Reproducible Research: Peer Assessment 1

Loading and preprocessing the data

```
activity <-read.csv("activity.csv",stringsAsFactors = FALSE)
str(activity)
```

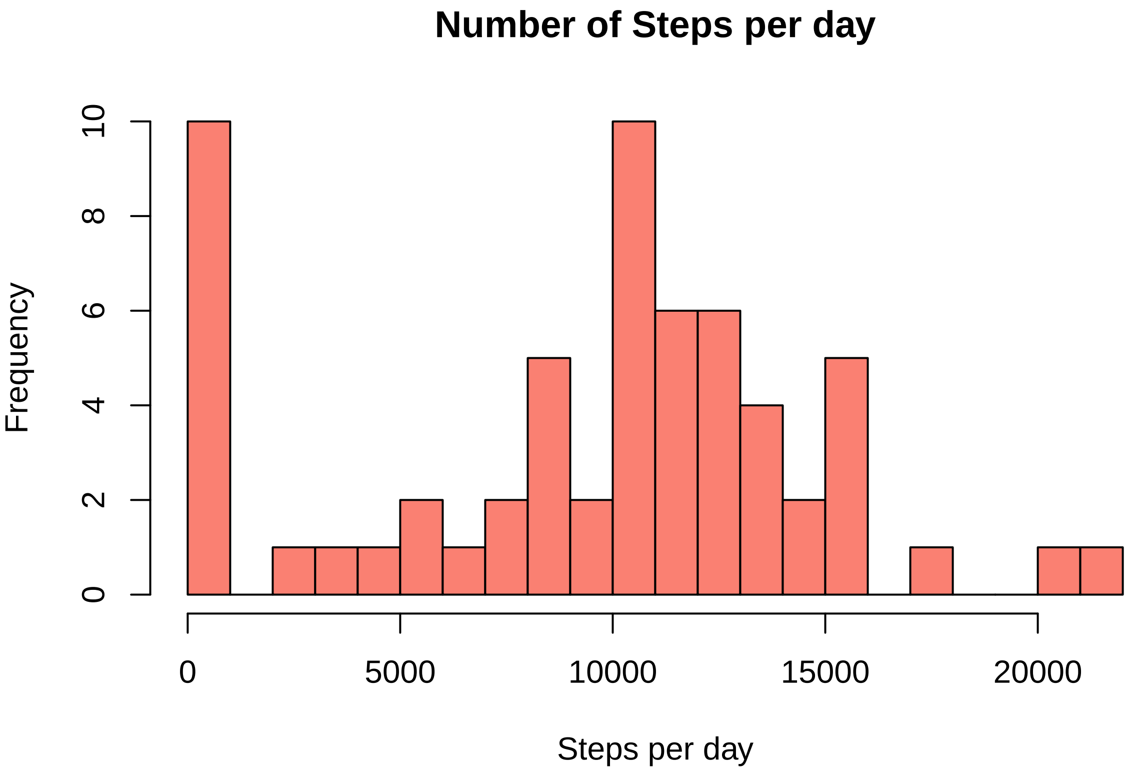
```
'data.frame':   17568 obs. of  3 variables:
 $ steps   : int  NA NA NA NA NA NA NA NA NA NA ...
 $ date    : chr  "2012-10-01" "2012-10-01" "2012-10-01" "2012-10-01" ...
 $ interval: int  0 5 10 15 20 25 30 35 40 45 ...
```

```
activity$date = as.Date(activity$date,"%Y-%m-%d")
```

Total Number of steps per day

Histogram Plot

```
activity.day.steps <- aggregate(activity$steps,
                                by = list(activity$date),
                                FUN = "sum",na.rm = TRUE)

h1 <- hist(activity.day.steps[,2],xlab="Steps per day",
           main ="Number of Steps per day",
           col ="salmon",breaks =20)
```



