ACADGILD

SESSION 13: Decision Tree Based Models

Assignment 1

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Data Analytics

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1. Problem Statement

1. Use the given link below:
https://archive.ics.uci.edu/ml/machine-learning-databases/00304/

Problem- prediction of the number of comments in the upcoming 24 hours on those blogs, the train data was generated from different base times that may temporally overlap. Therefore, if you simply split the train into disjoint partitions, the underlying time intervals may overlap. Therefore, the you should use the provided, temporally disjoint train and test splits to ensure that the evaluation is fair.

a) Read the dataset and identify the right features.
b) Clean dataset, impute missing values and perform exploratory data analysis.
c) Visualize the dataset and make inferences from that.
d) Perform any 3 hypothesis tests using columns of your choice, make conclusions.

2. Solution

a. Read the dataset and identify the right features.

The R-script for the given problem is as follows:

```
library(data.table)
library(foreach)
library(readr)
library(dplyr)

setwd("E:/munmun_acadgild/acadgild data analytics/supporting files/BlogFeedback")
getwd()

blogData_train <- read_csv("E:/munmun_acadgild/acadgild data analytics/supporting files/BlogFeedback/blogData_train.csv")
View(blogData_train)
```

```
# retrieve filenames of test sets
test_filenames = list.files(pattern = "blogData_test")

# load and combine dataset
train = fread("blogData_train.csv")
fbtest = foreach(i = 1:length(test_filenames), .combine = rbind) %do% {
  temp = fread(test_filenames[i], header = F)
}

# Assign variable names to the train data set
colnames(blogData_train) <-
c("plikes","checkin","talking","category","d5","d6","d7","d8","d9","d10","d11","d12",

"d13","d14","d15","d16","d17","d18","d19","d20","d21","d22","d23","d24","d25","d26",

"d27","d28","d29","cc1","cc2","cc3","cc4","cc5","basetime","postlength","postshre",

"postpromo","Hhrs","sun","mon","tue","wed","thu","fri","sat","basesun","basemon",
              "basetue","basewed","basethu","basefri","basesat","target")

dim(blogData_train)
dim(fbtest)
View(blogData_train)
View(fbtest)
str(blogData_train)
str(fbtest)

train <- blogData_train; test <- fbtest
head(train); head(test)

# making the data tidy by constructing single collumn for post publish day
train$pubday<- ifelse(train$sun ==1, 1, ifelse(train$mon ==1, 2, ifelse(train$tue ==1, 3,
                                            ifelse(train$wed ==1, 4, ifelse(train$thu
==1, 5, ifelse(train$fri ==1, 6,

ifelse(train$sat ==1, 7, NA)))))))

# making the data tidy by constructing single collumn for base day
train$baseday<- ifelse(train$basesun ==1, 1, ifelse(train$basemon ==1, 2,
ifelse(train$basetue ==1, 3,
                                                  ifelse(train$basewed ==1, 4,
ifelse(train$basethu ==1, 5,

ifelse(train$basefri ==1, 6, ifelse(train$basesat ==1, 7, NA)))))))
```

The output of the R-Script (from Console window) is given as follows:

```
> library(data.table)
> library(foreach)
> library(readr)
> library(dplyr)

Attaching package: ‘dplyr’

The following objects are masked from ‘package:data.table’:

    between, first, last

The following objects are masked from ‘package:stats’:

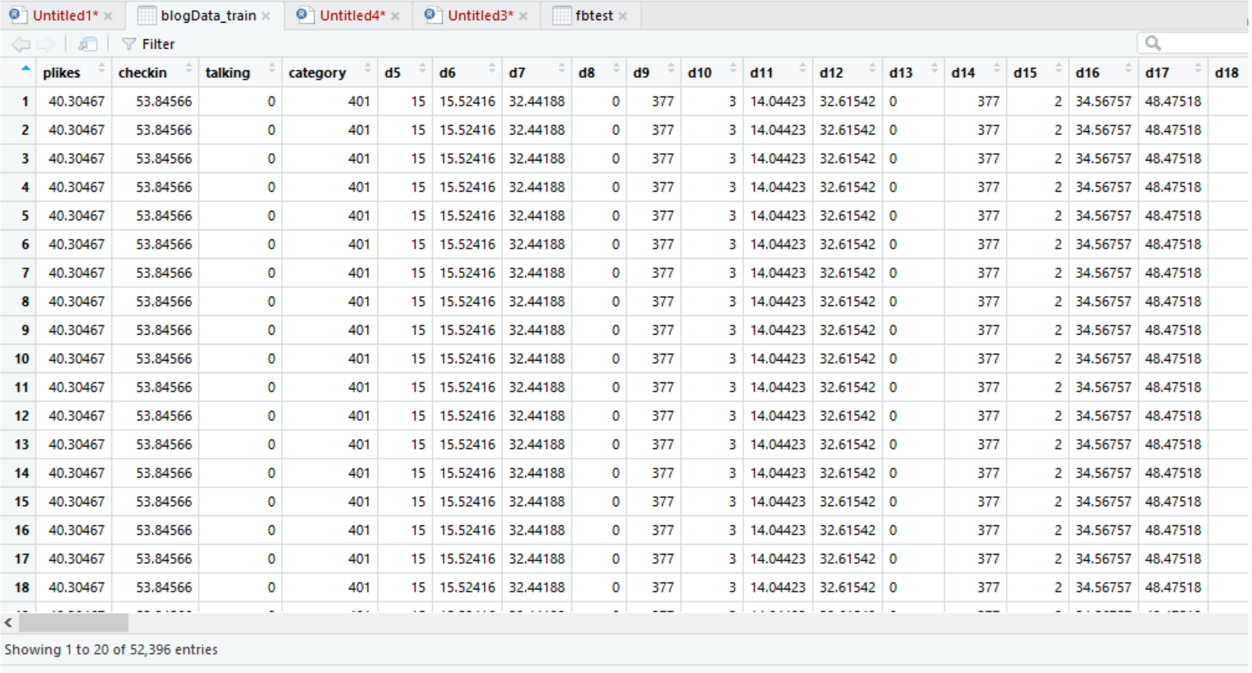
    filter, lag

The following objects are masked from ‘package:base’:

    intersect, setdiff, setequal, union

> setwd("E:/munmun_acadgild/acadgild data analytics/supporting 
files/BlogFeedback")
> getwd()
[1] "E:/munmun_acadgild/acadgild data analytics/supporting 
files/BlogFeedback"
> 
> blogData_train <- read_csv("E:/munmun_acadgild/acadgild data 
analytics/supporting files/BlogFeedback/blogData_train.csv")
Parsed with column specification:
cols(
  .default = col_double()
)
See spec(...) for full column specifications.
|============================================================================
======================================| 100%   62 MB
Warning message:
Duplicated column names deduplicated: '0.0' => '0.0_1' [8], '0.0' => '0.0_2' 
[13], '377.0' => '377.0_1' [14], '0.0' => '0.0_3' [18], '377.0' => '377.0_2' 
[24], '0.0' => '0.0_4' [25], '0.0' => '0.0_5' [28], '0.0' => '0.0_6' [30], 
'0.0' => '0.0_7' [33], '0.0' => '0.0_8' [35], '0.0' => '0.0_9' [38], '9.0' => 
'9.0_1' [39], '0.0' => '0.0_10' [40], '0.0' => '0.0_11' [43], '0.0' => 
'0.0_12' [45], '9.0' => '9.0_2' [49], '0.0' => '0.0_13' [50], '2.0' => 
'2.0_1' [51], '2.0' => '2.0_2' [52], '0.0' => '0.0_14' [53], '2.0' => '2.0_3' 
[54], '2.0' => '2.0_4' [55], '0.0' => '0.0_15' [56], '0.0' => '0.0_16' [57], 
'0.0' => '0.0_17' [58], '0.0' => '0.0_18' [59], '0.0' => '0.0_19' [60], 
'10.0' => '10.0_1' [61], '0.0' => '0.0_20' [62], '0.0' => '0.0_21' [63], 
'0.0' => '0.0_22' [64], '0.0' => '0.0_23' [65], '0.0' => '0.0_24' [66], '0.0' 
=> '0.0_25' [67], '0.0' => '0.0_26' [68], '0.0' => '0.0_27' [69], '0.0' => 
'0.0_28' [70], '0.0' => '0.0_29' [71], '0.0' => '0.0_30' [72], '0.0' => 
'0.0_31' [73], '0.0' => '0 [... truncated]
> # retrieve filenames of test sets
> test_filenames = list.files(pattern = "blogData_test")
> 
> # load and combine dataset
> train = fread("blogData_train.csv")
> fbtest = foreach(i = 1:length(test_filenames), .combine = rbind) %do% {
+   temp = fread(test_filenames[i], header = F)
+ }
> 
```

