mutating

residual sugar chlorides free sulfur dioxide total sulfur dioxide density pH sulphates alcohol quality

1.00	1.90	0.076	11	34	0.9821831	2.660761	0.5577228	9.4	5
2.00	2.60	0.098	25	67	0.9832034	2.692662	0.6765347	9.8	5
3.04	2.30	0.092	15	54	0.9829993	2.686488	0.6468317	9.8	5
7.56	1.90	0.075	17	60	0.9819790	2.696779	0.5757248	9.8	6
10.00	1.90	0.076	11	34	0.9821831	2.660761	0.5577228	9.4	5
10.00	1.88	0.075	13	40	0.9821831	2.660761	0.5577228	9.4	5
10.06	1.60	0.069	15	59	0.9836115	2.682371	0.4587129	9.4	5
10.00	1.20	0.065	15	21	0.9854480	2.673110	0.6468139	10.0	7
10.02	2.00	0.073	9	18	0.9832034	2.676197	0.5676238	9.5	7
10.36	6.10	0.071	17	102	0.9821831	2.677236	0.7953465	10.5	5
10.08	1.80	0.097	15	65	0.9841216	2.684430	0.5379208	9.2	5
10.36	6.10	0.071	17	102	0.9821831	2.677236	0.7953465	10.5	5
10.00	1.60	0.089	16	59	0.9857541	2.653557	0.5181188	9.9	5
12.29	1.60	0.114	9	29	0.9829192	2.686488	1.5478218	9.1	5
13.18	3.80	0.176	52	145	0.9813668	2.696779	0.8745545	9.2	5
13.19	3.90	0.170	51	148	0.9813668	2.695749	0.9246594	9.2	5
10.56	1.80	0.092	35	103	0.9831013	2.682371	0.7458416	10.5	7

Showing 1 to 17 of 1,599 entries. 12 total columns

R 4.3.3 C:\College PPT\SEM SEM\NT234

```
> summary(data$sulphates)
   Min. 1st Qu. Median Mean 3rd Qu. Max.
-0.3300 -0.2200 -0.1850 -0.1659 -0.1300  0.5050
> normalize<-function(x){
+   return ((x-min(x))/max(x)-min(x))
+ }
> data$density <- normalize(data$density)
> data$pH <- normalize(data$pH)
> data$sulphates <- normalize(data$sulphates)
> View(data)
>
```

RStudio

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Source

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```
> data$sulphates <- normalize(data$sulphates)
> View(data)
> trainIndex <- sample(1: nrow(data), 0.7*nrow(data))
> trainIndex
 [1] 164 1436 351 1036 11 1240 1054 1419 216 919 482 1098 1334
[14] 900 582 723 1020 614 1275 681 92 888 560 1261 841 263
[27] 179 408 1002 850 856 1016 328 828 1040 380 466 925 497
[40] 720 325 791 1091 1094 504 1497 1427 1547 747 702 1567 583
[53] 997 7 256 1037 852 713 245 1420 1486 732 73 736 247
[66] 420 1235 1058 1213 1393 1356 910 842 487 528 610 586 243
[79] 194 1173 138 289 1231 914 376 1525 772 167 1122 958 860
[92] 1534 211 663 456 147 1351 1474 1516 1337 890 1047 369 651
[105] 1410 558 89 1113 1302 1229 342 793 1463 457 1443 1146 1126
[118] 1450 460 783 1017 143 548 25 937 1029 974 386 51 1280
[131] 1099 417 271 1552 1367 779 281 1162 646 1504 1260 264 1079
[144] 1509 621 816 1472 766 181 358 851 1055 1132 203 153 840
[157] 512 993 568 296 1087 72 464 1290 810 664 618 1372 40
[170] 898 878 1469 642 640 956 1460 752 297 122 1286 626 1233
[183] 283 140 975 1524 1154 1360 655 1403 152 987 802 811 1192
[196] 571 30 1168 64 722 623 300 117 969 1277 1251 493 1278
[209] 432 965 1431 1244 318 210 902 104 491 252 1370 678 689
[222] 155 1438 1500 1110 985 1166 748 259 1194 1043 159 494 121
[235] 1455 966 1015 154 669 295 697 373 1028 522 1560 35 115
[248] 883 542 788 1149 751 1070 266 708 867 647 523 630 239
[261] 1430 873 855 1440 1030 489 176 1212 705 1598 1553 365 959
[274] 743 886 1388 710 61 1480 945 1359 1523 716 1160 1519 617
[287] 1156 1140 1321 731 674 1179 455 475 525 693 1451 118 396
[300] 138 431 262 1105 282 357 875 1597 844 1406 280 712 577
[313] 1387 74 156 1076 151 1467 1512 733 823 598 1317 572 251
[326] 970 971 1001 524 1157 1086 636 608 193 1008 907 1053 1306
[339] 472 5 962 425 815 1242 226 887 1357 192 891 1081 579
[352] 725 613 217 102 1116 1187 2 275 1518 1111 899 1252 728
[365] 829 827 224 585 785 1473 1561 1554 863 949 780 340 569
[378] 1573 675 133 1505 108 1061 666 1566 367 184 470 543 820
[391] 777 1517 361 1295 976 1378 1165 231 223 349 988 590 1454
```

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```
> train
# A tibble: 1,119 × 12
  `fixed acidity` `volatile acidity` `citric acid` `residual sugar`
    <dbl>            <dbl>           <dbl>           <dbl>
1          7.4            0.6            0.26            7.3
2         10.2            0.54           0.37           15.4
3         10.7            0.67           0.22            2.7
4          10.1            0.37           0.34            2.4
5          6.7             0.58           0.08            1.8
6          6.5             0.67           0                4.3
7          8.3             0.33           0.42            2.3
8          7.8             0.53           0.01            1.6
9          7                0.49           0.49            5.6
10         8.4             0.36           0.32            2.2
# i 1,109 more rows
# ℹ 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
#   `total sulfur dioxide` <dbl>, density <dbl>, pH <dbl>,
#   sulphates <dbl>, alcohol <dbl>, quality <fct>
# ℹ Use print(n = ...) to see more rows
> test
# A tibble: 480 × 12
  `fixed acidity` `volatile acidity` `citric acid` `residual sugar`
    <dbl>            <dbl>           <dbl>           <dbl>
1          7.8            0.76           0.04            2.3
2          7.8            0.58           0.02            2
3          7.5             0.5            0.36            6.1
4          7.8             0.61           0.29            1.6
5          8.9             0.62           0.19            3.9
6          7.6             0.39           0.31            2.3
7          8.5             0.49           0.11            2.3
8          5.7             1.13           0.09            1.5
9          7.5             0.49           0.2              2.6
10         8.1             0.66           0.22            2.2
# i 470 more rows
# ℹ 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
```

