

Reproducible Research: Peer Assessment 1

2022-11-03

R Markdown

```
#Load the data
```

```
df<- read.csv("activity.csv", na.strings="NA")
head(df)
```

```
##      steps      date interval
## 1      NA 2012-10-01         0
## 2      NA 2012-10-01         5
## 3      NA 2012-10-01        10
## 4      NA 2012-10-01        15
## 5      NA 2012-10-01        20
## 6      NA 2012-10-01        25
```

```
#Process/transform the data
```

```
df$date <- as.Date(df$date)
df_stepping<-subset(df, !is.na(df$steps))
head(df$date)
```

```
## [1] "2012-10-01" "2012-10-01" "2012-10-01" "2012-10-01" "2012-10-01"
## [6] "2012-10-01"
```

```
head(df_stepping)
```

```
##      steps      date interval
## 289      0 2012-10-02         0
## 290      0 2012-10-02         5
## 291      0 2012-10-02        10
## 292      0 2012-10-02        15
## 293      0 2012-10-02        20
## 294      0 2012-10-02        25
```

```
#Number of steps taken per day
```

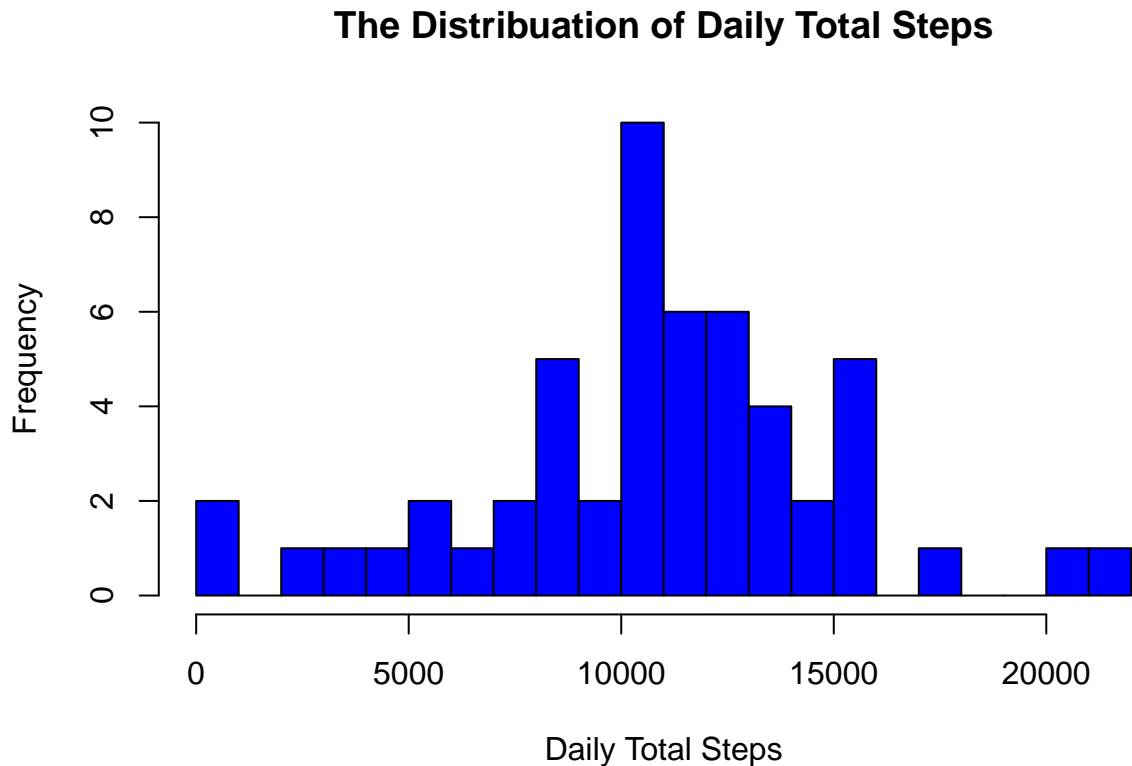
```
stepsday <- tapply(df_stepping$steps, df_stepping$date, sum, na.rm=TRUE, simplify =T)
stepsday
```

```
## 2012-10-02 2012-10-03 2012-10-04 2012-10-05 2012-10-06 2012-10-07 2012-10-09
##          126      11352      12116      13294      15420      11015      12811
## 2012-10-10 2012-10-11 2012-10-12 2012-10-13 2012-10-14 2012-10-15 2012-10-16
##          9900      10304      17382      12426      15098      10139      15084
## 2012-10-17 2012-10-18 2012-10-19 2012-10-20 2012-10-21 2012-10-22 2012-10-23
##          13452      10056      11829      10395      8821      13460      8918
## 2012-10-24 2012-10-25 2012-10-26 2012-10-27 2012-10-28 2012-10-29 2012-10-30
##           8355       2492       6778       10119      11458       5018       9819
## 2012-10-31 2012-11-02 2012-11-03 2012-11-05 2012-11-06 2012-11-07 2012-11-08
##          15414      10600      10571      10439      8334      12883       3219
## 2012-11-11 2012-11-12 2012-11-13 2012-11-15 2012-11-16 2012-11-17 2012-11-18
```

```
##      12608      10765      7336      41      5441      14339      15110
## 2012-11-19 2012-11-20 2012-11-21 2012-11-22 2012-11-23 2012-11-24 2012-11-25
##      8841      4472      12787      20427      21194      14478      11834
## 2012-11-26 2012-11-27 2012-11-28 2012-11-29
##      11162      13646      10183      7047
```

```
#Histogram of total number of steps taken per day
```

```
hist(x=stepsday, col="blue", breaks =20, xlab="Daily Total Steps", ylab="Frequency", main="The Distrib
```



```
#Mean of steps
```

```
mean(stepsday)
```

```
## [1] 10766.19
```

```
#Median of steps
```

```
median(stepsday)
```

```
## [1] 10765
```

```
#Time series plot of 5 minute interval
```

```
int_avg<-tapply(df_stepping$steps, df_stepping$interval, mean, na.rm=TRUE, simplify=T)
```

```
df_ia<- data.frame(interval=as.integer(names(int_avg)), avg=int_avg)
```

```
head(int_avg)
```