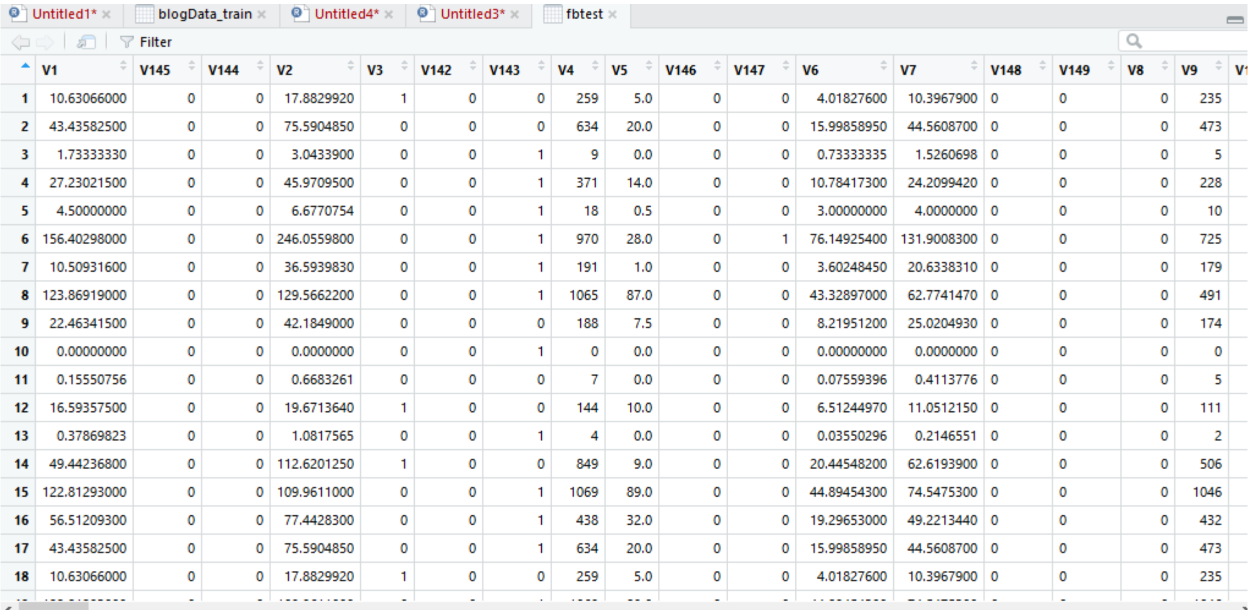
```
> # Assign variable names to the train and test data set
> colnames(blogData_train) <-
c("plikes","checkin","talking","category","d5","d6","d7","d8","d9","d10","d11
","d12",
+
"d13","d14","d15","d16","d17","d18","d19","d20","d21","d22","d23","d24","d25"
,"d26",
+
"d27","d28","d29","cc1","cc2","cc3","cc4","cc5","basetime","postlength","post
shre",
+
"postpromo","Hhrs","sun","mon","tue","wed","thu","fri","sat","basesun","basem
on",
+
"basetue","basewed","basethu","basefri","basesat","target")
> dim(blogData_train)
[1] 52396   281
> dim(fbtest)
[1] 7624  281
> View(blogData_train)
```



	plikes	checkin	talking	category	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	d17	d18
1	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
2	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
3	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
4	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
5	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
6	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
7	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
8	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
9	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
10	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
11	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
12	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
13	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
14	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
15	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
16	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
17	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	
18	40.30467	53.84566	0	401	15	15.52416	32.44188	0	377	3	14.04423	32.61542	0	377	2	34.56757	48.47518	

