Data analysis project, checkin analysis for yelp dataset

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Checkin analysis for yelp dataset

This document contains user checkin analysis. We plot different graphs to analyze check in patterns for a day and for peak hours.

We use time series oject to plot hourly timeseries graph and forecast checkins for next 15 hours.

```r
#setwd("c:/Dimple/RStats/")
#rm(list=ls())
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.1.1
```

```
##
## Attaching package: 'dplyr'
##
## The following object is masked from 'package:stats':
##
##     filter
##
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(lubridate)
```

```
## Warning: package 'lubridate' was built under R version 3.1.1
```

```r
library(forecast)
```

```
## Warning: package 'forecast' was built under R version 3.1.2
```

```
## Loading required package: zoo
##
## Attaching package: 'zoo'
##
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
##
## Loading required package: timeDate
```

```
## Warning: package 'timeDate' was built under R version 3.1.2
```

```
## This is forecast 5.6
```

```r
library(xts)
```

```
##
## Attaching package: 'xts'
##
## The following objects are masked from 'package:dplyr':
##
##     first, last
```

```r
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.1.1
```

```r
checkin_data <- read.csv("datayelp/yelp_academic_dataset_checkin.csv",
                         header = T,
                         stringsAsFactor = F)
# Analyze the data
dim(checkin_data)
```

```
## [1] 31617    170
```

```r
summary(checkin_data)
```

```
##   checkin_info.9.0 checkin_info.9.1 checkin_info.9.2 checkin_info.9.3
##  Min.   :  1      Min.   :  1      Min.   :  1      Min.   :  1
##  1st Qu.:  1      1st Qu.:  1      1st Qu.:  1      1st Qu.:  1
##  Median :  1      Median :  1      Median :  1      Median :  1
##  Mean   :  3      Mean   :  3      Mean   :  3      Mean   :  3
##  3rd Qu.:  3      3rd Qu.:  2      3rd Qu.:  2      3rd Qu.:  3
##  Max.   :522      Max.   :390      Max.   :348      Max.   :425
##  NA's   :25130    NA's   :25323    NA's   :25222    NA's   :25269
##   checkin_info.9.4 checkin_info.9.5 checkin_info.9.6 checkin_info.20.2
##  Min.   :  1      Min.   :  1      Min.   :  1      Min.   :  1
##  1st Qu.:  1      1st Qu.:  1      1st Qu.:  1      1st Qu.:  1
##  Median :  1      Median :  2      Median :  2      Median :  2
##  Mean   :  3      Mean   :  4      Mean   :  5      Mean   :  4
##  3rd Qu.:  3      3rd Qu.:  3      3rd Qu.:  4      3rd Qu.:  4
##  Max.   :485      Max.   :489      Max.   :528      Max.   :284
##  NA's   :24440    NA's   :22651    NA's   :24611    NA's   :22778
##   checkin_info.20.3 checkin_info.20.0 checkin_info.20.1 checkin_info.20.6
##  Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##  Median :  2       Median :  2       Median :  2       Median :  2
##  Mean   :  4       Mean   :  4       Mean   :  4       Mean   :  5
##  3rd Qu.:  4       3rd Qu.:  4       3rd Qu.:  4       3rd Qu.:  4
##  Max.   :466       Max.   :369       Max.   :247       Max.   :517
##  NA's   :22485     NA's   :23333     NA's   :23061     NA's   :24268
##   checkin_info.20.4 checkin_info.20.5 checkin_info.5.4 checkin_info.4.2
##  Min.   :  1       Min.   :  1       Min.   :  1      Min.   :  1
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1      1st Qu.:  1
##  Median :  2       Median :  2       Median :  1      Median :  1
```

```
##  Mean   : 6        Mean   : 6        Mean   : 3        Mean   : 2
##  3rd Qu.: 5        3rd Qu.: 6        3rd Qu.: 2        3rd Qu.: 2
##  Max.   :565       Max.   :382       Max.   :241       Max.   :93
##  NA's   :21240     NA's   :21777     NA's   :29660     NA's   :30535
##  business_id        checkin_info.12.1 checkin_info.12.0 checkin_info.12.3
##  Length:31617      Min.   : 1        Min.   : 1        Min.   : 1
##  Class :character  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Mode  :character  Median : 2        Median : 2        Median : 2
##                    Mean   : 4        Mean   : 4        Mean   : 4
##                    3rd Qu.: 4        3rd Qu.: 4        3rd Qu.: 4
##                    Max.   :388       Max.   :499       Max.   :419
##                    NA's   :19798     NA's   :19734     NA's   :19300
##  checkin_info.12.2 checkin_info.12.5 checkin_info.12.4 checkin_info.12.6
##  Min.   : 1        Min.   : 1        Min.   : 1        Min.   : 1
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 2        Median : 2        Median : 2        Median : 2
##  Mean   : 4        Mean   : 5        Mean   : 5        Mean   : 6
##  3rd Qu.: 4        3rd Qu.: 5        3rd Qu.: 4        3rd Qu.: 5
##  Max.   :364       Max.   :400       Max.   :504       Max.   :523
##  NA's   :19635     NA's   :17031     NA's   :18464     NA's   :19092
##  checkin_info.15.6 checkin_info.15.4 checkin_info.15.5 checkin_info.15.2
##  Min.   : 1        Min.   : 1        Min.   : 1        Min.   : 1
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 2        Median : 2        Median : 2        Median : 1
##  Mean   : 4        Mean   : 3        Mean   : 4        Mean   : 3
##  3rd Qu.: 4        3rd Qu.: 3        3rd Qu.: 4        3rd Qu.: 3
##  Max.   :560       Max.   :549       Max.   :403       Max.   :370
##  NA's   :20280     NA's   :19940     NA's   :18404     NA's   :21332
##  checkin_info.15.3 checkin_info.15.0 checkin_info.15.1 checkin_info.17.1
##  Min.   : 1        Min.   : 1        Min.   : 1        Min.   : 1
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 1        Median : 1        Median : 1        Median : 2