Mean and Median steps per day

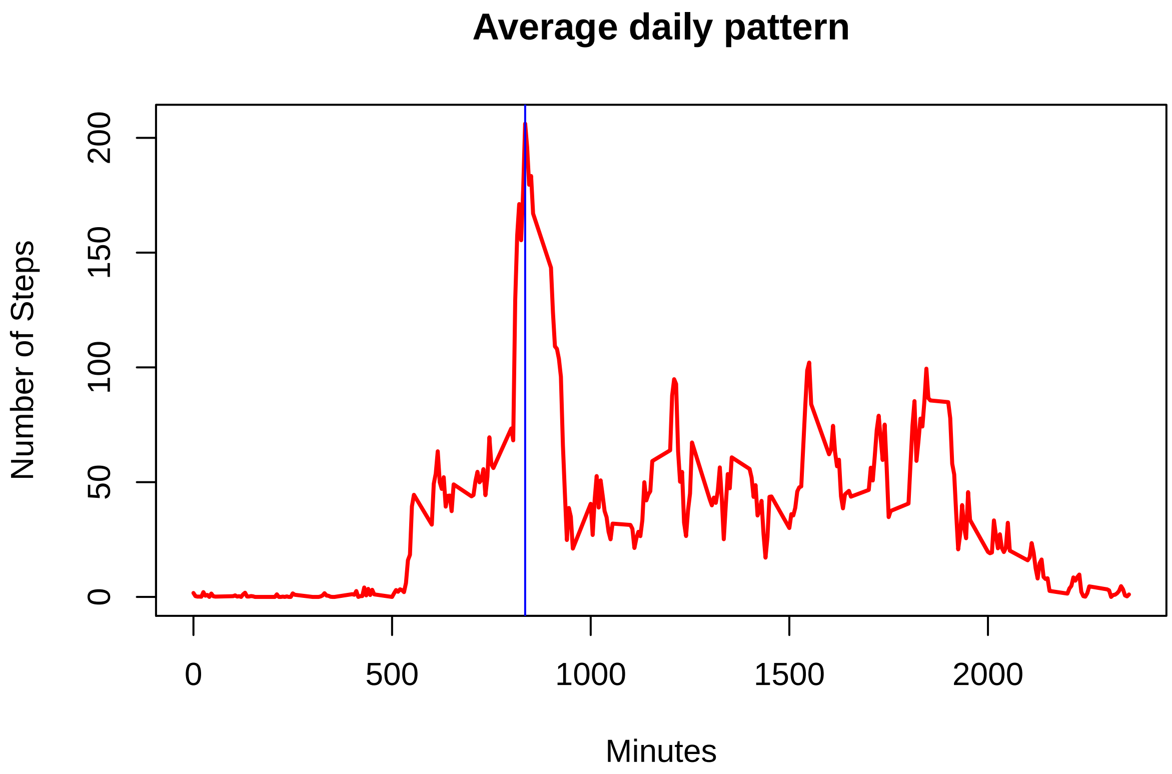
```
mean.total.steps <- round(mean(activity.day.steps[,2]),2)
median.total.steps <- round(median(activity.day.steps[,2]),2)
tab <- data.frame(Mean = mean.total.steps,Median = median.total.steps)
kable(tab)
```

Mean	Median
9354.23	10395

Average daily Activity Pattern

Time Series Plot

```
activity.time.steps <- aggregate(activity$steps, by = list(activity$interval),FUN = "mean",na.rm = TRUE)
names(activity.time.steps) <- c("Interval","AvgSteps")
Max.5 <- activity.time.steps[activity.time.steps$AvgSteps == max(activity.time.steps$AvgSteps),1 ]

plot(x = activity.time.steps$Interval,y = activity.time.steps$AvgSteps,
     type = 'l',main = "Average daily pattern",
     xlab = "Minutes",ylab = "Number of Steps",col = "red",lwd=2 )
abline(v = Max.5,col = "blue",lwd =1)
```