Showing 1 to 20 of 52,396 entries

```
> View(fbtest)
```



	V1	V145	V144	V2	V3	V142	V143	V4	V5	V146	V147	V6	V7	V148	V149	V8	V9	V1
1	10.63066000	0	0	17.8829920	1	0	0	259	5.0	0	0	4.01827600	10.3967900	0	0	0	235	
2	43.43582500	0	0	75.5904850	0	0	0	634	20.0	0	0	15.99858950	44.5608700	0	0	0	473	
3	1.73333330	0	0	3.0433900	0	0	1	9	0.0	0	0	0.73333335	1.5260698	0	0	0	5	
4	27.23021500	0	0	45.9709500	0	0	1	371	14.0	0	0	10.78417300	24.2099420	0	0	0	228	
5	4.50000000	0	0	6.6770754	0	0	1	18	0.5	0	0	3.00000000	4.0000000	0	0	0	10	
6	156.40298000	0	0	246.0559800	0	0	1	970	28.0	0	1	76.14925400	131.9008300	0	0	0	725	
7	10.50931600	0	0	36.5939830	0	0	1	191	1.0	0	0	3.60248450	20.6338310	0	0	0	179	
8	123.86919000	0	0	129.5662200	0	0	1	1065	87.0	0	0	43.32897000	62.7741470	0	0	0	491	
9	22.46341500	0	0	42.1849000	0	0	0	188	7.5	0	0	8.21951200	25.0204930	0	0	0	174	
10	0.00000000	0	0	0.0000000	0	0	1	0	0.0	0	0	0.00000000	0.0000000	0	0	0	0	
11	0.15550756	0	0	0.6683261	0	0	0	7	0.0	0	0	0.07559396	0.4113776	0	0	0	5	
12	16.59357500	0	0	19.6713640	1	0	0	144	10.0	0	0	6.51244970	11.0512150	0	0	0	111	
13	0.37869823	0	0	1.0817565	0	0	1	4	0.0	0	0	0.03550296	0.2146551	0	0	0	2	
14	49.44236800	0	0	112.6201250	1	0	0	849	9.0	0	0	20.44548200	62.6193900	0	0	0	506	
15	122.81293000	0	0	109.9611000	0	0	1	1069	89.0	0	0	44.89454300	74.5475300	0	0	0	1046	
16	56.51209300	0	0	77.4428300	0	0	1	438	32.0	0	0	19.29653000	49.2213440	0	0	0	432	
17	43.43582500	0	0	75.5904850	0	0	1	634	20.0	0	0	15.99858950	44.5608700	0	0	0	473	
18	10.63066000	0	0	17.8829920	1	0	0	259	5.0	0	0	4.01827600	10.3967900	0	0	0	235	

```
> str(blogData_train)
Classes ‘spec_tbl_df’, ‘tbl_df’, ‘tbl’ and 'data.frame':     52396 obs. of
281 variables:
 $ plikes    : num  40.3 40.3 40.3 40.3 40.3 ...
 $ checkin   : num  53.8 53.8 53.8 53.8 53.8 ...
 $ talking   : num  0 0 0 0 0 0 0 0 0 0 ...
 $ category  : num  401 401 401 401 401 401 401 401 401 401 ...
 $ d5        : num  15 15 15 15 15 15 15 15 15 15 ...
 $ d6        : num  15.5 15.5 15.5 15.5 15.5 ...
 $ d7        : num  32.4 32.4 32.4 32.4 32.4 ...
 $ d8        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ d9        : num  377 377 377 377 377 377 377 377 377 377 ...
 $ d10       : num  3 3 3 3 3 3 3 3 3 3 ...
 $ d11       : num  14 14 14 14 14 ...
 $ d12       : num  32.6 32.6 32.6 32.6 32.6 ...
 $ d13       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ d14       : num  377 377 377 377 377 377 377 377 377 377 ...
 $ d15       : num  2 2 2 2 2 2 2 2 2 2 ...
 $ d16       : num  34.6 34.6 34.6 34.6 34.6 ...
 $ d17       : num  48.5 48.5 48.5 48.5 48.5 ...
 $ d18       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ d19       : num  378 378 378 378 378 378 378 378 378 378 ...
 $ d20       : num  12 12 12 12 12 12 12 12 12 12 ...
 $ d21       : num  1.48 1.48 1.48 1.48 1.48 ...
 $ d22       : num  46.2 46.2 46.2 46.2 46.2 ...
 $ d23       : num  -356 -356 -356 -356 -356 -356 -356 -356 -356 -356 ...
 $ d24       : num  377 377 377 377 377 377 377 377 377 377 ...
 $ d25       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ d26       : num  1.08 1.08 1.08 1.08 1.08 ...
 $ d27       : num  1.8 1.8 1.8 1.8 1.8 ...
 $ d28       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ d29       : num  11 11 11 11 11 11 11 11 11 11 ...
 $ cc1       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ cc2       : num  0.4 0.4 0.4 0.4 0.4 ...
 $ cc3       : num  1.08 1.08 1.08 1.08 1.08 ...
 $ cc4       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ cc5       : num  9 9 9 9 9 9 9 9 9 9 ...
 $ basetime  : num  0 0 0 0 0 0 0 0 0 0 ...
 $ postlength: num  0.378 0.378 0.378 0.378 0.378 ...
 $ postshre  : num  1.07 1.07 1.07 1.07 1.07 ...
 $ postpromo : num  0 0 0 0 0 0 0 0 0 0 ...
 $ Hhrs      : num  9 9 9 9 9 9 9 9 9 9 ...
 $ sun       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ mon       : num  0.973 0.973 0.973 0.973 0.973 ...
 $ tue       : num  1.7 1.7 1.7 1.7 1.7 ...
 $ wed       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ thu       : num  10 10 10 10 10 10 10 10 10 10 ...
 $ fri       : num  0 0 0 0 0 0 0 0 0 0 ...
 $ sat       : num  0.0229 0.0229 0.0229 0.0229 0.0229 ...
 $ basesun   : num  1.52 1.52 1.52 1.52 1.52 ...
 $ basemon   : num  -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 ...
 $ basetue   : num  9 9 9 9 9 9 9 9 9 9 ...
 $ basewed   : num  0 0 0 0 0 0 0 0 0 0 ...
 $ basethu   : num  6 6 2 3 6 6 3 30 30 0 ...
 $ basefri   : num  2 2 2 1 0 0 1 27 27 0 ...
 $ basesat   : num  4 4 0 2 2 2 2 1 1 0 ...
 $ target    : num  5 5 2 2 5 5 2 2 2 0 ...
 $ NA        : num  -2 -2 2 -1 -2 -2 -1 26 26 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 2 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 2 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 2 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 2 ...
 $ NA        : num  35 35 10 34 59 59 34 58 58 11 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 $ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
```

```
$ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
$ NA        : num  0 0 0 0 0 0 0 0 0 0 ...
 [list output truncated]
- attr(*, "spec")=
 .. cols(
 ..   `40.30467` = col_double(),
 ..   `53.845657` = col_double(),
 ..   `0.0` = col_double(),
 ..   `401.0` = col_double(),
 ..   `15.0` = col_double(),
 ..   `15.52416` = col_double(),
 ..   `32.44188` = col_double(),
 ..   `0.0_1` = col_double(),
 ..   `377.0` = col_double(),
 ..   `3.0` = col_double(),
 ..   `14.044226` = col_double(),
 ..   `32.615417` = col_double(),
 ..   `0.0_2` = col_double(),
 ..   `377.0_1` = col_double(),
 ..   `2.0` = col_double(),
 ..   `34.567566` = col_double(),
 ..   `48.475178` = col_double(),
 ..   `0.0_3` = col_double(),
 ..   `378.0` = col_double(),
 ..   `12.0` = col_double(),
 ..   `1.4799345` = col_double(),
 ..   `46.18691` = col_double(),
 ..   `-356.0` = col_double(),
 ..   `377.0_2` = col_double(),
 ..   `0.0_4` = col_double(),
 ..   `1.0761671` = col_double(),
 ..   `1.795416` = col_double(),
 ..   `0.0_5` = col_double(),
 ..   `11.0` = col_double(),
 ..   `0.0_6` = col_double(),
 ..   `0.4004914` = col_double(),
 ..   `1.0780969` = col_double(),
 ..   `0.0_7` = col_double(),
 ..   `9.0` = col_double(),
 ..   `0.0_8` = col_double(),
 ..   `0.37755936` = col_double(),
 ..   `1.07421` = col_double(),
 ..   `0.0_9` = col_double(),
 ..   `9.0_1` = col_double(),
 ..   `0.0_10` = col_double(),
 ..   `0.972973` = col_double(),
 ..   `1.704671` = col_double(),
 ..   `0.0_11` = col_double(),
 ..   `10.0` = col_double(),
 ..   `0.0_12` = col_double(),
 ..   `0.022932023` = col_double(),
 ..   `1.521174` = col_double(),
 ..   `-8.0` = col_double(),
 ..   `9.0_2` = col_double(),
 ..   `0.0_13` = col_double(),
 ..   `2.0_1` = col_double(),
 ..   `2.0_2` = col_double(),
 ..   `0.0_14` = col_double(),
 ..   `2.0_3` = col_double(),
 ..   `2.0_4` = col_double(),
 ..   `0.0_15` = col_double(),
 ..   `0.0_16` = col_double(),
 ..   `0.0_17` = col_double(),
 ..   `0.0_18` = col_double(),
 ..   `0.0_19` = col_double(),
 ..   `10.0_1` = col_double(),
 ..   `0.0_20` = col_double(),
 ..   `0.0_21` = col_double(),
 ..   `0.0_22` = col_double(),
 ..   `0.0_23` = col_double(),
 ..   `0.0_24` = col_double(),
 ..   `0.0_25` = col_double(),
 ..   `0.0_26` = col_double(),
 ..   `0.0_27` = col_double(),
 ..   `0.0_28` = col_double(),
 ..   `0.0_29` = col_double(),
 ..   `0.0_30` = col_double(),
 ..   `0.0_31` = col_double(),
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 ..   `0.0_137` = col_double(),
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 ..   `0.0_142` = col_double(),
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 ..   `0.0_144` = col_double(),
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 ..   `0.0_146` = col_double(),
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 ..   `0.0_149` = col_double(),
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 ..   `0.0_161` = col_double(),
 ..   `0.0_162` = col_double(),
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  ..   `0.0_225` = col_double(),
  ..   `0.0_226` = col_double(),
  ..   `0.0_227` = col_double(),
  ..   `0.0_228` = col_double(),
  ..   `0.0_229` = col_double(),
  ..   `1.0_1` = col_double(),
  ..   `0.0_230` = col_double(),
  ..   `0.0_231` = col_double(),
  ..   `0.0_232` = col_double(),
  ..   `0.0_233` = col_double(),
  ..   `0.0_234` = col_double(),
  ..   `0.0_235` = col_double(),
  ..   `0.0_236` = col_double(),
  ..   `1.0_2` = col_double()
  .. )
> str(fbtest)
Classes ‘data.table’ and 'data.frame':7624 obs. of  281 variables:
 $ V1  : num  10.63 43.44 1.73 27.23 4.5 ...
 $ V145: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V144: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V2  : num  17.88 75.59 3.04 45.97 6.68 ...
 $ V3  : num  1 0 0 0 0 0 0 0 0 0 ...
 $ V142: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V143: num  0 0 1 1 1 1 1 1 0 1 ...
 $ V4  : num  259 634 9 371 18 ...
 $ V5  : num  5 20 0 14 0.5 28 1 87 7.5 0 ...
 $ V146: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V147: num  0 0 0 0 1 0 0 0 0 ...
 $ V6  : num  4.018 15.999 0.733 10.784 3 ...
 $ V7  : num  10.4 44.56 1.53 24.21 4 ...
 $ V148: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V149: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V8  : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V9  : num  235 473 5 228 10 725 179 491 174 0 ...
 $ V150: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V151: num  0 1 1 0 0 1 1 0 0 1 ...
 $ V10 : num  1 2 0 4 0.5 16 0 19.5 1.5 0 ...
 $ V11 : num  3.817 15.47 0.667 9.998 1.333 ...
 $ V152: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V153: num  0 0 1 0 0 1 0 0 0 0 ...
 $ V12 : num  10.3 44.69 1.53 24.4 2.56 ...
 $ V13 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V154: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V155: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V14 : num  235 473 5 228 7 725 179 491 174 0 ...
 $ V15 : num  1 1 0 2 0 3 0 14 1 0 ...
 $ V156: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V157: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V16 : num  9.78 40.97 1.13 22.56 2.83 ...
 $ V17 : num  16.07 70.31 1.82 39.76 3.67 ...
 $ V158: num  0 0 1 1 0 1 1 0 0 1 ...
 $ V159: num  0 0 1 0 0 1 0 0 0 0 ...
 $ V18 : num  1 0 0 0 0 0 0 0 0 0 ...
 $ V19 : num  192 479 5 337 8 913 189 786 186 0 ...
 $ V160: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V161: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V20 : num  5 18 0 10 0.5 26 0 74 5.5 0 ...
 $ V21 : num  0.201 0.5289 0.0667 0.7866 1.6667 ...
 $ V162: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V163: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V22 : num  13.95 62.13 1.73 30.36 2.21 ...
 $ V23 : num  -229 -461 -5 -156 0 -519 -178 -418 -161 0 ...
 $ V164: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V165: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V24 : num  217 473 4 228 6 725 170 491 174 0 ...
 $ V25 : num  0 0 0 0 0.5 2 0 -3 0 0 ...
 $ V166: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V167: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V26 : num  0.252 0.193 0.333 0.11 0 ...
 $ V27 : num  0.904 0.458 0.699 0.356 0 ...
 $ V168: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V169: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V28 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V29 : num  14 2 2 2 0 0 6 0 1 0 ...
 $ V170: num  0 0 1 0 0 1 0 0 0 0 ...
 $ V171: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V30 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V31 : num  0.0944 0.0733 0.1333 0.0432 0 ...
 $ V172: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V173: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V32 : num  0.507 0.286 0.34 0.215 0 ...
 $ V33 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V174: num  0 0 0 0 0 0 0 0 1 0 ...
 $ V175: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V34 : num  12 2 1 2 0 0 5 0 1 0 ...
 $ V35 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V176: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V177: num  0 0 0 0 0 0 0 0 0 0 ...
```