##  Mean   : 3        Mean   : 3        Mean   : 3        Mean   : 4
##  3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 4
##  Max.   :453       Max.   :433       Max.   :315       Max.   :353
##  NA's   :21204     NA's   :21491     NA's   :21500     NA's   :19697
##  checkin_info.22.4 checkin_info.22.5 checkin_info.22.6 checkin_info.22.0
##  Min.   : 1        Min.   : 1        Min.   : 1        Min.   : 1
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 2        Median : 2        Median : 1        Median : 1
##  Mean   : 6        Mean   : 6        Mean   : 4        Mean   : 3
##  3rd Qu.: 4        3rd Qu.: 5        3rd Qu.: 3        3rd Qu.: 3
##  Max.   :591       Max.   :688       Max.   :381       Max.   :250
##  NA's   :25654     NA's   :25732     NA's   :27643     NA's   :27634
##  checkin_info.22.1 checkin_info.22.2 checkin_info.22.3 checkin_info.11.2
##  Min.   : 1        Min.   : 1        Min.   : 1        Min.   : 1
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 1        Median : 1        Median : 1        Median : 2
##  Mean   : 3        Mean   : 3        Mean   : 4        Mean   : 4
##  3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 4
##  Max.   :167       Max.   :166       Max.   :427       Max.   :347
##  NA's   :27457     NA's   :28054     NA's   :27005     NA's   :20344
##  checkin_info.11.3 checkin_info.11.0 checkin_info.11.1 checkin_info.11.6
##  Min.   : 1        Min.   : 1        Min.   : 1        Min.   : 1
```

```
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  2        Median :  2        Median :  2        Median :  2
##  Mean   :  4        Mean   :  4        Mean   :  4        Mean   :  5
##  3rd Qu.:  4        3rd Qu.:  4        3rd Qu.:  3        3rd Qu.:  4
##  Max.   :432        Max.   :493        Max.   :385        Max.   :624
##  NA's   :20267      NA's   :20463      NA's   :20469      NA's   :19969
##  checkin_info.11.4 checkin_info.11.5 checkin_info.16.5 checkin_info.16.4
##  Min.   :  1        Min.   :  1        Min.   :  1        Min.   :  1
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  2        Median :  2        Median :  2        Median :  2
##  Mean   :  4        Mean   :  5        Mean   :  4        Mean   :  4
##  3rd Qu.:  4        3rd Qu.:  4        3rd Qu.:  4        3rd Qu.:  4
##  Max.   :545        Max.   :497        Max.   :375        Max.   :614
##  NA's   :19405      NA's   :17833      NA's   :18772      NA's   :19483
##  checkin_info.16.6 checkin_info.16.1 checkin_info.16.0 checkin_info.16.3
##  Min.   :  1        Min.   :  1        Min.   :  1        Min.   :  1
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  2        Median :  2        Median :  2        Median :  2
##  Mean   :  4        Mean   :  3        Mean   :  3        Mean   :  3
##  3rd Qu.:  4        3rd Qu.:  3        3rd Qu.:  3        3rd Qu.:  3
##  Max.   :604        Max.   :370        Max.   :452        Max.   :461
##  NA's   :20513      NA's   :20549      NA's   :20702      NA's   :20357
##  checkin_info.16.2 checkin_info.1.0 checkin_info.1.1 checkin_info.1.2
##  Min.   :  1        Min.   :  1        Min.   :  1        Min.    :  1
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  2        Median :  1        Median :  1        Median :  1
##  Mean   :  3        Mean   :  3        Mean   :  2        Mean    :  2
##  3rd Qu.:  3        3rd Qu.:  2        3rd Qu.:  2        3rd Qu.:  2
##  Max.   :397        Max.   :145        Max.   :113        Max.    :45
##  NA's   :20656      NA's   :30039      NA's   :30198      NA's    :30127
##  checkin_info.1.3 checkin_info.1.4 checkin_info.1.5 checkin_info.1.6
##  Min.   :  1        Min.   :  1        Min.   :  1        Min.    :  1
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  1        Median :  1        Median :  1        Median :  1
##  Mean   :  3        Mean   :  3        Mean   :  5        Mean    :  5
##  3rd Qu.:  2        3rd Qu.:  2        3rd Qu.:  3        3rd Qu.:  3
##  Max.   :58         Max.   :87         Max.   :207        Max.    :266
##  NA's   :30028      NA's   :29812      NA's   :29088      NA's    :29011
##  checkin_info.7.3 checkin_info.7.0 checkin_info.4.1 checkin_info.4.0
##  Min.   :  1        Min.   :  1        Min.   :  1        Min.    :  1
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  1        Median :  1        Median :  1        Median :  1
##  Mean   :  3        Mean   :  3        Mean   :  2        Mean    :  2
##  3rd Qu.:  3        3rd Qu.:  3        3rd Qu.:  2        3rd Qu.:  2
##  Max.   :470        Max.   :558        Max.   :81         Max.    :124
##  NA's   :27439      NA's   :27697      NA's   :30582      NA's    :30502
##  checkin_info.4.3 checkin_info.2.0 checkin_info.4.5 checkin_info.4.4
##  Min.   :  1        Min.   :  1        Min.   :  1        Min.    :  1
##  1st Qu.:  1        1st Qu.:  1        1st Qu.:  1        1st Qu.:  1
##  Median :  1        Median :  1        Median :  1        Median :  1
##  Mean   :  2        Mean   :  3        Mean   :  3        Mean    :  2
##  3rd Qu.:  2        3rd Qu.:  2        3rd Qu.:  2        3rd Qu.:  2
##  Max.   :171        Max.   :65         Max.   :177        Max.    :108
##  NA's   :30509      NA's   :30528      NA's   :30237      NA's    :30323
```

```