5

minute interval with maximum number of steps is at : 835 mins

Imputing missing values

```
NumNA <- sum(is.na(activity$steps))
```

The total number of rows with NAs is 2304

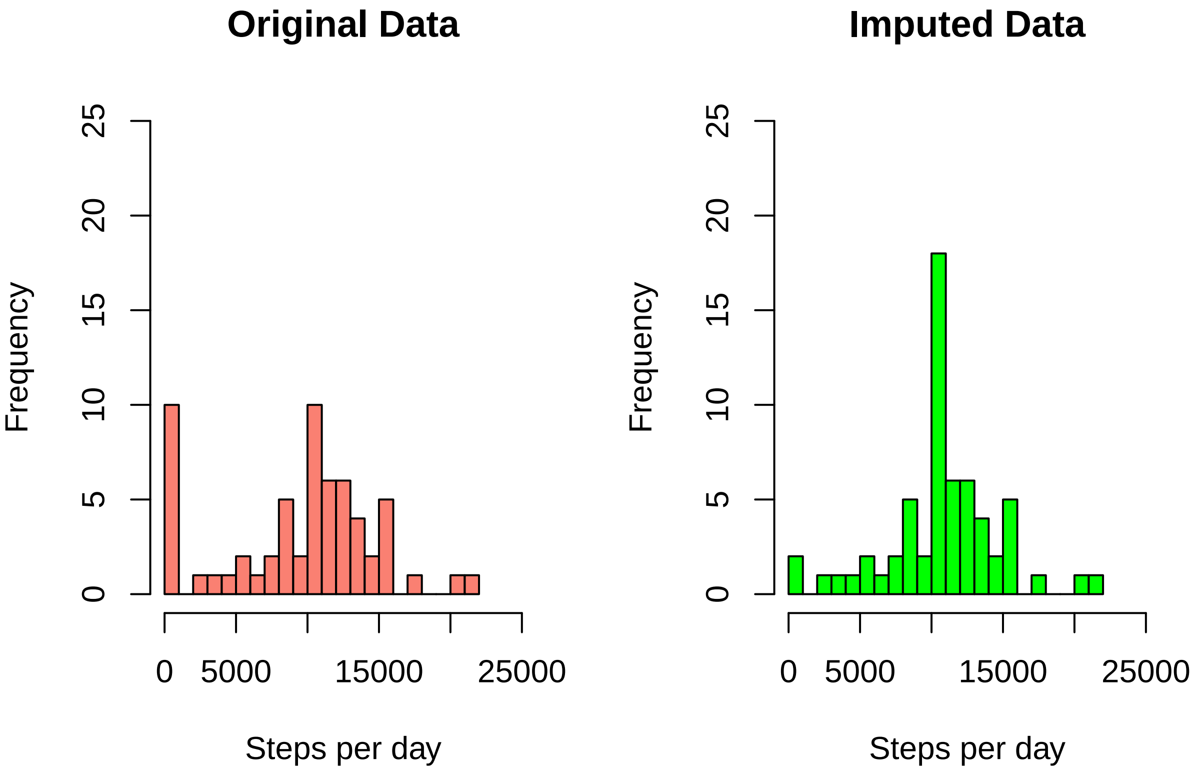
Creating a data set after imputing data

Impute Strategy is to replace NA values for any 5 minute interval with the average value for that 5 minute interval across all days

```
impute <- function(v){
    if(is.na(v$steps)){
        v$steps = activity.time.steps[activity.time.steps$Interval==v$interval,2]
    }
    else{
        v$steps = v$steps
    }
    return(v$steps)
}

clean.steps = as.vector(NULL)

for (i in seq(1:nrow(activity))){
    clean.steps[i] <- impute(activity[i,])
}

activity.clean <-cbind(activity,clean.steps)
```

Comparison of histograms after imputing data

```
activity.day.clean <- aggregate(activity.clean$clean.steps,
                                     by = list(activity.clean$date),
                                     FUN = "sum")

par(mfrow=c(1,2))
h1 <- hist(activity.day.steps[,2],
           xlab="Steps per day",main ="Original Data",
           col ="salmon",breaks =20,xlim = c(0,25000),ylim = c(0,25))

h2 <- hist(activity.day.clean[,2],
           xlab="Steps per day",main ="Imputed Data",
           col ="green",breaks =20,xlim = c(0,25000),ylim = c(0,25))
```