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```
# A tibble: 480 × 12
  `fixed acidity` `volatile acidity` `citric acid` `residual sugar`
    <dbl>            <dbl>           <dbl>           <dbl>
1          7.8            0.76           0.04            2.3
2          7.8            0.58           0.02            2
3          7.5             0.5            0.36            6.1
4          7.8             0.61           0.29            1.6
5          8.9             0.62           0.19            3.9
6          7.6             0.39           0.31            2.3
7          8.5             0.49           0.11            2.3
8          5.7             1.13           0.09            1.5
9          7.5             0.49           0.2              2.6
10         8.1             0.66           0.22            2.2
# i 470 more rows
# ℹ 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
#   `total sulfur dioxide` <dbl>, density <dbl>, pH <dbl>,
#   sulphates <dbl>, alcohol <dbl>, quality <fct>
# ℹ Use print(n = ...) to see more rows
> knn_pred <- knn(train[-1],test[-1],train$quality,k=162)
Error in knn(train[-1], test[-1], train$quality, k = 162) :
  could not find function "knn"
> table(knn_pred,test$quality,dnn = c("prediction","actual"))
      actual
prediction 3 4 5 6 7 8
  3 0 0 0 0 0 0
  4 0 0 0 0 0 0
  5 3 6 94 83 21 1
  6 0 12 102 116 36 6
  7 0 0 0 0 0 0
  8 0 0 0 0 0 0
> Accuracy<- sum(knn_pred==test$quality)/nrow(test)
> Accuracy
[1] 0.4375
```

2) Naïve Bayes:

Code:

The screenshot shows the RStudio interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help, and Addins. Below the menu is a toolbar with icons for View, Run, Source, and other functions. The main area contains an R script titled "Activity-3.R". The script code is as follows:

```
53 # Naïve Bayes
54 View(data)
55 str(data)
56 data$quality<-factor(data$quality)
57 install.packages("tm")
58 library(tm)
59 sms_corpus<-VCorpus(VectorSource(mutating))
60 print(sms_corpus)
61 as.character(sms_corpus[[1]])
62 lapply(sms_corpus[1:2],as.character)
63 sms_corpus_clean<-tm_map(sms_corpus,content_transformer(tolower))
64 print(sms_corpus_clean)
65 as.character(sms_corpus[[1]])
66 as.character(sms_corpus_clean[[1]])
67 sms_corpus_clean<-tm_map(sms_corpus_clean,removeNumbers)
68 print(sms_corpus_clean)
69 as.character(sms_corpus_clean[[3]])
70 sms_corpus_clean<-tm_map(sms_corpus_clean,removeWords,stopwords())
71 sms_corpus_clean<-tm_map(sms_corpus_clean,removePunctuation)
72 install.packages("SnowballC")
73 library(SnowballC)
74 sms_corpus_clean<-tm_map(sms_corpus_clean,stemDocument)
75 sms_corpus_clean<-tm_map(sms_corpus_clean,stripWhitespace)
76 sms_dtm<-DocumentTermMatrix(sms_corpus_clean)
77
78 sms_dtm_train<-sms_dtm[1:6,]
79 sms_dtm_test<-sms_dtm[7:12,]
80 sms_train_labels<-a[1:6,]$mutating
81 sms_test_labels<-a[7:12,]$mutating
82 prop.table(table(sms_train_labels))
83 prop.table(table(sms_test_labels))
84
```

The right side of the interface shows the Global Environment pane, which lists objects like tree, wbcd, wbcd_n, and z2. It also displays the Values pane with entries for a1, ab, and abc, and the Accuracy pane showing 0.4375. Below these panes is a file browser showing various documents and files in the "Home" directory.

This screenshot is identical to the one above, except it includes an additional line of code at the bottom of the script:

```
85 install.packages("wordcloud")
86 library(wordcloud)
```

The rest of the script and the environment pane are the same as the first screenshot.

Output:

```

R 4.3.3 C:\College PPfIS\5th SEM\INT234/ 
> install.packages("tm")
Error in install.packages : Updating loaded packages
> install.packages("tm")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:
https://cran.rstudio.com/bin/windows/Rtools/
Installing package into 'C:/Users/rishi/AppData/Local/R/win-library/4.3'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/tm_0.7-14.zip'
Content type 'application/zip' length 1000099 bytes (976 KB)
downloaded 976 KB

package 'tm' successfully unpacked and MD5 sums checked
Warning in install.packages :
  cannot remove prior installation of package 'tm'
warning in install.packages :
  problem copying C:\Users\rishi\AppData\Local\R\win-library\4.3\00LOCK\tm
\libs\x64\tm.dll to C:\Users\rishi\AppData\Local\R\win-library\4.3\tm\tibs
\x64\tm.dll: Permission denied
Warning in install.packages :
  restored 'tm'