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 $ V36 : num  0.0919 0.0677 0.1333 0.0408 0 ...
 $ V37 : num  0.504 0.278 0.34 0.21 0 ...
 $ V178: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V179: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V38 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V39 : num  12 2 1 2 0 0 5 0 1 0 ...
 $ V180: num  0 0 1 0 0 1 1 0 0 0 ...
 $ V181: num  0 0 1 0 0 0 0 0 0 0 ...
 $ V40 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V41 : num  0.2335 0.1763 0.2 0.0983 0 ...
 $ V182: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V183: num  0 0 0 0 0 1 0 0 0 0 ...
 $ V42 : num  0.855 0.43 0.4 0.321 0 ...
 $ V43 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V184: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V185: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V44 : num  13 2 1 2 0 0 5 0 1 0 ...
 $ V45 : num  0 0 0 0 0 0 0 0 0 0 ...
 $ V186: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V187: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V46 : num  0.00245 0.00564 0 0.0024 0 ...
 $ V47 : num  0.675 0.404 0.365 0.29 0 ...
 $ V188: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V189: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V48 : num  -10 -2 -1 -2 0 0 -5 0 -1 0 ...
 $ V49 : num  12 2 1 2 0 0 5 0 1 0 ...
 $ V190: num  0 0 0 0 0 0 0 0 0 0 ...
 $ V191: num  0 0 1 0 0 1 1 0 0 1 ...
  [list output truncated]
 - attr(*, ".internal.selfref")=<externalptr> 
>
> train <- blogData_train; test <- fbtest
> head(train); head(test)
# A tibble: 6 x 281
  plikes checkin talking category    d5    d6    d7    d8    d9   d10   d11
d12   d13   d14   d15   d16   d17   d18   d19   d20
   <dbl>   <dbl>   <dbl>    <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
<dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378    12
2   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378    12
3   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378    12
4   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378    12
5   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378    12
6   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378    12
# ... with 261 more variables: d21 <dbl>, d22 <dbl>, d23 <dbl>, d24 <dbl>,
d25 <dbl>, d26 <dbl>, d27 <dbl>, d28 <dbl>,
#   d29 <dbl>, cc1 <dbl>, cc2 <dbl>, cc3 <dbl>, cc4 <dbl>, cc5 <dbl>,
basetime <dbl>, postlength <dbl>, postshre <dbl>,
#   postpromo <dbl>, Hhrs <dbl>, sun <dbl>, mon <dbl>, tue <dbl>, wed <dbl>,
thu <dbl>, fri <dbl>, sat <dbl>, basesun <dbl>,
#   basemon <dbl>, basetue <dbl>, basewed <dbl>, basethu <dbl>, basefri
<dbl>, basesat <dbl>, target <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
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#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
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<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, ...
           V1 V145 V144         V2 V3 V142 V143  V4   V5 V146 V147          V6
V7 V148 V149 V8  V9 V150 V151  V10
1:  10.630660    0    0  17.882992  1    0    0 259  5.0    0    0  4.0182760
10.39679    0    0  0 235    0    0  1.0
2:  43.435825    0    0  75.590485  0    0    0 634 20.0    0    0 15.9985895
44.56087    0    0  0 473    0    1  2.0
3:   1.733333    0    0   3.043390  0    0    1   9  0.0    0    0  0.7333333
1.52607    0    0  0   5    0    1  0.0
          V11 V152 V153        V12 V13 V154 V155 V14 V15 V156 V157         V16
V17 V158 V159 V18 V19 V160 V161  V20
1:  3.8172395    0    0  10.297346   0    0    0 235   1    0    0   9.776869
16.073494    0    0   1 192    0    0  5.0
2: 15.4696760    0    0  44.685085   0    0    0 473   1    0    0  40.971790
70.307840    0    0   0 479    0    0 18.0
3:  0.6666667    0    1   1.534782   0    0    0   5   0    0    0   1.133333
1.820867    1    1   0   5    0    0  0.0
           V21 V162 V163         V22  V23 V164 V165 V24 V25 V166 V167
V26       V27 V168 V169 V28 V29 V170 V171 V30
1:  0.20103656    0    0  13.948867 -229    0    0 217 0.0    0    0
0.2517731 0.9038038    0    0   0  14    0    0   0
2:  0.52891400    0    0  62.134968 -461    0    0 473 0.0    0    0
0.1932299 0.4576994    0    0   0   2    0    0   0
3:  0.06666667    0    0   1.730767   -5    0    0   4 0.0    0    0
0.3333333 0.6992059    0    0   0   2    1    0   0
          V31 V172 V173       V32 V33 V174 V175 V34 V35 V176 V177         V36
V37 V178 V179 V38 V39 V180 V181 V40
1: 0.09438080    0    0 0.5067316   0    0    0  12   0    0    0 0.09192581
0.5042160    0    0   0  12    0    0   0
2: 0.07334273    0    0 0.2864750   0    0    0   2   0    0    0 0.06770099
0.2778884    0    0   0   2    0    0   0
3: 0.13333334    0    0 0.3399347   0    0    0   1   0    0    0 0.13333334
0.3399347    0    0   0   1    1    1   0
          V41 V182 V183       V42 V43 V184 V185 V44 V45 V186 V187          V46
V47 V188 V189 V48 V49 V190 V191 V50 V51 V192
1: 0.23349700    0    0 0.8547111   0    0    0  13   0    0    0 0.002454992
0.6747285    0    0 -10  12    0    0   0  35    0
2: 0.17630465    0    0 0.4297832   0    0    0   2   0    0    0 0.005641749
0.4044489    0    0  -2   2    0    0   0  21    0
3: 0.20000000    0    0 0.4000000   0    0    0   1   0    0    0 0.000000000
0.3651484    0    0  -1   1    0    1   0   2    0
   V193 V52 V53 V194 V195 V54 V55 V196 V197 V56 V57 V198 V199 V58 V59 V200
V201 V60 V61 V202 V203   V62 V63 V204 V205 V64 V65
1:    0  35   0    0    0  35  35    0    0   0   0    0    0   0   0    0
0   0   9    0    0     0   0    0    0   0   0
2:    0   0   2    0    0  21  -2    0    0   0   0    0    0   0   0    0
0   0  62    0    0   696   0    0    0   0   0
3:    0   2   0    0    0   2   2    0    0   2   2    0    0   0   2    0
0   2  13    1    0  8361   0    0    0   1   0
   V206 V207 V66 V67 V208 V209 V68 V69 V210 V211 V70 V71 V212 V213 V72 V73
V214 V215 V74 V75 V216 V217 V76 V77 V218 V219 V78 V79
```