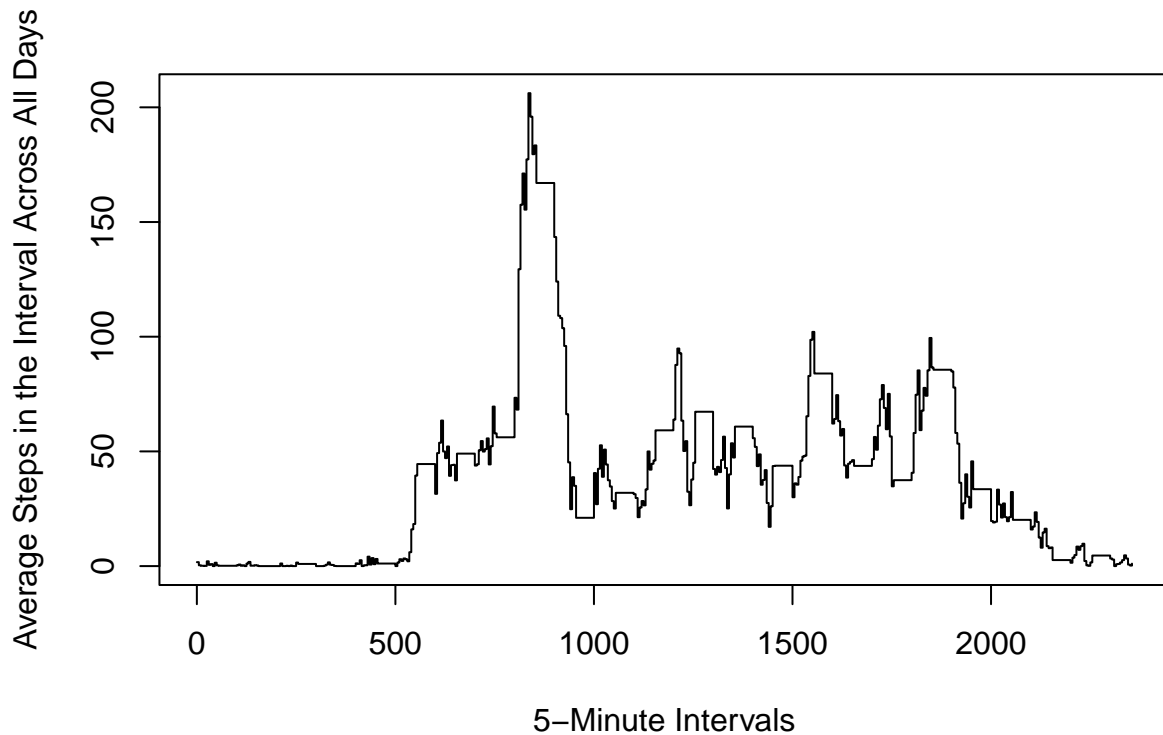
```
##      0      5      10      15      20      25
## 1.7169811 0.3396226 0.1320755 0.1509434 0.0754717 2.0943396
```

```
head(df_ia)
```

```
##   interval      avg
## 0         0 1.7169811
## 5         5 0.3396226
## 10        10 0.1320755
```

```
## 15      15 0.1509434
## 20      20 0.0754717
## 25      25 2.0943396
```

```
with(df_ia, plot(interval, avg, type="s", xlab="5-Minute Intervals", ylab="Average Steps in the Interval Across All Days"))
```



```
#Which 5 minute interval contains the maximum number of step
```

```
max_steps5 <- max(df_ia$avg)
df_ia[df_ia$avg==max_steps5,]
```

```
##      interval      avg
## 835         835 206.1698
```

```
head(max_steps5)
```

```
## [1] 206.1698
```

```
#Number of missing values
```

```
sum(is.na(df$steps))
```

```
## [1] 2304
```

```
#Filling in missing values
```

```
df_addinvalue<-df
ndx<-is.na(df_addinvalue$steps)
int_avg<-tapply(df_stepping$steps, df_stepping$interval, mean, na.rm=TRUE, simplify=T)
df_addinvalue$steps[ndx]<-int_avg[as.character(df_addinvalue$interval[ndx])]
head(df_addinvalue)
```

```
##      steps      date interval
## 1 1.7169811 2012-10-01        0
## 2 0.3396226 2012-10-01        5
## 3 0.1320755 2012-10-01       10
## 4 0.1509434 2012-10-01       15
```

```
## 5 0.0754717 2012-10-01      20
## 6 2.0943396 2012-10-01      25

#Histogram with missing data numbers
stepsdaymiss <- tapply(df_addinvalue$steps, df_addinvalue$date, sum, na.rm=TRUE, simplify =T)
stepsdaymiss

## 2012-10-01 2012-10-02 2012-10-03 2012-10-04 2012-10-05 2012-10-06 2012-10-07
## 10766.19 126.00 11352.00 12116.00 13294.00 15420.00 11015.00
## 2012-10-08 2012-10-09 2012-10-10 2012-10-11 2012-10-12 2012-10-13 2012-10-14
## 10766.19 12811.00 9900.00 10304.00 17382.00 12426.00 15098.00
## 