##   checkin_info.2.5 checkin_info.2.4 checkin_info.3.3 checkin_info.7.4
##   Min.   :  1      Min.   : 1       Min.   : 1       Min.   :  1
##   1st Qu.:  1      1st Qu.: 1       1st Qu.: 1       1st Qu.:  1
##   Median :  1      Median : 1       Median : 1       Median :  1
##   Mean   :  4      Mean   : 3       Mean   : 2       Mean   :  4
##   3rd Qu.:  3      3rd Qu.: 2       3rd Qu.: 2       3rd Qu.:  3
##   Max.   :203      Max.   :74       Max.   :39       Max.   :485
##   NA's   :29821    NA's   :30274    NA's   :30842    NA's   :27173
##   checkin_info.5.3 checkin_info.19.2 checkin_info.19.3 checkin_info.19.0
##   Min.   :  1      Min.   :  1       Min.   :  1       Min.   :  1
##   1st Qu.:  1      1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##   Median :  1      Median :  2       Median :  2       Median :  2
##   Mean   :  3      Mean   :  5       Mean   :  5       Mean   :  4
##   3rd Qu.:  2      3rd Qu.:  5       3rd Qu.:  5       3rd Qu.:  4
##   Max.   :255      Max.   :371       Max.   :457       Max.   :453
##   NA's   :29826    NA's   :20910     NA's   :20569     NA's   :21625
##   checkin_info.19.1 checkin_info.19.6 checkin_info.19.4 checkin_info.19.5
##   Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##   1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##   Median :  2       Median :  2       Median :  2       Median :  2
##   Mean   :  5       Mean   :  5       Mean   :  6       Mean   :  6
##   3rd Qu.:  5       3rd Qu.:  5       3rd Qu.:  6       3rd Qu.:  6
##   Max.   :307       Max.   :565       Max.   :580       Max.   :343
##   NA's   :21185     NA's   :22609     NA's   :19720     NA's   :20290
##   checkin_info.2.3 checkin_info.2.2 checkin_info.2.1 checkin_info.7.2
##   Min.   : 1       Min.   : 1       Min.   : 1       Min.   :  1
##   1st Qu.: 1       1st Qu.: 1       1st Qu.: 1       1st Qu.:  1
##   Median : 1       Median : 1       Median : 1       Median :  1
##   Mean   : 2       Mean   : 2       Mean   : 2       Mean   :  3
##   3rd Qu.: 2       3rd Qu.: 2       3rd Qu.: 2       3rd Qu.:  3
##   Max.   :42       Max.   :36       Max.   :64       Max.   :412
##   NA's   :30412    NA's   :30552    NA's   :30629    NA's   :27598
##   checkin_info.5.5 checkin_info.5.6 checkin_info.7.1 checkin_info.7.6
##   Min.   :  1      Min.   :  1      Min.   :  1      Min.   :  1
##   1st Qu.:  1      1st Qu.:  1      1st Qu.:  1      1st Qu.:  1
##   Median :  1      Median :  1      Median :  1      Median :  1
##   Mean   :  2      Mean   :  2      Mean   :  3      Mean   :  3
##   3rd Qu.:  2      3rd Qu.:  2      3rd Qu.:  3      3rd Qu.:  3
##   Max.   :129      Max.   :211      Max.   :391      Max.   :457
##   NA's   :29811    NA's   :30112    NA's   :27608    NA's   :27920
##   checkin_info.5.1 checkin_info.5.2 checkin_info.7.5 checkin_info.3.2
##   Min.   :  1      Min.   :  1      Min.   :  1      Min.   : 1
##   1st Qu.:  1      1st Qu.:  1      1st Qu.:  1      1st Qu.: 1
##   Median :  1      Median :  1      Median :  1      Median : 1
##   Mean   :  3      Mean   :  3      Mean   :  3      Mean   : 2
##   3rd Qu.:  2      3rd Qu.:  2      3rd Qu.:  3      3rd Qu.: 2
##   Max.   :207      Max.   :195      Max.   :336      Max.   :41
##   NA's   :29933    NA's   :29897    NA's   :26892    NA's   :30817
##   checkin_info.2.6 checkin_info.21.6 checkin_info.21.5 checkin_info.21.4
##   Min.   :  1      Min.   :  1       Min.   :  1       Min.   :  1
##   1st Qu.:  1      1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##   Median :  1      Median :  2       Median :  2       Median :  2
##   Mean   :  4      Mean   :  4       Mean   :  6       Mean   :  6
##   3rd Qu.:  3      3rd Qu.:  3       3rd Qu.:  5       3rd Qu.:  5
```

```
##    Max.   :189       Max.    :520       Max.    :401       Max.    :706
##    NA's   :29854      NA's    :26033     NA's    :23528     NA's    :23404
##  checkin_info.21.3 checkin_info.21.2 checkin_info.21.1 checkin_info.21.0
##  Min.   : 1         Min.    : 1        Min.    : 1        Min.    : 1
##  1st Qu.: 1         1st Qu.: 1         1st Qu.: 1         1st Qu.: 1
##  Median : 2         Median : 2         Median : 2         Median : 2
##  Mean   : 4         Mean    : 4        Mean    : 4        Mean    : 4
##  3rd Qu.: 4         3rd Qu.: 4         3rd Qu.: 3         3rd Qu.: 3
##  Max.   :520        Max.    :320       Max.    :249       Max.    :320
##  NA's   :24867      NA's    :25160     NA's    :25317     NA's    :25616
##  checkin_info.8.5 checkin_info.8.4 checkin_info.8.6      type
##  Min.   : 1        Min.    : 1       Min.    : 1       Length:31617
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        Class :character
##  Median : 2        Median : 1        Median : 1        Mode  :character
##  Mean   : 4        Mean    : 3       Mean    : 4
##  3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 3
##  Max.   :472       Max.    :546      Max.    :477
##  NA's   :24953     NA's    :25913    NA's    :26397
##  checkin_info.8.0 checkin_info.8.3 checkin_info.8.2 checkin_info.5.0
##  Min.   : 1        Min.    : 1       Min.    : 1       Min.    : 1
##  1st Qu.: 1        1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 1        Median : 1        Median : 1        Median : 1
##  Mean   : 3        Mean    : 3       Mean    : 3       Mean    : 3
##  3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 3        3rd Qu.: 2
##  Max.   :681       Max.    :503      Max.    :474      Max.    :391
##  NA's   :26520     NA's    :26442    NA's    :26483    NA's    :29958
##  checkin_info.17.0 checkin_info.8.1 checkin_info.17.2 checkin_info.17.3
##  Min.   : 1         Min.    : 1       Min.    : 1       Min.    : 1
##  1st Qu.: 1         1st Qu.: 1        1st Qu.: 1        1st Qu.: 1
##  Median : 2         Median : 1        Median : 2        Median : 2
##  Mean   : 4         Mean    : 3       Mean    : 4       Mean    : 4
##  3rd Qu.: 4         3rd Qu.: 3        3rd Qu.: 4        3rd Qu.: 4
##  Max.   :520        Max.    :474      Max.    :369      Max.    :495
##  NA's   :20066      NA's    :26618    NA's    :19475    NA's    :19192
##  checkin_info.17.4 checkin_info.17.5 checkin_info.17.6 checkin_info.14.3
##  Min.   : 1         Min.    : 1        Min.    : 1        Min.    : 1
##  1st Qu.: 1         1st Qu.: 1         1st Qu.: 1         1st Qu.: 1
##  Median : 2         Median : 2         Median : 2         Median : 1
##  Mean   : 5         Mean    : 5        Mean    : 5        Mean    : 3
##  3rd Qu.: 5         3rd Qu.: 5         3rd Qu.: 5         3rd Qu.: 3
##  Max.   :790        Max.    :390       Max.    :601       Max.    :442
##  NA's   :18548      NA's    :18997     NA's    :20845     NA's    :21182
##  checkin_info.14.2 checkin_info.14.1 checkin_info.14.0 checkin_info.14.6
##  Min.   : 1         Min.    : 1        Min.    : 1        Min.    : 1
##  1st Qu.: 1         1st Qu.: 1         1st Qu.: 1         1st Qu.: 1
##  Median : 1         Median : 1         Median : 1         Median : 2
##  Mean   : 3         Mean    : 3        Mean    : 3        Mean    : 5
##  3rd Qu.: 3         3rd Qu.: 3         3rd Qu.: 3         3rd Qu.: 4
##  Max.   :365        Max.    :344       Max.    :476       Max.    :544
##  NA's   :21373      NA's    :21591     NA's    :21103     NA's    :19683
##  checkin_info.14.5 checkin_info.14.4 checkin_info.4.6 checkin_info.13.4
##  Min.   : 1         Min.    : 1        Min.    : 1       Min.    : 1
##  1st Qu.: 1         1st Qu.: 1         1st Qu.: 1        1st Qu.: 1
##  Median : 2         Median : 2         Median : 1        Median : 2
```

```
##    Mean   :  5       Mean   :  3       Mean   :  3       Mean   :  4
##    3rd Qu.:  4       3rd Qu.:  3       3rd Qu.:  2       3rd Qu.:  4
##    Max.   :428       Max.   :534       Max.   :133       Max.   :493
##    NA's   :17970     NA's   :19974     NA's   :30358     NA's   :19227
##  checkin_info.13.5 checkin_info.13.6 checkin_info.13.0 checkin_info.13.1
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##    1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##    Median :  2       Median :  2       Median :  2       Median :  2
##    Mean   :  5       Mean   :  5       Mean   :  3       Mean   :  3
##    3rd Qu.:  5       3rd Qu.:  5       3rd Qu.:  3       3rd Qu.:  3
##    Max.   :407       Max.   :554       Max.   :466       Max.   :352
##    NA's   :17321     NA's   :19255     NA's   :20484     NA's   :20631
##  checkin_info.13.2 checkin_info.13.3 checkin_info.10.6 checkin_info.10.5
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##    1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##    Median :  2       Median :  2       Median :  2       Median :  2
##    Mean   :  3       Mean   :  3       Mean   :  5       Mean   :  4
##    3rd Qu.:  3       3rd Qu.:  3       3rd Qu.:  4       3rd Qu.:  4
##    Max.   :376       Max.   :462       Max.   :497       Max.   :476
##    NA's   :20339     NA's   :20234     NA's   :22289     NA's   :20176
##  checkin_info.10.4 checkin_info.10.3 checkin_info.10.2 checkin_info.10.1
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##    1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##    Median :  1       Median :  1       Median :  1       Median :  1
##    Mean   :  3       Mean   :  3       Mean   :  3       Mean   :  3
##    3rd Qu.:  3       3rd Qu.:  3       3rd Qu.:  3       3rd Qu.:  3
##    Max.   :534       Max.   :446       Max.   :375       Max.   :419
##    NA's   :21875     NA's   :22699     NA's   :22956     NA's   :23019
##  checkin_info.10.0 checkin_info.3.5  checkin_info.23.1 checkin_info.23.0
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##    1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##    Median :  1       Median :  1       Median :  1       Median :  1
##    Mean   :  3       Mean   :  4       Mean   :  3       Mean   :  3
##    3rd Qu.:  3       3rd Qu.:  2       3rd Qu.:  3       3rd Qu.:  3
##    Max.   :558       Max.   :238       Max.   :158       Max.   :226
##    NA's   :23021     NA's   :30171     NA's   :28847     NA's   :28935
##  checkin_info.23.3 checkin_info.23.2 checkin_info.23.5 checkin_info.23.4
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##    1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##    Median :  1       Median :  1       Median :  2       Median :  2
##    Mean   :  4       Mean   :  3       Mean   :  6       Mean   :  6
##    3rd Qu.:  3       3rd Qu.:  3       3rd Qu.:  4       3rd Qu.:  4
##    Max.   :314       Max.   :196       Max.   :591       Max.   :398
##    NA's   :28435     NA's   :28792     NA's   :27148     NA's   :27300
##  checkin_info.23.6 checkin_info.6.5  checkin_info.3.0  checkin_info.0.5
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##    1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##    Median :  1       Median :  1       Median :  1       Median :  1
##    Mean   :  4       Mean   :  2       Mean   :  3       Mean   :  6
##    3rd Qu.:  3       3rd Qu.:  2       3rd Qu.:  2       3rd Qu.:  4
##    Max.   :322       Max.   :237       Max.   :67        Max.   :305
##    NA's   :28823     NA's   :28712     NA's   :30670     NA's   :28331
##  checkin_info.0.4  checkin_info.0.6  checkin_info.0.1  checkin_info.0.0
##    Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
```

```
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##  Median :  1       Median :  2       Median :  1       Median :  1