```
1:     0     0    0    0     0     0    0    0     0     0    0    0     0     0    0    0
0     0    0    0     0     0    0    0     0     0    0    0
2:     0     0    0    0     0     0    1    0     0     0    0    0     0     0    0    0
0     0    0    0     0     0    0    0     0     0    0    0
3:     0     1    0    1     0     0    1    1     1     0    0    0     0     1    0    0
0     0    0    0     0     0    0    0     0     0    0    1
   v220 v221 v80 v81 v222 v223 v82 v83 v224 v225 v84 v85 v226 v227 v86 v87
v228 v229 v88 v89 v230 v231 v90 v91 v232 v233 v92 v93
1:     0     0    0    0     0     0    0    0     0     0    0    0     0     0    0    0
0     0    0    0     0     0    0    0     0     0    0    0
2:     0     0    0    0     0     0    0    0     0     0    0    0     1     0    0    0
0     0    0    0     0     0    0    0     1     0    0    0
3:     0     0    0    0     0     0    0    0     0     0    0    0     1     0    0    0
1     0    0    0     0     0    0    0     1     0    0    0
   v234 v235 v94 v95 v236 v237 v96 v97 v238 v239 v98 v99 v240 v241 v100 v101
v242 v243 v102 v103 v244 v245 v104 v105 v246 v247
1:     0     0    0    0     0     0    0    0     0     0    0    0     0     0     0     0
0     0     0     0     0     0     0     0     0     0
2:     0     0    0    0     0     0    0    0     0     0    0    0     0     0     0     1
0     0     0     0     0     0     0     0     1     0
3:     0     0    0    0     0     0    1    0     0     0    0    0     0     0     0     1
0     0     1     0     0     0     0     0     1     0
   v106 v107 v248 v249 v108 v109 v250 v251 v110 v111 v252 v253 v112 v113 v254
v255 v114 v115 v256 v257 v116 v117 v258 v259 v118
1:     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
0     0     0     0     0     0     0     0     0     0
2:     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
0     0     0     0     0     0     0     0     0     0
3:     0     0     1     0     0     0     0     0     0     0     0     0     0     0     1
0     0     0     0     0     0     0     0     0     0
   v119 v260 v261 v120 v121 v262 v263 v122 v123 v264 v265 v124 v125 v266 v267
v126 v127 v268 v269 v128 v129 v270 v271 v130 v131
1:     0     0     0     0     0     0     0     0     0     0     1     0     0     0     0
0     0     0     0     0     0     0     1     0     0
2:     0     0     0     0     0     0     0     0     0     0     1     0     0     0     0
0     0     0     0     0     0     0     0     0     0
3:     0     0     0     1     0     0     0     1     0     0     1     0     0     0     0
0     0     0     0     0     0     0     1     0     0
   v272 v273 v132 v133 v274 v275 v134 v135 v276 v277 v136 v137 v278 v279 v138
v139 v280 v281 v140 v141
1:     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
0     0     4     0     0
2:     0     0     0     0     0     0     0     0     1     0     0     0     0     0     0
1     0     0     0     0
3:     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
0     0     1     0     0
 [ reached getOption("max.print") -- omitted 3 rows ]
>
> # making the data tidy by constructing single collumn for post publish day
> train$pubday<- ifelse(train$sun ==1, 1, ifelse(train$mon ==1, 2,
ifelse(train$tue ==1, 3,
+
ifelse(train$wed ==1, 4, ifelse(train$thu ==1, 5, ifelse(train$fri ==1, 6,
+
ifelse(train$sat ==1, 7, NA)))))))
> # making the data tidy by constructing single collumn for base day
> train$baseday<- ifelse(train$basesun ==1, 1, ifelse(train$basemon ==1, 2,
ifelse(train$basetue ==1, 3,
+
ifelse(train$basewed ==1, 4, ifelse(train$basethu ==1, 5,
+
ifelse(train$basefri ==1, 6, ifelse(train$basesat ==1, 7, NA)))))))
```

Conclusion/Interpretation:

The train and test datasets are read and right features are identified. Now the data set is ready

b. Clean dataset, impute missing values and perform exploratory data analysis.

The R-script for the given problem is as follows:

```
distinct(train)   # removing overlapping observations if any
dim(train)
sapply(train, function(x) sum(is.na(x))) # no missing values

correlation <- cor(train,y = NULL, use = "everything",
                   method = c("pearson", "kendall", "spearman"))
corr <- as.data.frame(reshape::melt(correlation))
corr <- corr%>%filter(X1 == "target" & value != 1 & value > 0.32 & value > -0.32)
corr  # good corelations with target variable
library(corrplot)
corrplot.mixed(cor(train[,c(30:32)]))
# Total comments are strongly correlated to correlated with cc3(comments in last 48 to
last 24 hours relative to base date/time)

df <- train
melt_df <- melt(df)