2012-10-15 2012-10-16 2012-10-17 2012-10-18 2012-10-19 2012-10-20 2012-10-21
## 10139.00 15084.00 13452.00 10056.00 11829.00 10395.00 8821.00
## 2012-10-22 2012-10-23 2012-10-24 2012-10-25 2012-10-26 2012-10-27 2012-10-28
## 13460.00 8918.00 8355.00 2492.00 6778.00 10119.00 11458.00
## 2012-10-29 2012-10-30 2012-10-31 2012-11-01 2012-11-02 2012-11-03 2012-11-04
## 5018.00 9819.00 15414.00 10766.19 10600.00 10571.00 10766.19
## 2012-11-05 2012-11-06 2012-11-07 2012-11-08 2012-11-09 2012-11-10 2012-11-11
## 10439.00 8334.00 12883.00 3219.00 10766.19 10766.19 12608.00
## 2012-11-12 2012-11-13 2012-11-14 2012-11-15 2012-11-16 2012-11-17 2012-11-18
## 10765.00 7336.00 10766.19 41.00 5441.00 14339.00 15110.00
## 2012-11-19 2012-11-20 2012-11-21 2012-11-22 2012-11-23 2012-11-24 2012-11-25
## 8841.00 4472.00 12787.00 20427.00 21194.00 14478.00 11834.00
## 2012-11-26 2012-11-27 2012-11-28 2012-11-29 2012-11-30
## 11162.00 13646.00 10183.00 7047.00 10766.19

hist(x=stepsdaymiss, col="blue", breaks =20, xlab="Daily Total Steps", ylab="Frequency", main="The Dist. of Daily Total Steps")

#Mean of steps
mean(stepsdaymiss)

## [1] 10766.19

#Median of steps
median(stepsdaymiss)

## [1] 10766.19

#The mean is the same and the median changed to to be closer to the mean

#Are there differences in activity patterns between weekdays and weekends?

isitweekday<-function(d){wd<-weekdays(d)
ifelse (wd=="Saturday" | wd=="Sunday", "weekend", "weekday")}

wx<-sapply(df_addinvalue$date, isitweekday)
df_addinvalue$wk<-as.factor(wx)
head(df_addinvalue)

##      steps      date interval      wk
## 1 1.7169811 2012-10-01         0 weekday
## 2 0.3396226 2012-10-01         5 weekday
## 3 0.1320755 2012-10-01        10 weekday
## 4 0.1509434 2012-10-01        15 weekday
## 5 0.0754717 2012-10-01        20 weekday
```

