Reproducible Research Week 2 Project

Loading and preprocessing the data

Load the data Process/transform the data (if necessary) into a format suitable for your analysis

```
# download file from web

download.file("https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2Factivity.zip", destfile = "activity.zip", mode="wb")

# unzip data and read

unzip("activity.zip")

stepdata <- read.csv("activity.csv", header = TRUE)

head(stepdata)
```

```
##   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
```

1. Calculate total number of steps taken each day

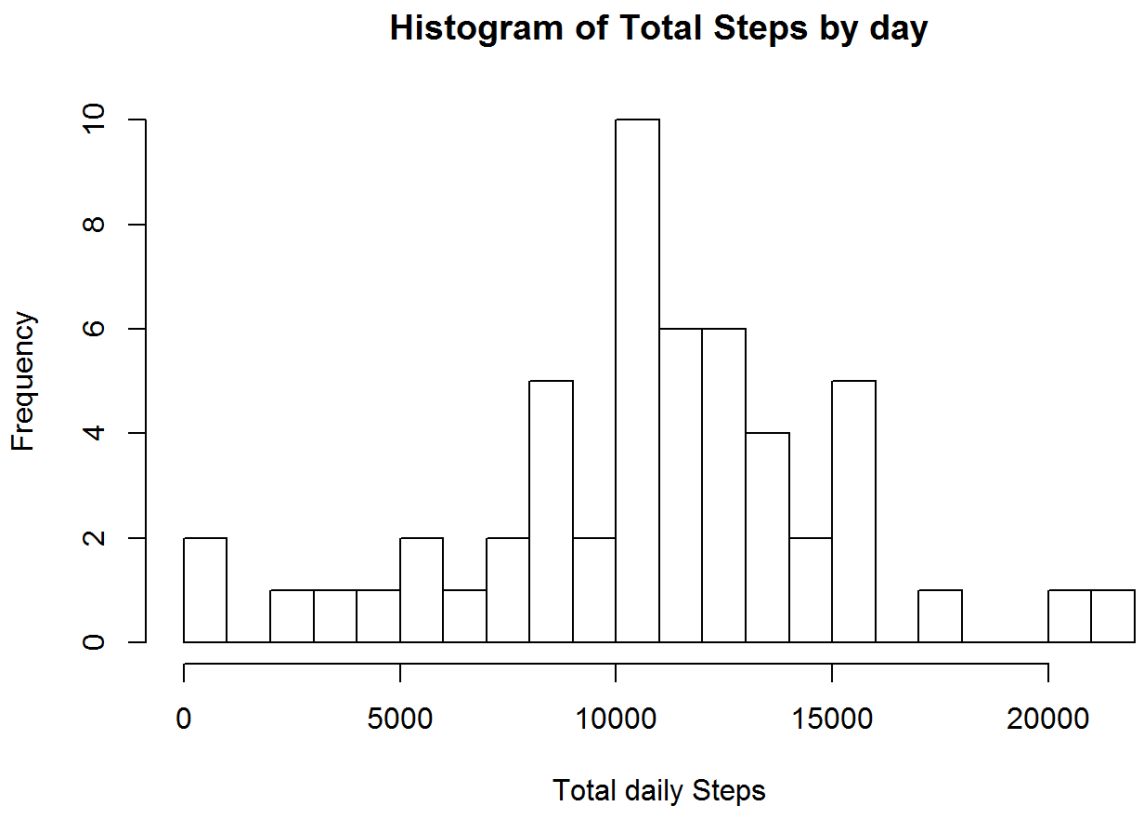
```
library(magrittr)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
databydate <- stepdata %>% select(date, steps) %>% group_by(date) %>% summari
ze(tsteps= sum(steps)) %>%na.omit()

hist(databydate$tsteps, xlab = "Total daily Steps",main="Histogram of Total S
teps by day", breaks = 20)
```