library(ggplot2)
# Distribution of all the Variables - Histogram
ggplot(melt_df, aes(x=value, fill = variable))+
  geom_histogram(bins=10, color = "Blue")+
  facet_wrap(~variable, scales = 'free_x')
df <- log(train[1:39])
par(mfrow=c(1,1))
```

The output of the R-Script (from Console window) is given as follows:

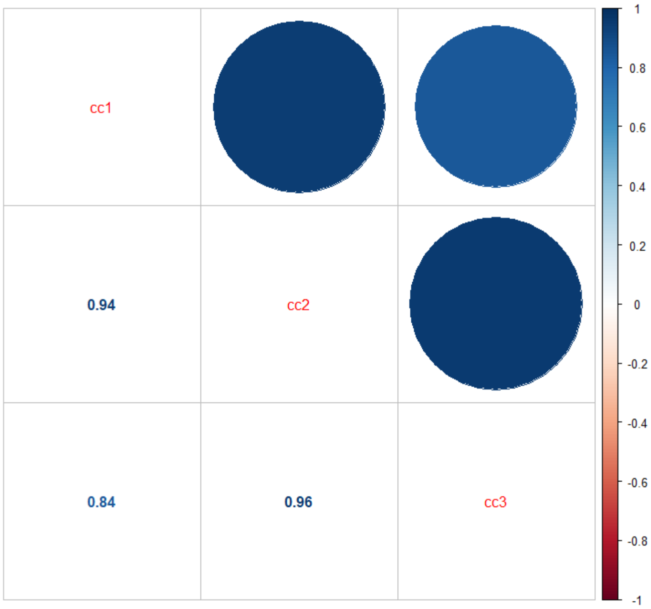
```
> distinct(train)    # removing overlapping observations if any
# A tibble: 49,203 x 283
   plikes checkin talking category     d5     d6     d7     d8     d9    d10    d11
d12    d13    d14    d15    d16    d17    d18    d19
    <dbl>   <dbl>   <dbl>    <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>
<dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>
```

```
 1   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 2   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 3   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 4   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 5   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 6   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 7   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 8   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
 9   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
10   40.3    53.8       0      401    15  15.5  32.4     0   377     3  14.0
32.6     0   377     2  34.6  48.5     0   378
# ... with 49,193 more rows, and 264 more variables: d20 <dbl>, d21 <dbl>,
d22 <dbl>, d23 <dbl>, d24 <dbl>, d25 <dbl>,
#   d26 <dbl>, d27 <dbl>, d28 <dbl>, d29 <dbl>, cc1 <dbl>, cc2 <dbl>, cc3
<dbl>, cc4 <dbl>, cc5 <dbl>, basetime <dbl>,
#   postlength <dbl>, postshre <dbl>, postpromo <dbl>, Hhrs <dbl>, sun <dbl>,
mon <dbl>, tue <dbl>, wed <dbl>, thu <dbl>,
#   fri <dbl>, sat <dbl>, basesun <dbl>, basemon <dbl>, basetue <dbl>,
basewed <dbl>, basethu <dbl>, basefri <dbl>,
#   basesat <dbl>, target <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>,
#   NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA <dbl>, NA
<dbl>, ...
> dim(train)
[1] 52396   283
> sapply(train, function(x) sum(is.na(x))) # no missing values
    plikes    checkin    talking   category         d5         d6         d7
d8         d9        d10        d11
         0          0          0          0          0          0          0
0          0          0          0
       d12        d13        d14        d15        d16        d17        d18
d19        d20        d21        d22
         0          0          0          0          0          0          0
0          0          0          0
       d23        d24        d25        d26        d27        d28        d29
cc1        cc2        cc3        cc4
         0          0          0          0          0          0          0
0          0          0          0
       cc5   basetime postlength   postshre  postpromo       Hhrs        sun
mon        tue        wed        thu
         0          0          0          0          0          0          0
0          0          0          0
```

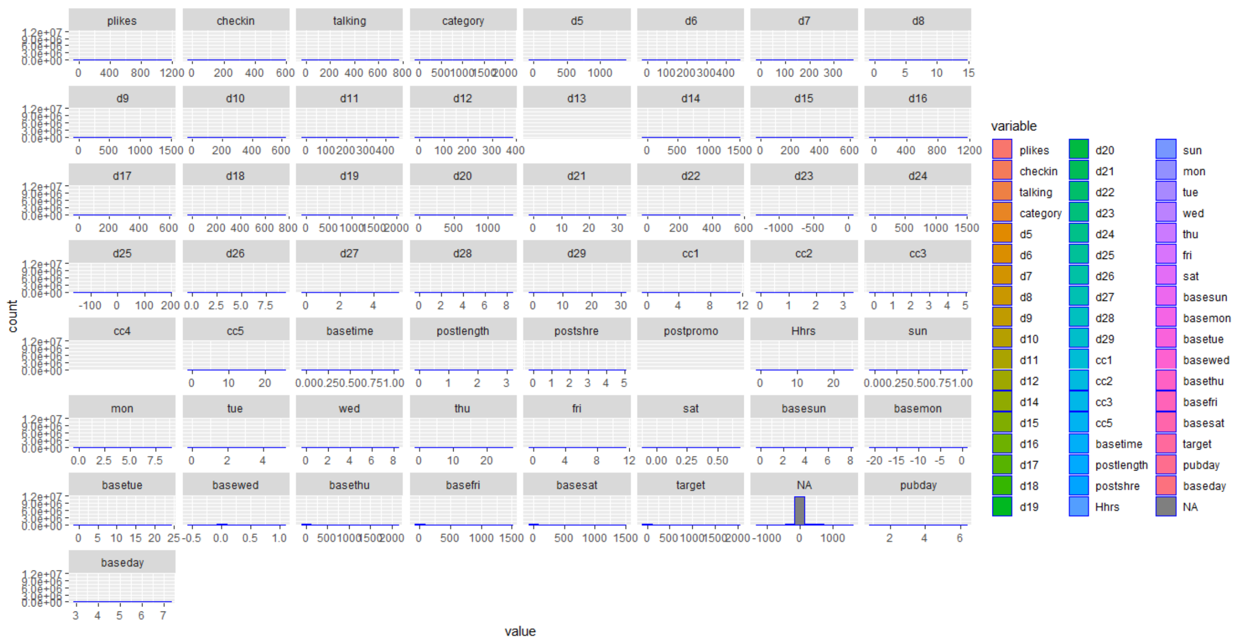
```
        fri        sat    basesun    basemon    basetue    basewed    basethu
basefri    basesat    target        <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
          0          0          0          0          0          0          0
0          0          0          0
```

```
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
         0          0          0          0          0          0          0
0          0          0          0
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
         0          0          0          0          0          0          0
0          0          0          0
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
         0          0          0          0          0          0          0
0          0          0          0
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
         0          0          0          0          0          0          0
0          0          0          0
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
         0          0          0          0          0          0          0
0          0          0          0
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>       <NA>
<NA>       <NA>       <NA>       <NA>
         0          0          0          0          0          0          0
0          0          0          0
      <NA>       <NA>       <NA>       <NA>       <NA>       <NA>     pubday
baseday
         0          0          0          0          0          0      41204
34162
>
> correlation <- cor(train,y = NULL, use = "everything",
+                    method = c("pearson", "kendall", "spearman"))
> corr <- as.data.frame(reshape::melt(correlation))
> corr <- corr%>%filter(X1 == "target" & value != 1 & value > 0.32 & value >
-0.32)
> corr  # good corelations with target variable
       X1         X2     value
1  target     plikes 0.7033608
2  target    checkin 0.6582532
3  target   category 0.6140403
4  target         d5 0.6807699
5  target         d6 0.6977038
6  target         d7 0.6697552
7  target         d9 0.5780158
8  target        d10 0.6320845
9  target        d11 0.7018448
10 target        d12 0.6742162
11 target        d14 0.5801304
12 target        d15 0.6318017
13 target        d16 0.7053838
14 target        d17 0.6369178
15 target        d19 0.5713231
16 target        d20 0.6814563
17 target        d21 0.5998368
18 target        d22 0.6792232
19 target        d24 0.5784182
20 target        d26 0.4680802
21 target        d27 0.3716850
22 target        d29 0.3436600
23 target        cc1 0.4857482
24 target        cc2 0.4713853
```