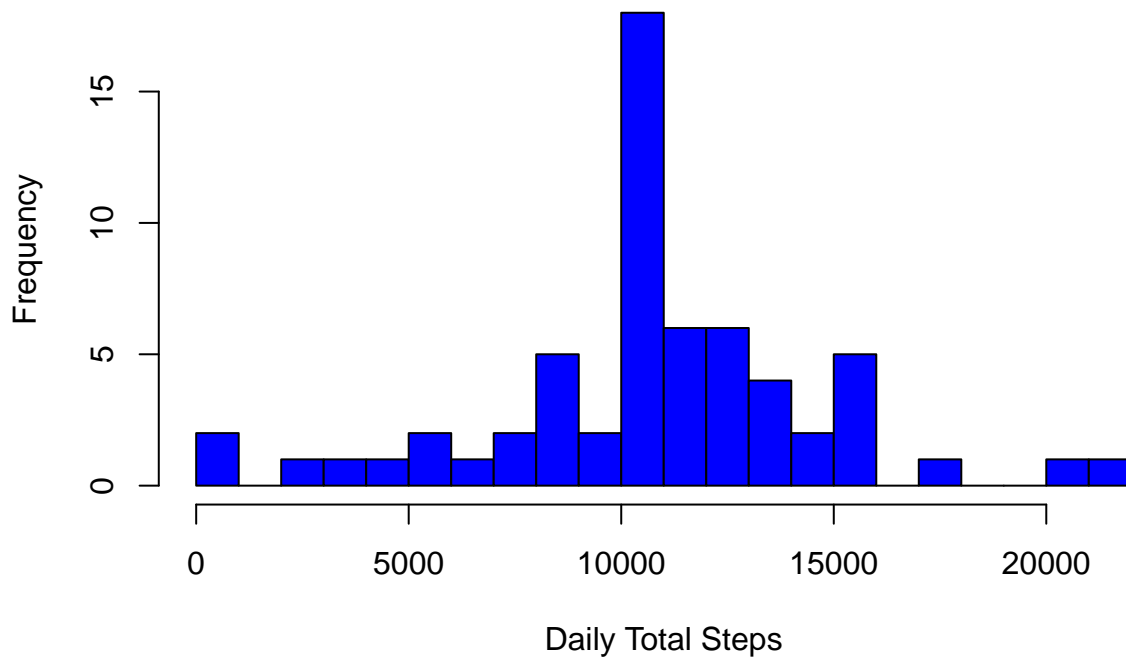
```
## 6 2.0943396 2012-10-01      25 weekday
```

```
#Panel plot with time series plot of the 5 minute interval
```

```
wk_df <- aggregate(steps ~ wk+interval, data=df_addinvalue, FUN=mean)
```

```
library(lattice)
```

The Distribution of Daily Total Steps



```
xyplot(steps ~ interval | factor(wk),  
        layout = c(1, 2),  
        xlab="Interval",  
        ylab="Number of steps",  
        type="l",  
        lty=1,  
        data=wk_df)
```