The downloaded binary packages are in
  C:\Users\rishi\AppData\Local\Temp\Rtmp8gB85s\downloaded_packages
> library(tm)
Loading required package: NLP
> sms_corpus<-vcorpus(VectorSource(mutating))
> print(sms_corpus)
<<VCorpus>>
Metadata: corpus specific: 0, document level (indexed): 0
Content: documents: 12
> |

```

```

R 4.3.3 C:\College PPfIS\5th SEM\INT234/ 
<<VCorpus>>
Metadata: corpus specific: 0, document level (indexed): 0
Content: documents: 12
> as.character(sms_corpus[[1]])
[1] "7.4" "7.8" "11.2" "7.4" "7.4" "7.9" "7.3" "7.8"
[10] "7.5" "6.7" "7.5" "5.6" "7.8" "8.9" "8.5" "8.1"
[19] "7.4" "7.9" "8.9" "7.6" "7.9" "8.5" "6.9" "6.3"
[28] "7.9" "7.1" "7.8" "6.7" "6.9" "8.3" "6.9" "5.2"
[37] "7.8" "8.1" "5.7" "7.3" "7.3" "8.8" "7.5" "8.1"
[46] "4.6" "7.7" "8.7" "6.4" "5.6" "8.8" "6.6" "6.6"
[55] "7.6" "7.7" "10.2" "7.5" "7.8" "7.3" "8.8" "7.7"
[64] "7" "7.2" "7.2" "7.5" "6.6" "9.3" "8" "7.7"
[73] "7.7" "8.3" "9.7" "8.8" "8.8" "6.8" "6.7" "8.3"
[82] "7.8" "7.4" "7.3" "6.3" "6.9" "8.6" "7.7" "9.3"
[91] "7.9" "8.6" "8.6" "7.7" "5" "4.7" "6.8" "7" "7.6"
[100] "8.1" "8.3" "7.8" "8.1" "8.1" "7.2" "8.1" "7.8" "6.2"
[109] "8" "8.1" "7.8" "8.4" "8.4" "10.1" "7.8" "9.4" "8.3"
[118] "7.8" "8.8" "7" "7.3" "8.8" "7.3" "8" "7.8" "9"
[127] "8.2" "8.1" "8" "6.1" "6" "5.6" "5.6" "6.6" "7.9"
[136] "8.4" "8.3" "7.2" "7.8" "7.8" "8.4" "8.3" "5.2" "6.3"
[145] "5.2" "8.1" "5.8" "7.6" "6.9" "8.2" "7.3" "9.2" "7.5"
[154] "7.5" "7.1" "7.1" "7.1" "7.1" "6.8" "7.6" "7.6"
[163] "7.8" "7.4" "7.3" "7.8" "6.8" "7.3" "6.8" "7.5" "7.9"
[172] "8" "8" "7.4" "7.3" "6.9" "7.3" "7.5" "7" "8.8"
[181] "8.8" "8.9" "7.2" "6.8" "6.7" "8.9" "7.4" "7.7" "7.9"
[190] "7.9" "8.2" "6.4" "6.8" "7.6" "7.6" "7.8" "7.3" "11.5"
[199] "5.4" "6.9" "9.6" "8.8" "6.8" "7" "7" "12.8" "12.8"
[208] "7.8" "7.8" "11" "9.7" "8" "11.6" "8.2" "7.8" "7"
[217] "8.7" "8.1" "7.5" "7.8" "7.8" "7.4" "6.8" "8.6" "8.4"
[226] "7.7" "8.9" "9" "7.7" "6.9" "5.2" "8" "8.5" "6.9"
[235] "8.2" "7.2" "7.2" "7.2" "7.2" "8.2" "8.9" "12" "7.7"
[244] "15" "15" "7.3" "7.1" "8.2" "7.7" "7.3" "10.6" "7.1"
[253] "11.1" "7.7" "7.1" "8" "9.4" "6.6" "7.7" "10" "7.9"
[262] "7" "8" "7.9" "12.5" "11.8" "8.1" "7.9" "6.9" "11.5"
[271] "7.9" "11.5" "10.9" "8.4" "7.5" "7.9" "6.9" "11.5" "10.3"

```

RStudio