```
25 target        cc3 0.3958093
26 target   basetime 0.5353860
27 target postlength 0.4745144
28 target   postshre 0.3990222
29 target        mon 0.4713000
30 target        tue 0.3742968
31 target        thu 0.3336524
32 target        fri 0.4600544
33 target        sat 0.3211086
34 target    basesun 0.4087624
35 target    basethu 0.9755843
36 target    basefri 0.6832788
37 target    basesat 0.7092183
38 target       <NA> 0.5298679
39 target       <NA> 0.3259848
40 target       <NA> 0.3617648
41 target       <NA> 0.5330890
> library(corrplot)
corrplot 0.84 loaded
> corrplot.mixed(cor(train[,c(30:32)]))
```



```
> df <- train
> melt_df <- melt(df)
> library(ggplot2)
> # Distribution of all the Variables - Histogram
> ggplot(melt_df, aes(x=value, fill = variable))+
+   geom_histogram(bins=10, color = "Blue")+
+   facet_wrap(~variable, scales = 'free_x')
> df <- log(train[1:39])
> par(mfrow=c(1,1))
```



Conclusion/Interpretation:

- There is a good corelations with target variable
- Total comments are strongly correlated to correlated cc3(comments in last 48 to last 24 hours relative to base date/time)

c. Visualize the dataset and make inferences from that.

The R-script for the given problem is as follows:

```
barplot(table(train$target, train$pubday), col = heat.colors(7),
      xlab = "Weekday", ylab = "Number of comments",
      main = "Number of comments Vs. Weekday")

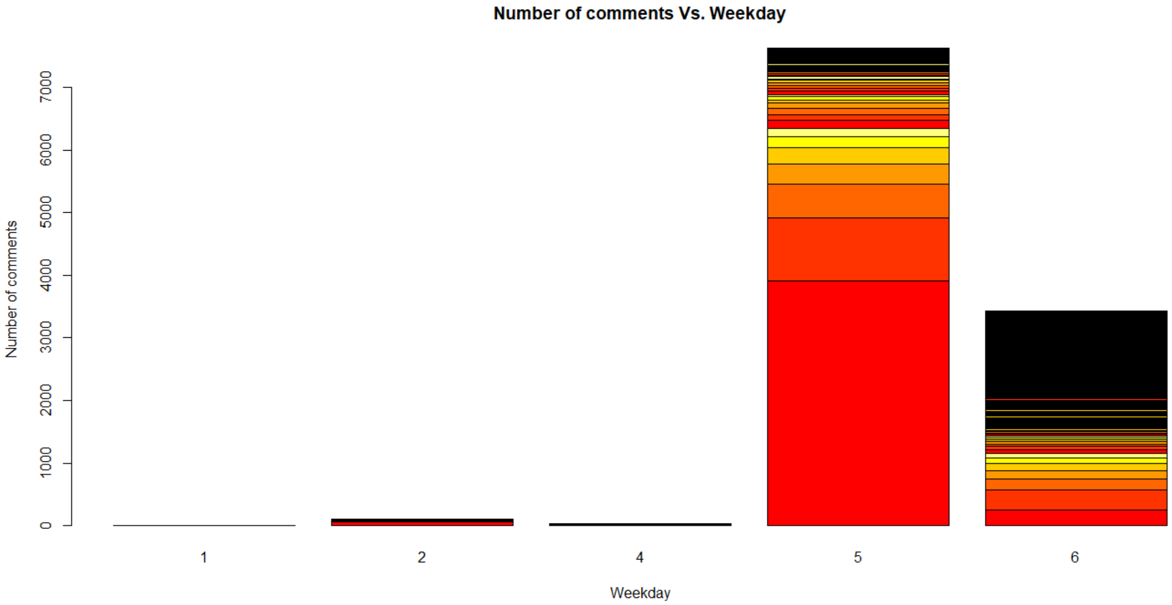
library(car)
# number of comments vs Post Likes
scatterplot(train$plikes, train$target , col = "Blue",
          xlab = "Page Likes", ylab = "Number of comments",
          main = "Number of comments Vs. Pagelikes",
          xlim = c(0,10000000), ylim = c(0,400))
abline(lm(plikes~target, data = train), col = "red")

# Number of comments Vs Post length
scatterplot(train$postlength, train$target , col = "Red",
          xlab = "Post Length", ylab = "Number of comments",
          main = "Number of comments Vs. Psot Length",
          ylim = c(0,400), xlim = c(0,5000))
abline(lm(postlength~target, data = train), col= "blue")
```

hist(train$target, breaks = 1000, xlim = c(0,10))

The output of the R-Script (from Console window) is given as follows:

```
> barplot(table(train$target, train$pubday), col = heat.colors(7),
+         xlab = "Weekday", ylab = "Number of comments",
+         main = "Number of comments Vs. Weekday")
> # post published on Wednesday has maximum comments
```



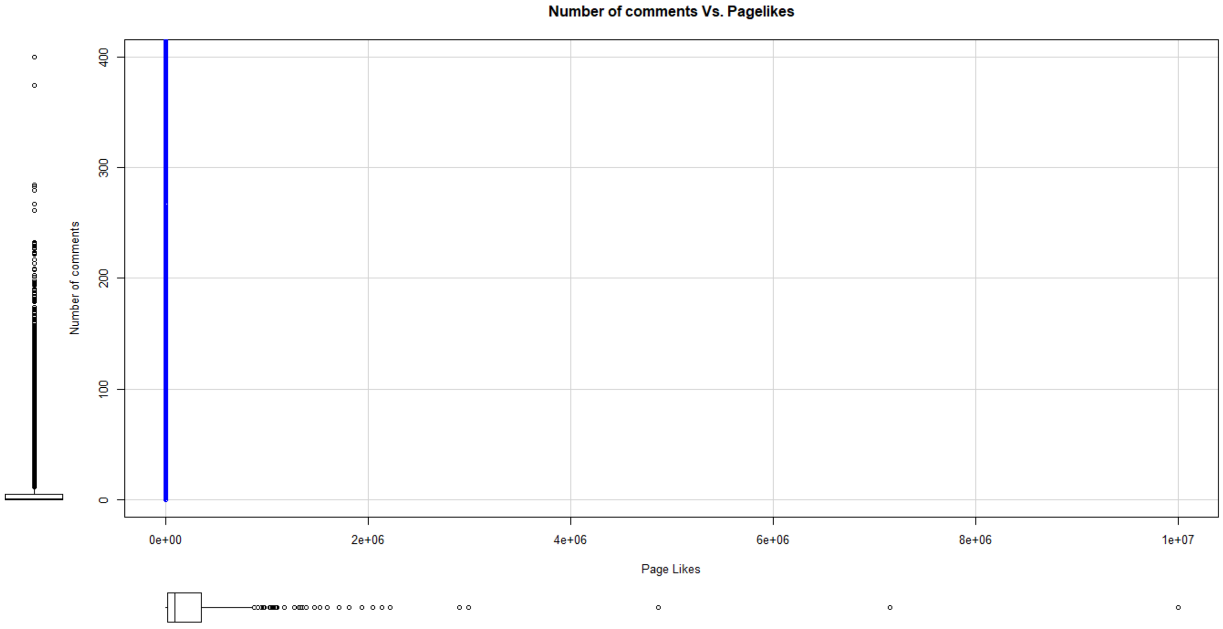
```
> library(car)
Loading required package: carData

Attaching package: ‘car’