2. Calculate and report the mean and median of the total number of steps taken per day

```
mean(databydate$tsteps)
```

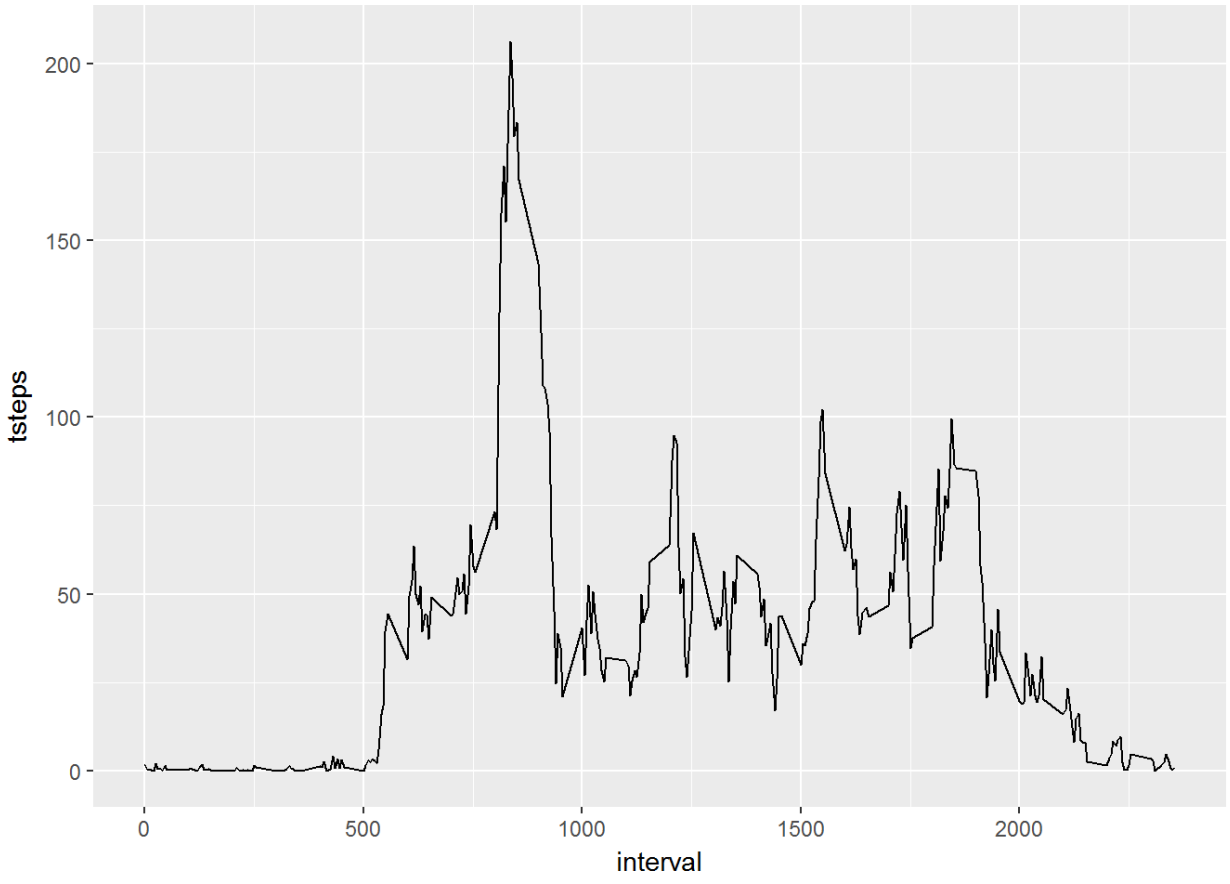
```
## [1] 10766.19
```

```
median(databydate$tsteps)
```

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

4. Time series plot

```
library(ggplot2)

databyinterval <- stepdata%>% select(interval, steps) %>% na.omit() %>% group
_by(interval) %>% summarize(tsteps= mean(steps))

ggplot(databyinterval, aes(x=interval, y=tsteps))+ geom_line()
```



5.The 5-minute interval that, on average, contains the maximum number of steps

```
databyinterval[which(databyinterval$tsteps== max(databyinterval$tsteps)),]
```

```
## # A tibble: 1 x 2
##   interval   tsteps
##      <int>    <dbl>
## 1      835 206.1698
```

Imputing missing values

1. Calculate and report the total number of missing values in the dataset (i.e. the total number of rows with NAs)

```
# generate listing of NA's
missingVals <- sum(is.na(data))
```

```
## Warning in is.na(data): is.na() applied to non-(list or vector) of type
## 'closure'
```

```
missingVals
```

```
## [1] 0
```

2.Devise a strategy for filling in all of the missing values in the dataset. The strategy does not need to be sophisticated. For example, you could use the mean/median for that day, or the mean for that 5-minute interval, etc.

I will use the mean for that 5 -minute interval to replace all the missing values in the dataset. At the end, I will check if all the NAs have been replaced

```
library(magrittr)
library(dplyr)


replacewithmean <- function(x) replace(x, is.na(x), mean(x, na.rm = TRUE))
meandata <- stepdata%>% group_by(interval) %>% mutate(steps= replacewithmean(steps))
head(meandata)
```

```
## # A tibble: 6 x 3
## # Groups:   interval [6]
##       steps       date interval
##       <dbl>     <fctr>    <int>
## 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
```