```
R 4.3.3 C:\College PP\Py\Stk\SEM\INT2344 ↵
[937] "8.8" "12" "7.2" "6.2" "9.6" "9.9" "10.1" "9.8" "8.3"
[946] "10.2" "10.2" "8.3" "8.9" "8.9" "8.3" "8.2" "10.2"
[955] "7.6" "8.5" "9" "9.5" "6.4" "8" "8.5" "7.1" "6.6"
[964] "8.8" "8.5" "8.3" "9" "8.5" "9" "6.7" "10.4" "10.4"
[973] "10.1" "8.5" "8.8" "7.2" "7.2" "8.4" "7" "12.2" "9.1"
[982] "9.5" "7.3" "9.1" "12.2" "7.4" "9.8" "7.1" "7.7" "9.7"
[991] "7.7" "7.1" "6.5" "7.1" "10" "7.7" "5.6" "5.6" "8.9"
[1000] "6.4"
[ reached getoption("max.print") -- omitted 599 entries ]
> lapply(sms_corpus[1:2],as.character)
$ 1
[1] "7.4" "7.8" "7.8" "11.2" "7.4" "7.4" "7.9" "7.3" "7.8"
[10] "7.5" "6.7" "7.5" "5.6" "7.8" "8.9" "8.9" "8.5" "8.1"
[19] "7.4" "7.9" "8.9" "7.6" "7.9" "8.5" "6.9" "6.3" "7.6"
[28] "7.9" "7.1" "7.8" "6.7" "6.9" "8.3" "6.9" "5.2" "7.8"
[37] "7.8" "8.1" "5.7" "7.3" "7.3" "8.8" "7.5" "8.1" "6.8"
[46] "4.6" "7.7" "8.7" "6.4" "5.6" "8.8" "6.6" "6.6" "8.6"
[55] "7.6" "7.7" "10.2" "7.5" "7.8" "7.3" "8.8" "7.7" "7.5"
[64] "7" "7.2" "7.2" "7.5" "6.6" "9.3" "8" "7.7" "7.7"
[73] "7.7" "8.3" "9.7" "8.8" "8.8" "6.8" "6.7" "8.3" "6.2"
[82] "7.8" "7.4" "7.3" "6.3" "6.9" "8.6" "7.7" "9.3" "7"
[91] "7.9" "8.6" "8.6" "7.7" "5" "4.7" "6.8" "7" "7.6"
[100] "8.1" "8.3" "7.8" "8.1" "8.1" "7.2" "8.1" "7.8" "6.2"
[109] "8" "8.1" "7.8" "8.4" "8.4" "10.1" "7.8" "9.4" "8.3"
[118] "7.8" "8.8" "7" "7.3" "8.8" "7.3" "8.9" "7.8" "9"
[127] "8.2" "8.1" "8" "6.1" "8" "5.6" "5.6" "6.6" "7.9"
[136] "8.4" "8.3" "7.2" "7.8" "7.8" "8.4" "8.3" "5.2" "6.3"
[145] "5.2" "8.1" "5.8" "7.6" "6.9" "8.2" "7.3" "9.2" "7.5"
[154] "7.5" "7.1" "7.1" "7.1" "7.1" "7.1" "6.8" "7.6" "7.6"
[163] "7.8" "7.4" "7.3" "7.8" "6.8" "7.3" "6.8" "7.5" "7.9"
[172] "8" "8" "7.4" "7.3" "6.9" "7.3" "7.5" "7" "8.8"
[181] "8.8" "8.9" "7.2" "6.8" "6.7" "8.9" "7.4" "7.7" "7.9"
[190] "7.9" "8.2" "6.4" "6.8" "7.6" "7.6" "7.8" "7.3" "11.5"
[199] "5.4" "6.9" "9.6" "8.8" "6.8" "7" "7" "12.8" "12.8"
[208] "7.8" "7.8" "11" "6" "8" "7" "7.8" "7.8" "7.8"
```

RStudio

```
R 4.3.3 C:\College PP\Py\Stk\SEM\INT2344 ↵
[77] "0.53" "0.53" "0.53" "0.52" "0.52" "0.52" "0.52" "0.52" "0.52"
[78] "0.59" "0.35" "0.35" "0.56" "0.56" "0.63" "0.37" "0.64"
[79] "0.61" "0.6" "0.27" "0.89" "0.46" "0.37" "0.5" "0.5"
[80] "0.61" "0.55" "0.585" "0.56" "0.52" "0.28" "0.25" "0.28"
[809] "0.53" "0.48" "0.49" "0.5" "0.45" "0.39" "0.41" "0.45"
[817] "0.51" "0.29" "0.715" "0.66" "0.685" "0.42" "0.54" "0.54"
[825] "0.48" "0.46" "0.27" "0.46" "0.57" "0.61" "0.685" "0.61"
[833] "0.44" "0.47" "0.685" "0.665" "0.28" "0.28" "0.31" "0.5"
[841] "0.42" "0.66" "0.5" "0.685" "0.25" "0.64" "0.64" "0.68"
[849] "0.64" "0.63" "0.43" "0.43" "0.42" "0.36" "0.36" "0.735"
[857] "0.36" "0.26" "0.28" "0.56" "0.62" "1.01" "0.42" "0.62"
[865] "0.62" "0.635" "0.49" "0.51" "0.56" "0.63" "0.715" "0.56"
[873] "0.35" "0.21" "0.38" "0.31" "0.47" "0.715" "0.61" "0.6"
[881] "0.56" "0.715" "0.31" "0.6" "0.61" "0.75" "0.8" "0.52"
[889] "0.57" "0.9" "0.34" "0.66" "0.45" "0.66" "0.63" "0.59"
[897] "0.31" "0.59" "0.31" "1.02" "0.31" "0.635" "0.635" "0.59"
[905] "0.59" "0.58" "0.54" "0.56" "0.52" "0.305" "0.38" "0.28"
[913] "0.46" "0.395" "0.305" "0.315" "0.715" "0.41" "0.36" "0.62"
[921] "0.41" "0.36" "0.62" "0.41" "0.47" "0.22" "0.24" "0.67"
[929] "0.47" "0.33" "0.61" "0.61" "0.4" "0.61" "0.61" "0.3"
[937] "0.3" "0.63" "0.38" "0.46" "0.33" "0.27" "0.43" "0.5"
[945] "0.3" "0.44" "0.44" "0.28" "0.12" "0.12" "0.12" "0.28"
[953] "0.31" "0.34" "0.43" "0.21" "0.36" "0.37" "0.57" "0.59"
[961] "0.47" "0.56" "0.57" "0.27" "0.47" "0.34" "0.38" "0.66"
[969] "0.4" "0.56" "0.26" "0.26" "0.38" "0.34" "0.33" "0.41"
[977] "0.41" "0.59" "0.4" "0.45" "0.5" "0.86" "0.52" "0.5"
[985] "0.45" "0.58" "0.34" "0.36" "0.39" "0.295" "0.39" "0.34"
[993] "0.4" "0.34" "0.35" "0.6" "0.66" "0.66" "0.84" "0.69"
[ reached getoption("max.print") -- omitted 599 entries ]
> sms_corpus_clean=tm_map(sms_corpus,content_transformer(tolower))
> print(sms_corpus_clean)
<VCorpus>
Metadata: corpus specific: 0, document level (indexed): 0
Content: documents: 12
```

RStudio