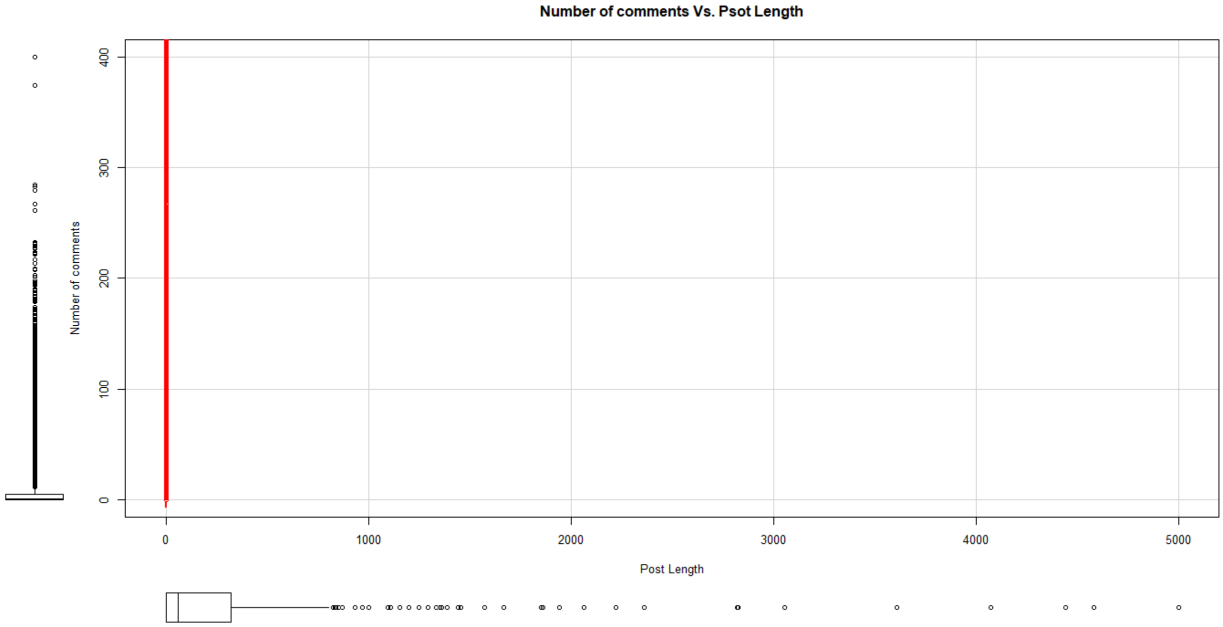
The following object is masked from ‘package:dplyr’:

    recode

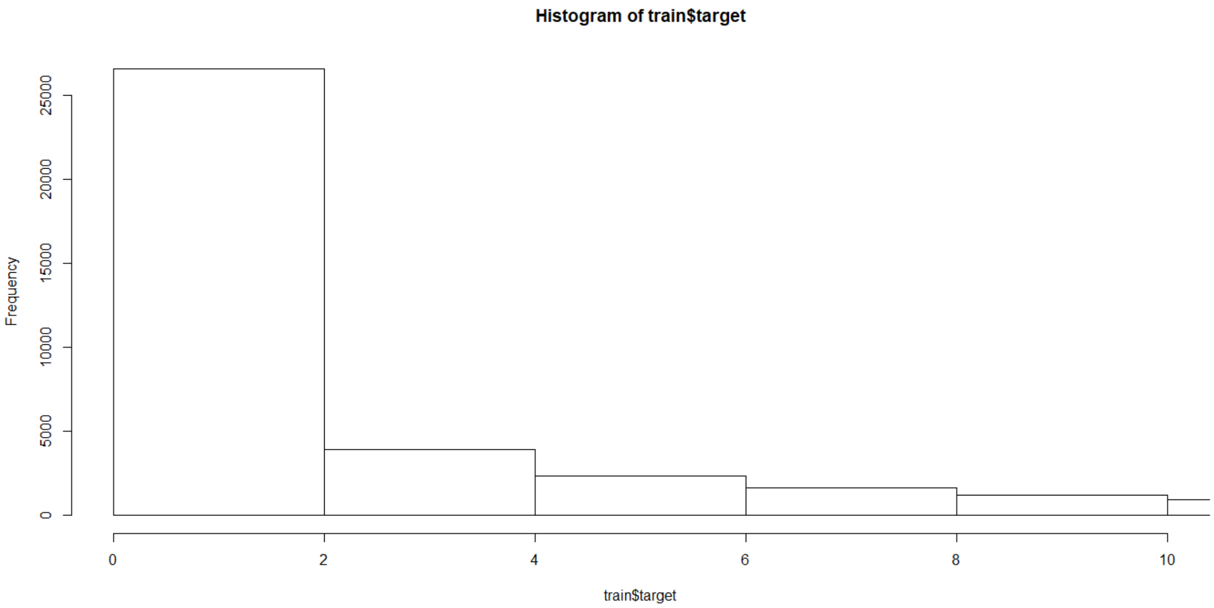
> # number of comments vs Post Likes
> scatterplot(train$plikes, train$target , col = "Blue",
+             xlab = "Page Likes", ylab = "Number of comments",
+             main = "Number of comments Vs. Pagelikes",
+             xlim = c(0,10000000), ylim = c(0,400))
> abline(lm(plikes~target, data = train), col = "red")
```



```
> # Number of comments Vs Post length
> scatterplot(train$postlength, train$target , col = "Red",
+             xlab = "Post Length", ylab = "Number of comments",
+             main = "Number of comments Vs. Psot Length",
+             ylim = c(0,400), xlim = c(0,5000))
> abline(lm(postlength~target, data = train), col= "blue")
```



```
hist(train$target, breaks = 1000, xlim = c(0,10) )
```



Conclusion/Interpretation:

- Posts which are published on Wednesday has maximum comments
- As the page likes increases the comments are not increasing
- As the page length is increasing the number of comments decreases
- Data is very positively skewed. Very less comments after base time

d. Perform any 3 hypothesis tests using columns of your choice, make conclusions.

1.

The R-script for the given problem is as follows:

```
# Ho: Mean difference bet comments across the publish day is not significant
day <- aov(target~pubday, data = train)
summary(day)
```

The output of the R-Script (from Console window) is given as follows:

```
> # Ho: Mean difference bet comments across the publish day is not
significant
> day <- aov(target~pubday, data = train)
> summary(day)
               Df   Sum Sq Mean Sq F value Pr(>F)    
pubday          1  7910633 7910633    1221 <2e-16 ***
Residuals   11190 72480187    6477                   
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
41204 observations deleted due to missingness
```

Conclusion/Interpretation:

# Difference between the number of comments after H hrs and comments in first 24 hrs of publish is significant

2.

The R-script for the given problem is as follows:

```
# Ho: Difference between Mean comments within cc2 and cc4 is not significant
cc2 <- t.test(x=train$cc2, y=train$cc4, paired = FALSE, alternative = "two.sided", mu=0)
cc2
```

The output of the R-Script (from Console window) is given as follows:

```
> # Ho: Difference between Mean comments within cc2 and cc4 is not significant
> cc2 <- t.test(x=train$cc2, y=train$cc4, paired = FALSE, alternative =
"two.sided", mu=0)
> cc2

        Welch Two Sample t-test

data:  train$cc2 and train$cc4
t = 122.01, df = 52395, p-value < 2.2e-16
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.1885319 0.1946882
sample estimates:
mean of x mean of y
  0.19161   0.00000
```

Conclusion/Interpretation:

# Difference between the number of comments in last 24 hrs of base time and comments in first 24 hrs of publish is significant

3.

The R-script for the given problem is as follows:

```
# Ho: Difference between Mean comments within cc1 and cc3 is not significant
cc3 <- t.test(x=train$cc1, y=train$cc3, paired = FALSE, alternative = "two.sided", mu=0)
cc3
```

The output of the R-Script (from Console window) is given as follows:

```
> cc3 <- t.test(x=train$cc1, y=train$cc3, paired = FALSE, alternative =
"two.sided", mu=0)
> cc3

  Welch Two Sample t-test

data:  train$cc1 and train$cc3
t = -44.255, df = 96439, p-value < 2.2e-16
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.2161059 -0.1977756
sample estimates:
mean of x mean of y
0.2791816 0.4861223
```

Conclusion/Interpretation:
Difference between Mean comments within cc1 and cc3 is significant