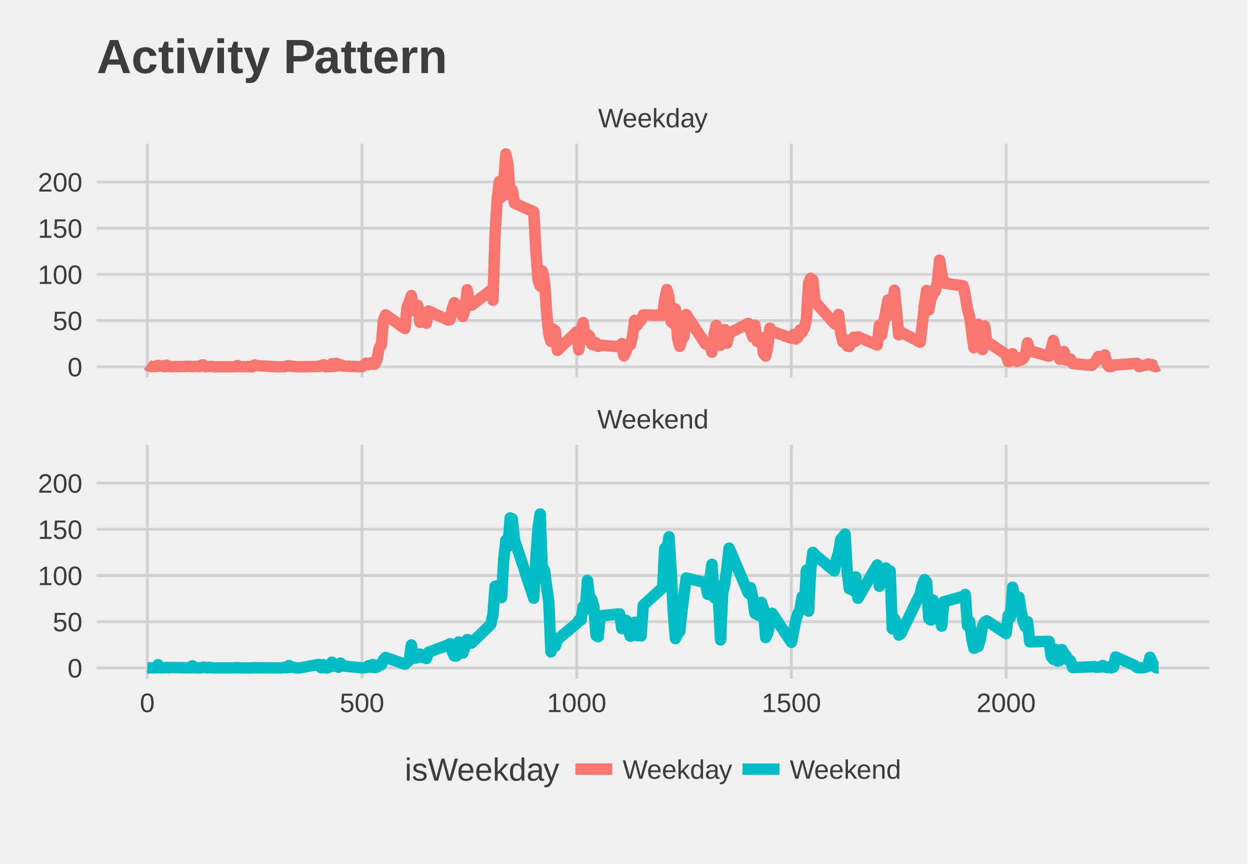


Mean and Median Steps per day: Original data vs imputed data

	Mean	Median
Original Data	9354.23	10395.00
Imputed Data	10766.19	10766.19

Weekday vs Weekend Activity Pattern

```
activity.time.clean <- as.tbl(activity.clean) %>%
    mutate(isWeekday = ifelse(weekdays(date) %in% c("Saturday","Sunday"),"Weekend","Weekday"))%>%
    mutate(isWeekday=as.factor(isWeekday))%>%
    group_by(isWeekday,interval)%>%
    summarize(AvgSteps = mean(clean.steps))%>%
    select(interval,AvgSteps,isWeekday)


g <- ggplot(activity.time.clean) +
    geom_line(aes(x= interval, y=AvgSteps, col = isWeekday),size =2) +
    labs( x = "Time Interval(in mins)", y="Average Steps",title ="Activity Pattern") +
    facet_wrap(facets = ~ isWeekday,nrow=2)+
    theme_fivethirtyeight()

print(g)
```


Activity Pattern
Weekday
200
150
100
50
0
Weekend
200
150
100
50
0
0
500
1000
1500
2000
isWeekday
Weekday
Weekend