```
[829] "7.8" "5.9" "7.5" "5.9" "10.4" "11.6" "8.8" "7.6" "6.7"
[838] "6.7" "10.1" "6" "11.1" "6.6" "10.6" "7.1" "9.9" "6.4"
[847] "6.4" "7.4" "6.4" "6.4" "9.3" "9.3" "8" "9.3" "9.3"
[856] "7.6" "9.3" "8.2" "11.7" "6.8" "7.2" "5.8" "7.5" "7.2"
[865] "7.2" "7.2" "6.8" "6.9" "6.8" "7.6" "7.7" "6.9" "7.3"
[874] "9.1" "10.4" "8.8" "7.1" "7.7" "8.8" "7.2" "9.2" "7.6"
[883] "8.4" "7.2" "8.8" "8.9" "9" "10.7" "6.8" "10.7" "7.2"
[892] "7.2" "10.1" "7.2" "7.2" "7.1" "8.3" "7.1" "8.3" "8.3"
[901] "8.9" "7.4" "7.4" "6.8" "6.8" "9.2" "7.2" "6.1" "7.4"
[910] "7.3" "9.3" "9.1" "10" "9.4" "7.3" "8.6" "5.3" "6.8"
[919] "8.4" "8.4" "9.6" "8.4" "8.4" "6.8" "8.6" "8.6" "9.4"
[928] "8.4" "8.6" "8.7" "6.6" "7.4" "7.6" "7.4" "6.6" "8.8"
[937] "8.8" "12" "7.2" "6.2" "9.6" "9.9" "10.1" "9.8" "8.3"
[946] "10.2" "10.2" "8.3" "8.9" "8.9" "8.9" "8.3" "8.2" "10.2"
[955] "7.6" "8.5" "9" "9.5" "6.4" "8" "8.5" "7.1" "6.6"
[964] "8.8" "8.5" "8.3" "9" "8.5" "9" "6.7" "10.4" "10.4"
[973] "10.1" "8.5" "8.8" "7.2" "7.2" "8.4" "7" "12.2" "9.1"
[982] "7.9" "7.3" "9.1" "12.2" "7.4" "9.8" "7.1" "7.7" "9.7"
[991] "7.7" "7.1" "6.5" "7.1" "10" "7.7" "5.6" "5.6" "8.9"
[1000] "6.4"

[ reached getoption("max.print") -- omitted 599 entries ]
> sms_corpus_clean=tm_map(sms_corpus_clean,removeNumbers)
> print(sms_corpus_clean)
<<VCorpus>>
Metadata: corpus specific: 0, document level (indexed): 0
Content: documents: 12
> as.character(sms_corpus_clean[[3]])
[1] " " " " " " " " " " " " " "
[17] " " " " " " " " " " " " " "
[33] " " " " " " " " " " " " " "
[49] " " " " " " " " " " " " " "
[65] " " " " " " " " " " " " " "
[81] " " " " " " " " " " " " " "
[97] " " " " " " " " " " " " " "
[113] " " " " " " " " " " " " " "
```

RStudio

```
[865] " " " " " " " " " " " " " "
[881] " " " " " " " " " " " " " "
[897] " " " " " " " " " " " " " "
[913] " " " " " " " " " " " " " "
[929] " " " " " " " " " " " " " "
[945] " " " " " " " " " " " " " "
[961] " " " " " " " " " " " " " "
[977] " " " " " " " " " " " " " "
[993] " " " " " " " " " " " " " "

[ reached getoption("max.print") -- omitted 599 entries ]
> sms_corpus_clean=tm_map(sms_corpus_clean,removeNumbers)
> sms_corpus_clean=tm_map(sms_corpus_clean,removePunctuation)
> install.packages("SnowballC")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:

https://cran.rstudio.com/bin/windows/Rtools/
Installing package into 'C:/Users/rishi/AppData/Local/R/win-library/4.3'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/SnowballC_0.7.1.zip'
Content type 'application/zip' length 364431 bytes (355 KB)
downloaded 355 KB

package 'SnowballC' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:/Users/rishi/AppData/Local/Temp/Rtmp8GB85s/downloaded_packages
> library(SnowballC)
> sms_corpus_clean=tm_map(sms_corpus_clean,stemDocument)
> sms_corpus_clean=tm_map(sms_corpus_clean,stripWhitespace)
> sms_dtM=DocumentTermMatrix(sms_corpus_clean)
> |
```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)