##  Mean   :  4       Mean   :  6       Mean   :  3       Mean   :  3
##  3rd Qu.:  3       3rd Qu.:  4       3rd Qu.:  2       3rd Qu.:  3
##  Max.   :144       Max.   :441       Max.   :173       Max.   :271
##  NA's   :29119     NA's   :28179     NA's   :29515     NA's   :29283
##  checkin_info.0.3  checkin_info.0.2  checkin_info.3.6  checkin_info.6.6
##  Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##  Median :  1       Median :  1       Median :  1       Median :  1
##  Mean   :  3       Mean   :  3       Mean   :  4       Mean   :  2
##  3rd Qu.:  2       3rd Qu.:  2       3rd Qu.:  3       3rd Qu.:  2
##  Max.   :131       Max.   :92        Max.   :192       Max.   :343
##  NA's   :29302     NA's   :29493     NA's   :30195     NA's   :29406
##  checkin_info.3.4  checkin_info.6.4  checkin_info.6.3  checkin_info.6.2
##  Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##  Median :  1       Median :  1       Median :  1       Median :  1
##  Mean   :  2       Mean   :  3       Mean   :  3       Mean   :  3
##  3rd Qu.:  2       3rd Qu.:  3       3rd Qu.:  3       3rd Qu.:  2
##  Max.   :81        Max.   :359       Max.   :334       Max.   :284
##  NA's   :30586     NA's   :28625     NA's   :28846     NA's   :28819
##  checkin_info.6.1  checkin_info.6.0  checkin_info.3.1  checkin_info.18.6
##  Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##  Median :  1       Median :  1       Median :  1       Median :  2
##  Mean   :  3       Mean   :  3       Mean   :  2       Mean   :  5
##  3rd Qu.:  3       3rd Qu.:  2       3rd Qu.:  2       3rd Qu.:  5
##  Max.   :278       Max.   :441       Max.   :65        Max.   :649
##  NA's   :28888     NA's   :29005     NA's   :30840     NA's   :21589
##  checkin_info.18.5 checkin_info.18.4 checkin_info.18.3 checkin_info.18.2
##  Min.   :  1       Min.   :  1       Min.   :  1       Min.   :  1
##  1st Qu.:  1       1st Qu.:  1       1st Qu.:  1       1st Qu.:  1
##  Median :  2       Median :  2       Median :  2       Median :  2
##  Mean   :  6       Mean   :  6       Mean   :  5       Mean   :  5
##  3rd Qu.:  6       3rd Qu.:  6       3rd Qu.:  5       3rd Qu.:  5
##  Max.   :364       Max.   :589       Max.   :525       Max.   :416
##  NA's   :19465     NA's   :18769     NA's   :19392     NA's   :19649
##  checkin_info.18.1 checkin_info.18.0
##  Min.   :  1       Min.   :  1
##  1st Qu.:  1       1st Qu.:  1
##  Median :  2       Median :  2
##  Mean   :  5       Mean   :  5
##  3rd Qu.:  5       3rd Qu.:  5
##  Max.   :358       Max.   :481
##  NA's   :19915     NA's   :20412
```

```r
head(checkin_data, 2)
```

```
##   checkin_info.9.0 checkin_info.9.1 checkin_info.9.2 checkin_info.9.3
## 1               NA               NA                1               NA
## 2               NA               NA               NA                1
##   checkin_info.9.4 checkin_info.9.5 checkin_info.9.6 checkin_info.20.2
## 1               NA                1                1                NA
```

```
## 2              NA          NA          NA          NA
##   checkin_info.20.3 checkin_info.20.0 checkin_info.20.1 checkin_info.20.6
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.20.4 checkin_info.20.5 checkin_info.5.4 checkin_info.4.2
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##              business_id checkin_info.12.1 checkin_info.12.0
## 1 JwUE5GmEO-sH1FuwJgKB1Q              NA          NA
## 2 uGykseHzyS5xAMWoN6YUqA              NA          NA
##   checkin_info.12.3 checkin_info.12.2 checkin_info.12.5 checkin_info.12.4
## 1              NA          NA          NA          NA
## 2              NA          NA           1          NA
##   checkin_info.12.6 checkin_info.15.6 checkin_info.15.4 checkin_info.15.5
## 1               1          NA          NA          NA
## 2              NA           1           1           1
##   checkin_info.15.2 checkin_info.15.3 checkin_info.15.0 checkin_info.15.1
## 1              NA          NA          NA          NA
## 2              NA           1          NA          NA
##   checkin_info.17.1 checkin_info.22.4 checkin_info.22.5 checkin_info.22.6
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.22.0 checkin_info.22.1 checkin_info.22.2 checkin_info.22.3
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.11.2 checkin_info.11.3 checkin_info.11.0 checkin_info.11.1
## 1              NA           1          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.11.6 checkin_info.11.4 checkin_info.11.5 checkin_info.16.5
## 1               2          NA           1          NA
## 2              NA          NA          NA          NA
##   checkin_info.16.4 checkin_info.16.6 checkin_info.16.1 checkin_info.16.0
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.16.3 checkin_info.16.2 checkin_info.1.0 checkin_info.1.1
## 1              NA          NA          NA          NA
## 2               1          NA          NA          NA
##   checkin_info.1.2 checkin_info.1.3 checkin_info.1.4 checkin_info.1.5
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.1.6 checkin_info.7.3 checkin_info.7.0 checkin_info.4.1
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.4.0 checkin_info.4.3 checkin_info.2.0 checkin_info.4.5
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.4.4 checkin_info.2.5 checkin_info.2.4 checkin_info.3.3
## 1              NA          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.7.4 checkin_info.5.3 checkin_info.19.2 checkin_info.19.3
## 1               1          NA          NA          NA
## 2              NA          NA          NA          NA
##   checkin_info.19.0 checkin_info.19.1 checkin_info.19.6 checkin_info.19.4
## 1               1          NA          NA          NA
```

```