4 Make a histogram of the total number of steps taken each day and Calculate and report the mean and median total number of steps taken per day.

```
FullSummedDataByDay <- aggregate(meandata$steps, by=list(meandata$date), sum)


names(FullSummedDataByDay)[1] ="date"
names(FullSummedDataByDay)[2] ="totalsteps"
head(FullSummedDataByDay,15)
```

```
##          date totalsteps
## 1  2012-10-01   10766.19
## 2  2012-10-02     126.00
```

```
## 3  2012-10-03   11352.00
## 4  2012-10-04   12116.00
## 5  2012-10-05   13294.00
## 6  2012-10-06   15420.00
## 7  2012-10-07   11015.00
## 8  2012-10-08   10766.19
## 9  2012-10-09   12811.00
## 10 2012-10-10    9900.00
## 11 2012-10-11   10304.00
## 12 2012-10-12   17382.00
## 13 2012-10-13   12426.00
## 14 2012-10-14   15098.00
## 15 2012-10-15   10139.00
```

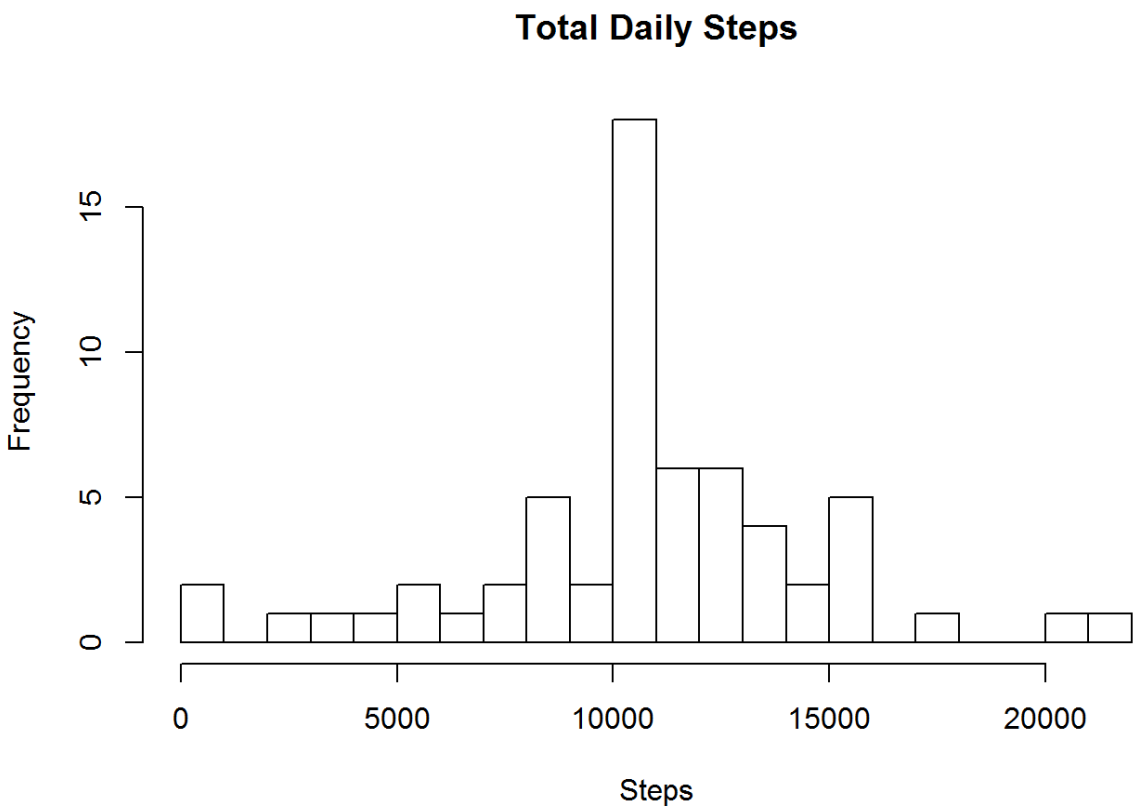
Summary of new data : mean & median

```
summary(FullSummedDataByDay)
```

```
##          date      totalsteps
##  2012-10-01: 1   Min.   :   41
##  2012-10-02: 1   1st Qu.: 9819
##  2012-10-03: 1   Median :10766
##  2012-10-04: 1   Mean   :10766
##  2012-10-05: 1   3rd Qu.:12811
##  2012-10-06: 1   Max.   :21194
##  (Other)   :55
```

Making a histogram

```
hist(FullSummedDataByDay$totalsteps, xlab = "Steps", ylab = "Frequency", main
= "Total Daily Steps", breaks = 20)
```



4C Compare the mean and median of Old and New data

```
oldmean <- mean(databydate$tsteps, na.rm = TRUE)
newmean <- mean(FullSummedDataByDay$totalsteps)
# Old mean and New mean
oldmean
```