```
[R 4.3.3 C:\College PPTs\SEM\NT224/]
[993] " " " "
[ reached getoption("max.print") -- omitted 599 entries ]
> sms_corpus_clean_tm_map(sms_corpus_clean,removewords,stopwords())
> sms_corpus_clean_tm_map(sms_corpus_clean,removePunctuation)
> install.packages("SnowballC")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:
https://cran.rstudio.com/bin/windows/Rtools/
Installing package into ':/Users/rishi/AppData/Local/R/win-library/4.3',
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/snowballc_0.7.1.zip'
Content type 'application/zip' length 364431 bytes (355 KB)
downloaded 355 KB

package 'SnowballC' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\rishi\AppData\Local\Temp\Rtmp8GB85s\downloaded_packages
> library(SnowballC)
> sms_corpus_clean_tm_map(sms_corpus_clean,stemDocument)
> sms_corpus_clean_tm_map(sms_corpus_clean,stripWhitespace)
> sms_dtm<-DocumentTermMatrix(sms_corpus_clean)
> sms_dtm_train<-sms_dtm[1:6,]
> sms_dtm_test<-sms_dtm[7:12,]
> sms_train_labels<-a[1:6,]$mutating
> sms_test_labels<-a[7:12,]$mutating
> prop.table(table(sms_train_labels))
numeric(0)
> prop.table(table(sms_test_labels))
numeric(0)
> |
```

Environment History Connections Tutorial
R - Global Environment List
s1 5 obs. of 3 variables
sms_classifier List of 5
sms_corpus List of 12
sms_corpus_clean List of 12
sms_dtm List of 6
sms_dtm_freq_te... List of 6
sms_dtm_freq_tr... List of 6
sms_dtm_test List of 6
sms_dtm_train List of 6

Files Plots Packages Help Viewer Presentation
New Folder New Blank File Delete Rename Home
Name Size Modified
RData 1.4 MB Sep 24, 2024, 3:56 PM
Rhistory 5.7 KB Sep 27, 2024, 10:06 AM
abc.csv 172 B Sep 12, 2024, 7:14 PM
akke presentation.pptx 1.7 MB May 12, 2022, 6:30 AM
akshay python project (1).docx 344 KB Dec 6, 2022, 8:58 PM
akshay python project.docx 344 KB Dec 6, 2022, 8:53 PM
Arduino
Cat1.docx 1.9 MB Sep 17, 2024, 1:07 PM
CA3 Template.docx 2.3 MB Dec 15, 2022, 10:07 AM
CHEGG
Community development Presentation.pptx 4.1 MB Oct 29, 2023, 11:27 PM
Community Development project.docx 3.5 MB Aug 26, 2023, 8:07 PM
Conditional formatting.xlsx 197 KB May 6, 2024, 7:01 PM
cse 121 presentation.pptx 114 KB Mar 9, 2023, 3:59 PM
Custom Office Templates
desktop.ini 418 B Sep 23, 2024, 10:35 AM
Doc1.doc 1.2 MB Aug 30, 2024, 7:23 AM
excel.xlsx 11.1 KB Jun 23, 2024, 4:54 PM

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)

```
[R 4.3.3 C:\College PPTs\SEM\NT224/]
[993] " " " "
> sms_dtm_train<-sms_dtm[1:6,]
> sms_dtm_test<-sms_dtm[7:12,]
> sms_train_labels<-a[1:6,]$mutating
> sms_test_labels<-a[7:12,]$mutating
> prop.table(table(sms_train_labels))
numeric(0)
> prop.table(table(sms_test_labels))
numeric(0)
> |install.packages("wordcloud")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:
https://cran.rstudio.com/bin/windows/Rtools/
Installing package into ':/Users/rishi/AppData/Local/R/win-library/4.3',
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/wordcloud_2.6.zip'
Content type 'application/zip' length 447508 bytes (437 KB)
downloaded 437 KB

package 'wordcloud' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\rishi\AppData\Local\Temp\Rtmp8GB85s\downloaded_packages
> library(wordcloud)
Loading required package: RColorBrewer
> wordcloud(sms_corpus_clean,min.freq = 50,random.order = FALSE )
> sms_freq_words<-findFreqTerms(sms_dtm_train,5)
> str(sms_freq_words)
chr(0)
> sms_dtm_freq_train<-sms_dtm_train[,sms_freq_words]
> sms_dtm_freq_test<-sms_dtm_test[,sms_freq_words]
```

Environment History Connections Tutorial
R - Global Environment List
sms_dtm_freq_te... List of 6
sms_dtm_freq_tr... List of 6
sms_dtm_test List of 6
sms_dtm_train List of 6
sp num [1:3, 1:3] 11 11 11 11 11 11 11 11 11
test 480 obs. of 12 variables
train 1119 obs. of 12 variables
tree List of 14
whcd 569 obs. of 31 variables

Files Plots Packages Help Viewer Presentation
Zoom Export Publish
six
five
seven four

RStudio interface showing R code execution and a word cloud visualization.

```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)
Source
R 4.3.3 C:\college\RPY\SDM\INT234/
Loading required package: RColorBrewer
> wordcloud(sms_corpus_clean,min.freq = 50,random.order = FALSE )
> sms_freq_words<-findFreqTerms(sms_dtm_train,5)
> str(sms_freq_words)
chr(0)
> sms_dtm_freq_train=sms_dtm_train[,sms_freq_words]
> sms_dtm_freq_test=sms_dtm_test[,sms_freq_words]
> x<-ifelse(x>0,"yes","No")
> convert_counts<-function(x){
+   x<-ifelse(x>0,"yes","No")
+ }
> sms_train=apply(sms_dtm_freq_train,MARGIN = 2,convert_counts)
> sms_test=apply(sms_dtm_freq_test,MARGIN = 2,convert_counts)
> install.packages("e1071")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:
https://cran.rstudio.com/bin/windows/Rtools/
Installing package into 'C:/Users/rishi/AppData/Local/R/win-library/4.3' (as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/e1071_1.7-16.zip'
Content type 'application/zip' length 665314 bytes (649 KB)
downloaded 649 KB