## 2                  NA              NA              NA              NA
##   checkin_info.19.5 checkin_info.2.3 checkin_info.2.2 checkin_info.2.1
## 1                NA              NA              NA              NA
## 2                NA              NA              NA              NA
##   checkin_info.7.2 checkin_info.5.5 checkin_info.5.6 checkin_info.7.1
## 1               NA               1               NA               NA
## 2               NA              NA               NA               NA
##   checkin_info.7.6 checkin_info.5.1 checkin_info.5.2 checkin_info.7.5
## 1                1              NA                1                1
## 2                1              NA               NA                1
##   checkin_info.3.2 checkin_info.2.6 checkin_info.21.6 checkin_info.21.5
## 1               NA              NA                NA                NA
## 2               NA              NA                NA                NA
##   checkin_info.21.4 checkin_info.21.3 checkin_info.21.2 checkin_info.21.1
## 1                NA                NA                NA                NA
## 2                NA                NA                NA                NA
##   checkin_info.21.0 checkin_info.8.5 checkin_info.8.4 checkin_info.8.6
## 1                NA               1               NA               NA
## 2                NA               2               NA               NA
##      type checkin_info.8.0 checkin_info.8.3 checkin_info.8.2
## 1 checkin               NA               NA               NA
## 2 checkin               NA               NA                1
##   checkin_info.5.0 checkin_info.17.0 checkin_info.8.1 checkin_info.17.2
## 1               NA                NA               NA                NA
## 2               NA                NA               NA                NA
##   checkin_info.17.3 checkin_info.17.4 checkin_info.17.5 checkin_info.17.6
## 1                NA                NA                 1                NA
## 2                NA                NA                NA                NA
##   checkin_info.14.3 checkin_info.14.2 checkin_info.14.1 checkin_info.14.0
## 1                 1                 1                NA                NA
## 2                NA                NA                NA                NA
##   checkin_info.14.6 checkin_info.14.5 checkin_info.14.4 checkin_info.4.6
## 1                 1                 1                NA               NA
## 2                NA                NA                NA               NA
##   checkin_info.13.4 checkin_info.13.5 checkin_info.13.6 checkin_info.13.0
## 1                NA                 1                NA                NA
## 2                NA                NA                NA                NA
##   checkin_info.13.1 checkin_info.13.2 checkin_info.13.3 checkin_info.10.6
## 1                NA                 1                NA                 1
## 2                NA                NA                NA                NA
##   checkin_info.10.5 checkin_info.10.4 checkin_info.10.3 checkin_info.10.2
## 1                 1                NA                NA                 1
## 2                 1                 1                NA                NA
##   checkin_info.10.1 checkin_info.10.0 checkin_info.3.5 checkin_info.23.1
## 1                NA                NA               NA                NA
## 2                NA                 1               NA                NA
##   checkin_info.23.0 checkin_info.23.3 checkin_info.23.2 checkin_info.23.5
## 1                NA                NA                NA                NA
## 2                NA                NA                NA                NA
##   checkin_info.23.4 checkin_info.23.6 checkin_info.6.5 checkin_info.3.0
## 1                NA                NA                1               NA
## 2                NA                NA                1               NA
##   checkin_info.0.5 checkin_info.0.4 checkin_info.0.6 checkin_info.0.1
## 1               NA               NA               NA               NA
```

```
## 2                NA                NA                NA                NA
##   checkin_info.0.0 checkin_info.0.3 checkin_info.0.2 checkin_info.3.6
## 1               NA               NA               NA               NA
## 2               NA               NA               NA               NA
##   checkin_info.6.6 checkin_info.3.4 checkin_info.6.4 checkin_info.6.3
## 1                1                1               NA               NA
## 2                2               NA               NA               NA
##   checkin_info.6.2 checkin_info.6.1 checkin_info.6.0 checkin_info.3.1
## 1               NA               NA               NA               NA
## 2               NA               NA               NA               NA
##   checkin_info.18.6 checkin_info.18.5 checkin_info.18.4 checkin_info.18.3
## 1                NA                NA                NA                NA
## 2                NA                NA                NA                NA
##   checkin_info.18.2 checkin_info.18.1 checkin_info.18.0
## 1                NA                NA                NA
## 2                NA                NA                NA
```

```r
tail(checkin_data, 2)
```

```
##       checkin_info.9.0 checkin_info.9.1 checkin_info.9.2 checkin_info.9.3
## 31616               NA               NA               NA               NA
## 31617               NA               NA               NA               NA
##       checkin_info.9.4 checkin_info.9.5 checkin_info.9.6 checkin_info.20.2
## 31616               NA               NA               NA                NA
## 31617               NA               NA               NA                NA
##       checkin_info.20.3 checkin_info.20.0 checkin_info.20.1
## 31616                NA                NA                 1
## 31617                 1                NA                NA
##       checkin_info.20.6 checkin_info.20.4 checkin_info.20.5
## 31616                NA                NA                NA
## 31617                NA                NA                NA
##       checkin_info.5.4 checkin_info.4.2           business_id
## 31616               NA               NA nYer89hXYAoddMEKTxw7kA
## 31617               NA               NA BMjggIgOghBMEXPo8q7q3w
##       checkin_info.12.1 checkin_info.12.0 checkin_info.12.3
## 31616                NA                NA                NA
## 31617                NA                NA                NA