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

```
newmean
```

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

```
oldmedian <- median(databydate$tsteps, na.rm = TRUE)

newmedian <- median(FullSummedDataByDay$totalsteps)

# Old median and New median

oldmedian
```

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

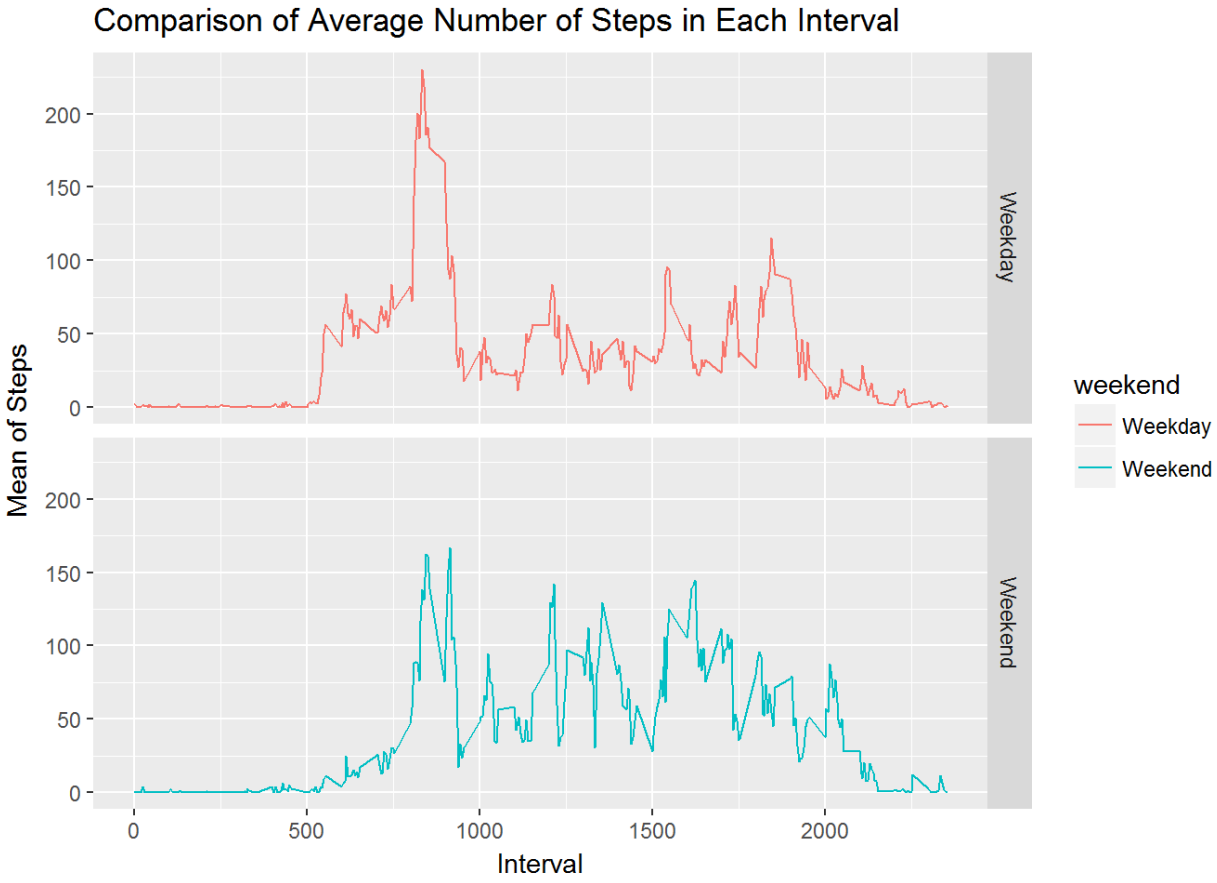
```
newmedian
```

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

Are there differences in activity patterns between weekdays and weekends?

```
meandata$date <- as.Date(meandata$date)

meandata$weekday <- weekdays(meandata$date)

meandata$weekend <- ifelse(meandata$weekday=="Saturday" | meandata$weekday=="
Sunday", "Weekend", "Weekday" )
```

```
library(ggplot2)

meandataweekendweekday <- aggregate(meandata$steps , by= list(meandata$weeken
d, meandata$interval), na.omit(mean))

names(meandataweekendweekday) <- c("weekend", "interval", "steps")


ggplot(meandataweekendweekday, aes(x=interval, y=steps, color=weekend)) + geo
m_line()+

facet_grid(weekend ~.) + xlab("Interval") + ylab("Mean of Steps") +

    ggtitle("Comparison of Average Number of Steps in Each Interval")
```


Comparison of Average Number of Steps in Each Interval
Mean of Steps
Interval
Weekday
Weekend
0
50
100
150
200
500
1000
1500
2000
weekend
Weekday
Weekend