package 'e1071' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:/Users/rishi/AppData/Local/Temp/Rtmp8GB85s/downloaded_packages
> library(e1071)
> sms_classifier<-naiveBayes(sms_train,sms_train_labels)
> sms_test_pred<-predict(sms_classifier,sms_test)
> |

```

The Global Environment pane shows variables:

salary	num [1:3]	1200	3400	5000
sales_2019	num [1:3]	20	14	23
sales_2023	num [1:3]	12	18	19
seven_count	199L			
six_count	638L			
sms_freq_words	character (empty)			
sms_test	character (empty)			
sms_test_labels	NULL			
sms_test_pred	Factor w/ 0 levels:			

A word cloud plot is visible in the main area, with the words "six", "five", and "seven" being prominent.

3) Decision Tree:

Code:

RStudio interface showing R code for a decision tree and a file browser.

```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)
Activity.R
95 }
96 sms_train=apply(sms_dtm_freq_train,MARGIN = 2,convert_counts)
97 sms_test=apply(sms_dtm_freq_test,MARGIN = 2,convert_counts)
98 install.packages("e1071")
99 library(e1071)
100 sms_classifier<-naiveBayes(sms_train,sms_train_labels)
101 sms_test_pred<-predict(sms_classifier,sms_test)
102
103
104 #decision tree
105 install.packages("rpart")
106 library("rpart")
107 View(data)
108 str(data)
109 indexes=sample(162,110)
110 indexes
111 data_train=data[indexes,]
112 data_train
113 data_test=data[-indexes,]
114 data_test
115
116 target<-quality~chlorides+density+pH+sulphates
117 target
118
119 tree=rpart(target,data=data_train,method="class")
120 install.packages("rpart.plot")
121 library("rpart.plot")
122
123 predictions=predict(tree,data_test,type="class")
124 predictions
125 actual=data_test$quality
126 rpart.plot(tree)
127

```

The Global Environment pane shows variables:

salary	num [1:3]	1200	3400	5000
sales_2019	num [1:3]	20	14	23
sales_2023	num [1:3]	12	18	19
seven_count	199L			
six_count	638L			
sms_freq_words	character (empty)			
sms_test	character (empty)			
sms_test_labels	NULL			
sms_test_pred	Factor w/ 0 levels:			

The Files pane shows a directory structure:

- Home
 - Name
 - Size
 - Modified
 - RData
 - 5.7 kB
 - Sep 27, 2024, 10:06 PM
 - Rhistory
 - 172 B
 - Sep 12, 2024, 7:14 PM
 - abc.csv
 - 1.7 MB
 - May 12, 2023, 6:30 AM
 - akka presentation.pptx
 - 344 kB
 - Dec 6, 2022, 8:58 PM
 - akshay python project (1).docx
 - 344 kB
 - Dec 6, 2022, 8:53 PM
 - Arduino
 - 1.9 MB
 - Sep 17, 2024, 1:07 PM
 - CA1.docx
 - 2.3 MB
 - Dec 15, 2022, 10:07 AM
 - CA3 template.docx
 - CHEGG
 - Community development Presentation.pptx
 - 4.1 MB
 - Oct 29, 2023, 1:12 PM
 - Community Development project.docx
 - 3.5 MB
 - Aug 26, 2023, 8:07 PM
 - Conditional formatting.xlsx
 - 19.7 kB
 - May 6, 2024, 7:01 PM
 - cse 121 presentation.pptx
 - 114 kB
 - Mar 9, 2023, 3:59 PM
 - Custom Office Templates
 - desktop.ini
 - 418 B
 - Sep 23, 2024, 10:35 AM
 - Doc1.docx
 - 1.2 MB
 - Aug 30, 2024, 7:23 AM
 - Excel 1.xlsx
 - 11.1 kB
 - Jan 23, 2024, 4:54 PM

Output:

RStudio Environment pane showing the following objects:

- data_train**: 110 obs. of 12 variables
- df**: 10 obs. of 4 variables
- df1**: 4 obs. of 2 variables
- e**: 5 obs. of 2 variables
- emplist**: List of 3
- f**: 3 obs. of 4 variables
- fig**: List of 8
- fig1**: List of 8
- TRL**: 'xts' num [1:4364, 1:6] 21.9 21.4 22.5 23.4 ...

The Source code pane shows the following R script:

```

restored 'rpart'

The downloaded binary packages are in
  c:\Users\rishi\AppData\Local\Temp\Rtmp8cB85s\downloaded_packages
> library("rpart")
> indexes=sample(162,110)
> indexes
[1] 114 154 11 77 107 80 79 149 95 52 71 31 125 151 16 160 137
[18] 1 64 61 28 133 116 3 141 131 46 62 14 82 123 159 130 136
[35] 162 58 102 70 148 145 35 32 29 55 19 127 12 138 68 21 110
[52] 158 155 143 78 72 42 129 112 51 56 106 118 47 81 17 34 117
[69] 91 49 18 67 161 88 66 45 94 124 113 73 101 98 105 122 36
[86] 65 74 26 84 108 25 119 152 7 76 24 57 103 38 146 50 142
[103] 59 92 134 144 53 75 89 48
> data_train=data[indexes,]
> data_train
# A tibble: 110 × 12
  `fixed acidity` `volatile acidity` `citric acid` `residual sugar`
                <dbl>            <dbl>           <dbl>            <dbl>
1              10.1             0.31            0.44            2.3 
2               7.5              0.6             0.03            1.8 
3               6.7              0.58            0.08            1.8 
4               8.8              0.41            0.64            2.2 
5               7.8              0.41            0.68            1.7 
6               8.3              0.625            0.2             1.5 
7               6.7              0.75            0.12             2  
8               6.9              0.49            0.1              2.3 
9               5                 1.02            0.04            1.4 
10              6.6              0.52            0.04            2.2 
# i 100 more rows
# i 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
# `total sulfur dioxide` <dbl>, density <dbl>, pH <dbl>,
# sulphates <dbl>, alcohol <dbl>, quality <fct>
# i Use print(n = ...) to see more rows
```