##       checkin_info.12.2 checkin_info.12.5 checkin_info.12.4
## 31616                NA                NA                NA
## 31617                NA                NA                NA
##       checkin_info.12.6 checkin_info.15.6 checkin_info.15.4
## 31616                NA                NA                NA
## 31617                NA                NA                NA
##       checkin_info.15.5 checkin_info.15.2 checkin_info.15.3
## 31616                NA                NA                NA
## 31617                NA                NA                NA
##       checkin_info.15.0 checkin_info.15.1 checkin_info.17.1
## 31616                NA                NA                16
## 31617                NA                 1                NA
##       checkin_info.22.4 checkin_info.22.5 checkin_info.22.6
## 31616                NA                NA                NA
## 31617                NA                 1                NA
##       checkin_info.22.0 checkin_info.22.1 checkin_info.22.2
## 31616                NA                NA                NA
```

```
## 31617                    NA               NA               NA
##      checkin_info.22.3 checkin_info.11.2 checkin_info.11.3
## 31616               NA               NA               NA
## 31617               NA               NA               NA
##      checkin_info.11.0 checkin_info.11.1 checkin_info.11.6
## 31616               NA               NA               NA
## 31617                1               NA               NA
##      checkin_info.11.4 checkin_info.11.5 checkin_info.16.5
## 31616               NA               NA               NA
## 31617               NA               NA               NA
##      checkin_info.16.4 checkin_info.16.6 checkin_info.16.1
## 31616               NA               NA                1
## 31617               NA               NA               NA
##      checkin_info.16.0 checkin_info.16.3 checkin_info.16.2
## 31616               NA               NA               NA
## 31617               NA               NA               NA
##      checkin_info.1.0 checkin_info.1.1 checkin_info.1.2 checkin_info.1.3
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.1.4 checkin_info.1.5 checkin_info.1.6 checkin_info.7.3
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.7.0 checkin_info.4.1 checkin_info.4.0 checkin_info.4.3
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.2.0 checkin_info.4.5 checkin_info.4.4 checkin_info.2.5
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.2.4 checkin_info.3.3 checkin_info.7.4 checkin_info.5.3
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.19.2 checkin_info.19.3 checkin_info.19.0
## 31616                1               NA               NA
## 31617               NA               NA               NA
##      checkin_info.19.1 checkin_info.19.6 checkin_info.19.4
## 31616                2               NA               NA
## 31617               NA                1               NA
##      checkin_info.19.5 checkin_info.2.3 checkin_info.2.2 checkin_info.2.1
## 31616               NA              NA              NA              NA
## 31617               NA              NA              NA              NA
##      checkin_info.7.2 checkin_info.5.5 checkin_info.5.6 checkin_info.7.1
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.7.6 checkin_info.5.1 checkin_info.5.2 checkin_info.7.5
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.3.2 checkin_info.2.6 checkin_info.21.6
## 31616              NA              NA               NA
## 31617              NA              NA               NA
##      checkin_info.21.5 checkin_info.21.4 checkin_info.21.3
## 31616               NA               NA               NA
## 31617               NA               NA               NA
##      checkin_info.21.2 checkin_info.21.1 checkin_info.21.0
## 31616               NA               NA               NA
```

```
## 31617              NA             NA             NA
##      checkin_info.8.5 checkin_info.8.4 checkin_info.8.6    type
## 31616              NA             NA             NA checkin
## 31617              NA             NA             NA checkin
##      checkin_info.8.0 checkin_info.8.3 checkin_info.8.2 checkin_info.5.0
## 31616              NA             NA             NA             NA
## 31617              NA             NA             NA             NA
##      checkin_info.17.0 checkin_info.8.1 checkin_info.17.2
## 31616              NA             NA             NA
## 31617               1             NA             NA
##      checkin_info.17.3 checkin_info.17.4 checkin_info.17.5
## 31616              NA             NA             NA
## 31617               1             NA             NA
##      checkin_info.17.6 checkin_info.14.3 checkin_info.14.2
## 31616              NA             NA             NA
## 31617               1             NA             NA
##      checkin_info.14.1 checkin_info.14.0 checkin_info.14.6
## 31616              NA             NA             NA
## 31617               1             NA             NA
##      checkin_info.14.5 checkin_info.14.4 checkin_info.4.6
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.13.4 checkin_info.13.5 checkin_info.13.6
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.13.0 checkin_info.13.1 checkin_info.13.2
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.13.3 checkin_info.10.6 checkin_info.10.5
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.10.4 checkin_info.10.3 checkin_info.10.2
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.10.1 checkin_info.10.0 checkin_info.3.5
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.23.1 checkin_info.23.0 checkin_info.23.3
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.23.2 checkin_info.23.5 checkin_info.23.4
## 31616              NA             NA             NA
## 31617              NA             NA             NA
##      checkin_info.23.6 checkin_info.6.5 checkin_info.3.0 checkin_info.0.5
## 31616              NA             NA             NA             NA
## 31617              NA             NA             NA             NA
##      checkin_info.0.4 checkin_info.0.6 checkin_info.0.1 checkin_info.0.0
## 31616              NA             NA             NA             NA
## 31617              NA             NA             NA             NA
##      checkin_info.0.3 checkin_info.0.2 checkin_info.3.6 checkin_info.6.6
## 31616              NA              1             NA             NA
## 31617              NA             NA             NA             NA
##      checkin_info.3.4 checkin_info.6.4 checkin_info.6.3 checkin_info.6.2
## 31616              NA             NA             NA             NA
```

```
## 31617              NA              NA              NA              NA
##      checkin_info.6.1 checkin_info.6.0 checkin_info.3.1 checkin_info.18.6
## 31616              NA              NA              NA              NA
## 31617              NA              NA              NA              NA
##      checkin_info.18.5 checkin_info.18.4 checkin_info.18.3
## 31616              NA              NA              NA
## 31617              NA              NA              NA
##      checkin_info.18.2 checkin_info.18.1 checkin_info.18.0
## 31616              NA              NA              NA
## 31617               1              NA              NA
```

```r
# Convert all na values to 0
n <- ncol(checkin_data)
for(i in 1:n){
        if(colnames(checkin_data) != "business_id" || colnames(checkin_data) != "type" )
                checkin_data[is.na(checkin_data[i]), i] <- 0
}


daily <- seq(from = as.POSIXlt("2014-12-06 00:00:00"),
          to = as.POSIXlt("2014-12-12 23:00:00"), by = "+1 hour")
hours <- as.numeric(format(daily, format("%H")))
total_checkin <- rep( 0, length(daily))

for(i in 1:length(daily)){

        day <-  daily[i]
        #day_weekday <- ifelse(wday(day) == 7, 0, wday(day))
        day_weekday <- wday(day) - 1

        col_name <- paste("checkin_info.", hours[i], ".", day_weekday, sep = "")
        #print(col_name)
        total_checkin[i] <- sum(checkin_data[,which(colnames(checkin_data) == col_name)])
}

checkin_day_hour <- data.frame(daily, total_checkin)

# Time series and forecast

# Create hourly data time series
ts_data <- xts(checkin_day_hour$total_checkin, order = checkin_day_hour$daily)

# checkin hourly time series plot
plot(ts_data, las = 2)
```
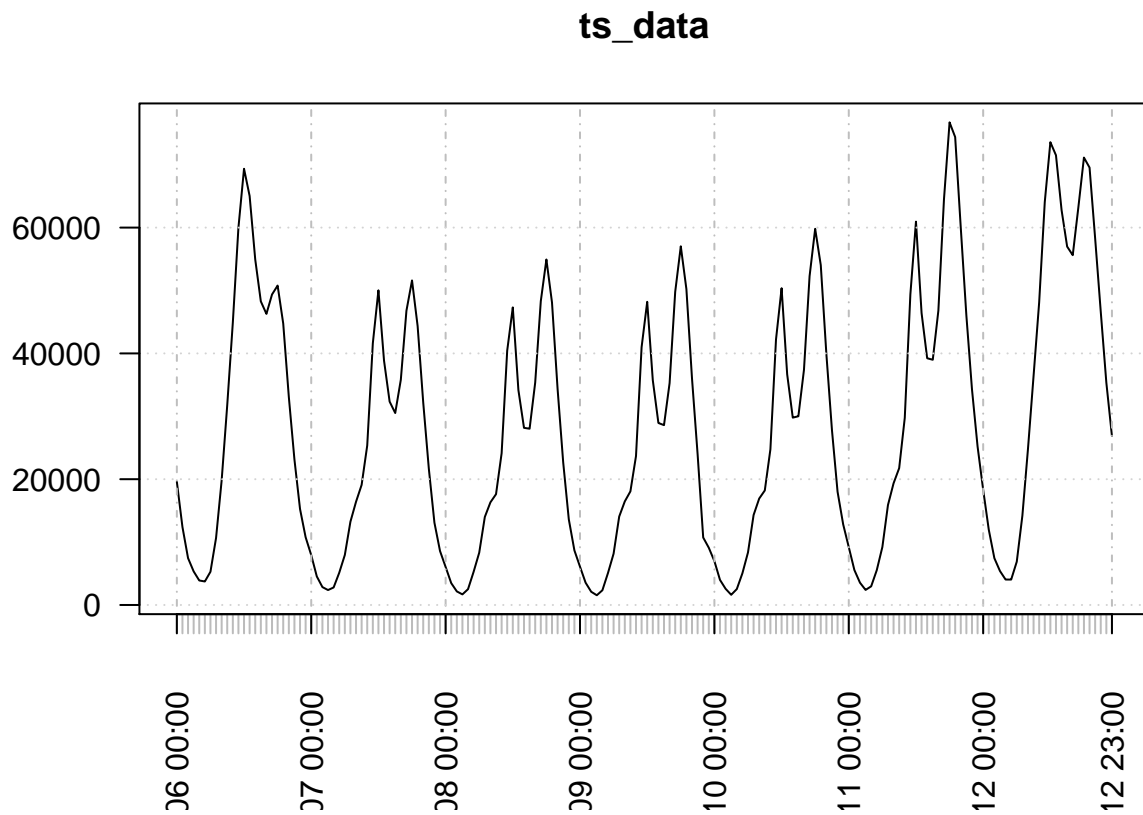
ts_data


```r
summary(ts_data)
```

```
##       Index                       ts_data
##   Min.   :2014-12-06 00:00:00   Min.   : 1549
##   1st Qu.:2014-12-07 17:45:00   1st Qu.: 8350
##   Median :2014-12-09 11:30:00   Median :24779
##   Mean   :2014-12-09 11:30:00   Mean   :28058
##   3rd Qu.:2014-12-11 05:15:00   3rd Qu.:46318
##   Max.   :2014-12-12 23:00:00   Max.   :76734
```

```r
# Auto arima and forecast checkins for next 15 hours
fit_ts <- auto.arima(ts_data)
hourly_forecast <- forecast(fit_ts, 15)
plot(forecast(fit_ts, 15))
```

Forecasts from ARIMA(2,0,1) with non−zero mean
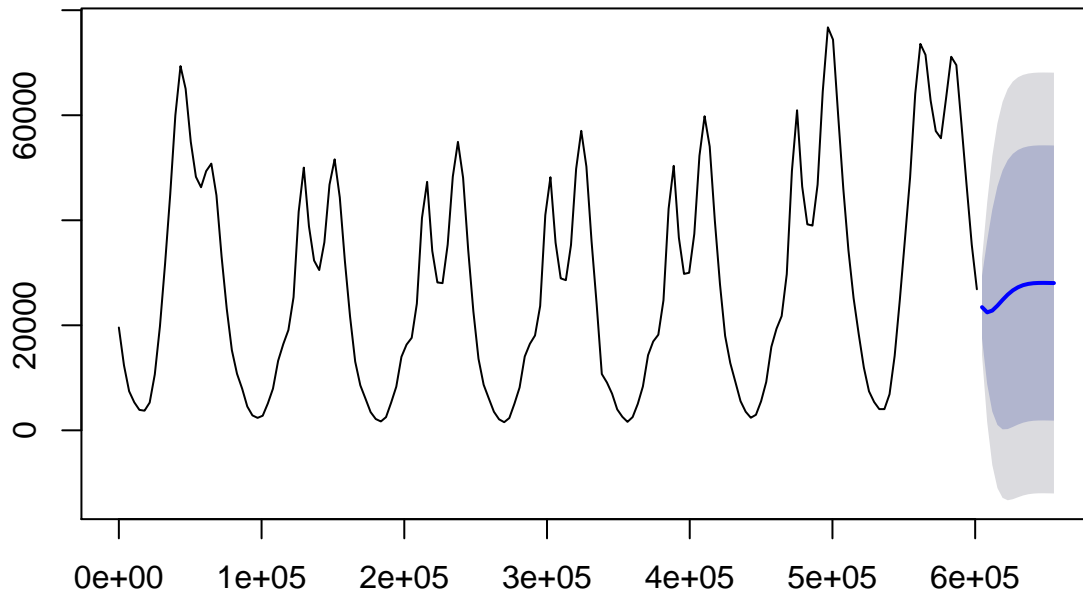

```
hourly_forecast
```

```
##        Point Forecast   Lo 80 Hi 80   Lo 95 Hi 95
## 604801          23457 17488.5 29425   14329 32584
## 608401          22464  8812.0 36117    1585 43344
## 612001          22803  3585.6 42021   -6588 52194
## 615601          23744  1032.8 46455  -10990 58478
## 619201          24838   187.1 49489  -12862 62539
## 622801          25843   241.8 51444  -13311 64997
## 626401          26653   648.9 52657  -13117 66423
## 630001          27246  1099.5 53392  -12741 67232
## 633601          27643  1458.5 53827  -12403 67688
## 637201          27884  1693.9 54074  -12170 67938
## 640801          28013  1822.7 54203  -12041 68067
## 644401          28067  1876.2 54258  -11988 68122
## 648001          28077  1884.1 54269  -11981 68134
## 651601          28063  1868.6 54257  -11998 68123
## 655201          28040  1844.2 54235  -12023 68102
```
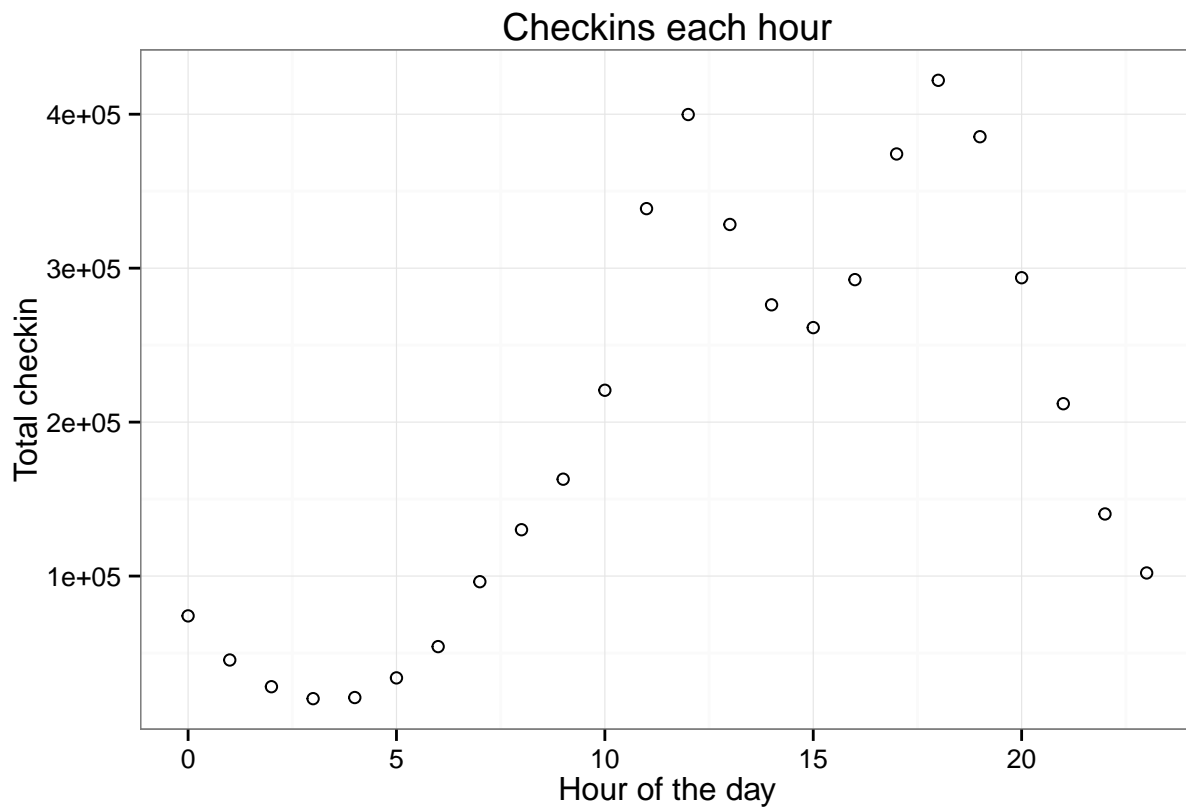
```r
# Checkins each day graph
checkin_day_hour %>%
        group_by( weekday=wday(daily)) %>%
        summarise( checkins = sum(total_checkin)) %>%
        ggplot(aes(x= weekday, y = checkins, fill=factor(weekday))) +
        geom_bar(stat="identity") +
```

```
      labs(title = "Checkins in a day ", x = "Hour of the day", y = "Total checkin") +
      scale_fill_discrete(name = "Weekdays",
          labels = c("Sunday", "Monday", "Tuesday", "Wednesday",
                     "Thursday", "Friday", "saturday"))
```
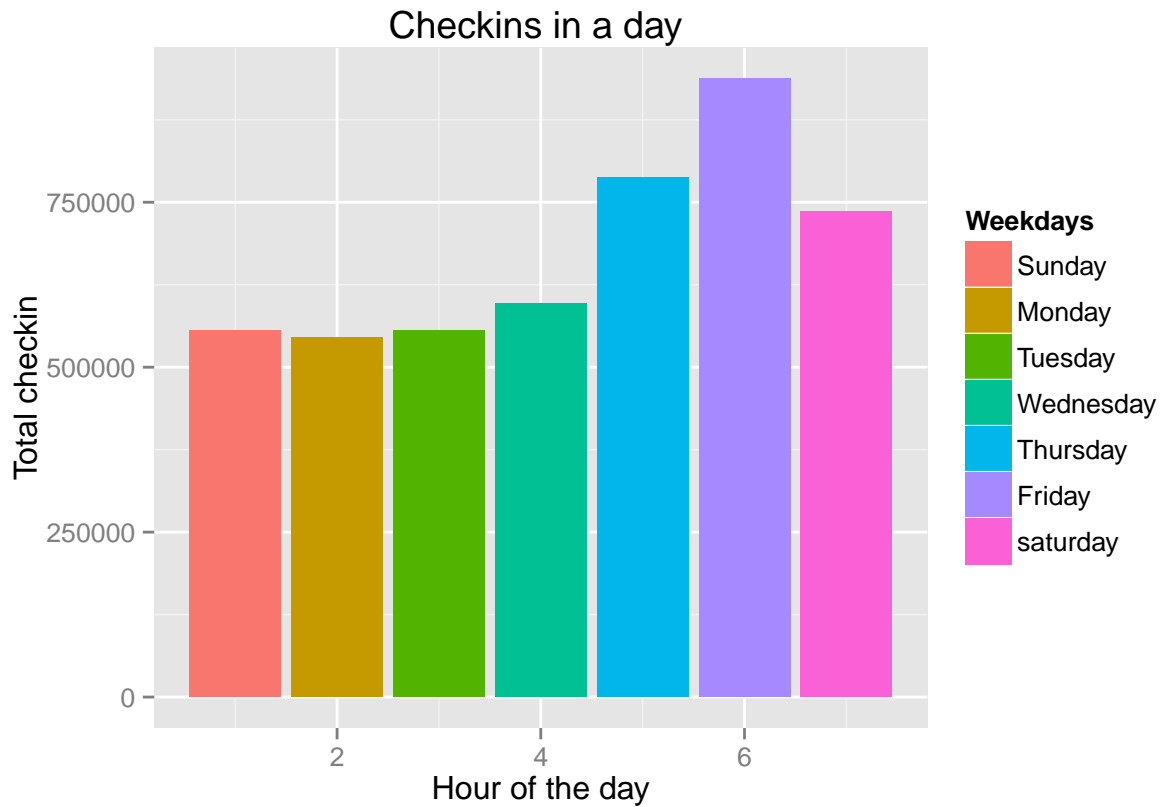


```
# Daily hour graph
checkin_day_hour %>%
        group_by( eachhour=hour(daily)) %>%
        summarise( checkins = sum(total_checkin)) %>%
        ggplot(aes(x= eachhour, y = checkins)) +
        geom_point(shape = 1) +
        labs(title = "Checkins each hour", x = "Hour of the day", y = "Total checkin") +
        theme_bw()
```

Checkins each hour


```
# peek hours of the day
checkin_day_hour %>%
        group_by( weekday=wday(daily), eachhour=hour(daily)) %>%
        summarise( checkins = sum(total_checkin)) %>%
        ggplot(aes(x= eachhour, y = checkins,
            colour = factor(weekday))) +
        geom_point(shape = 1) +
        geom_line() +
        labs(title = "Peak hours of a day", x = "Hour of the day", y = "Total checkin") +
        scale_color_discrete(name = "Weekday number",
                            labels = c("Sunday", "Monday", "Tuesday", "Wednesday",
                                "Thursday", "Friday", "saturday"))
```

Peak hours of a day