```

RStudio Environment pane showing the same list of objects as the first screenshot.

The Source code pane shows the same R script as the first screenshot, with the addition of the following lines at the bottom:

```

i 1,479 more rows
i 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
`total sulfur dioxide` <dbl>, density <dbl>, pH <dbl>,
sulphates <dbl>, alcohol <dbl>, quality <fct>
i Use print(n = ...) to see more rows
```

```

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Source

```
R 4.3.3 - C:/College PPf6/Sth SEM/INT234/ 
5   7.3    0.65    0    1.2
6   7.8    0.58    0.02   2
7   7.5    0.5    0.36   6.1
8   5.6    0.615   0    1.6
9   8.9    0.62    0.18   3.8
10  7.9    0.32    0.51   1.8
# i 1,479 more rows
# i 8 more variables: chlorides <dbl>, `free sulfur dioxide` <dbl>,
# `total sulfur dioxide` <dbl>, density <dbl>, pH <dbl>,
# sulphates <dbl>, alcohol <dbl>, quality <fct>
# i use `print(n = ...)` to see more rows
> target<-quality-chlorides=density+pH+sulphates
> target
quality ~ chlorides + density + pH + sulphates
> tree=rpart(target,data=data_train,method="class")
> install.packages("rpart.plot")
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:
https://cran.rstudio.com/bin/windows/Rtools/
Installing package into ':C:/Users/rishi/AppData/Local/R/win-library/4.3'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/rpart.plot_3.1.2.zip'
Content type 'application/zip' length 1035299 bytes (1011 KB)
downloaded 1011 KB

package 'rpart.plot' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\rishi\AppData\Local\Temp\Rtmp8GB85s\downloaded_packages
> library("rpart.plot")
>
```

Environment History Connections Tutorial

R - Global Environment

tree	List of 14
wbcd	569 obs. of 31 variables
wbcd_n	569 obs. of 30 variables
z2	4 obs. of 4 variables
values	
a1	chr [1:5] "chd" "pgw" "De1" "gun" "vlp"
ab	NULL
abc	"the answer is 32"
Accuracy	0.4375

Files Plots Packages Help Viewer Presentation

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desktop.ini	418 B	Sep 23, 2024, 10:35 AM
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Excel.xlsx	11.1 KB	Sep 23, 2024, 4:54 PM

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Source

```
R 4.3.3 - C:/College PPf6/Sth SEM/INT234/ 
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/rpart.plot_3.1.2.zip'
Content type 'application/zip' length 1035299 bytes (1011 KB)
downloaded 1011 KB

package 'rpart.plot' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
  C:\Users\rishi\AppData\Local\Temp\Rtmp8GB85s\downloaded_packages
> library("rpart.plot")
> predictions=predict(tree,data_test,type="class")
> predictions
  1   2   3   4   5   6   7   8   9   10  11  12  13  14
 5   5   5   5   5   6   5   6   5   5   5   5   5   5   6
15  16  17  18  19  20  21  22  23  24  25  26  27  28
 5   5   6   6   6   5   6   5   6   6   5   6   6   6   6
29  30  31  32  33  34  35  36  37  38  39  40  41  42
 5   5   6   6   6   6   5   5   6   5   5   5   5   5   5
43  44  45  46  47  48  49  50  51  52  53  54  55  56
 5   6   5   6   6   6   5   5   5   6   5   5   5   5   5
57  58  59  60  61  62  63  64  65  66  67  68  69  70
 5   5   6   5   5   5   6   5   5   5   5   5   5   5   5
71  72  73  74  75  76  77  78  79  80  81  82  83  84
 5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
85  86  87  88  89  90  91  92  93  94  95  96  97  98
 5   5   6   5   6   5   5   5   6   5   5   5   5   5   5
99 100 101 102 103 104 105 106 107 108 109 110 111 112
 5   6   5   5   5   5   5   5   5   6   6   6   5   5   5
113 114 115 116 117 118 119 120 121 122 123 124 125 126
 6   5   6   6   5   6   6   6   6   6   6   6   6   6   6
127 128 129 130 131 132 133 134 135 136 137 138 139 140
 6   6   6   6   5   5   5   5   5   6   5   5   5   5
141 142 143 144 145 146 147 148 149 150 151 152 153 154
 5   5   5   5   5   5   5   5   5   5   5   5   5   5
```

Environment History Connections Tutorial

R - Global Environment

mix7	chr [1:5] "53.5" "lpu" "TRUE" "2+31" "FALSE"
n	5L
name	chr [1:10] "Ram" "Sai" "Shyam" "Nayak" "Rish..."
new_dimension	79966L
num1	TRUE
num2	5
num3	2
parts	chr [1:3] "beverage" "vegetable" "diary"
predictions	Factor w/ 6 levels "3","4","5","6",..., 3, 3, 3

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