# peerass1.Rmd

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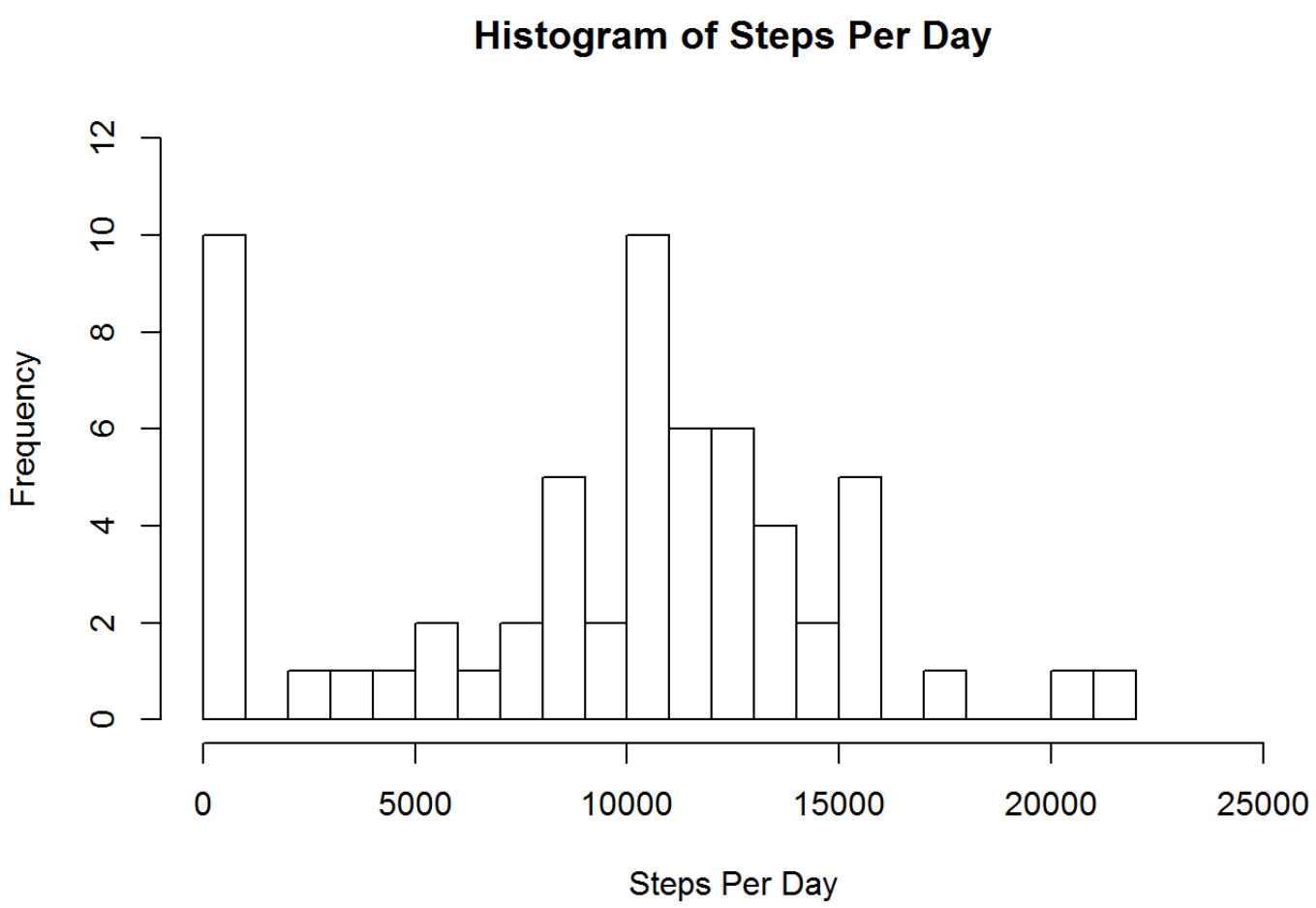
# Loading and preprocessing the data

```
#setwd("C:/Users/vannem.han/OneDrive/2_Coursera/JHU_Repro_Res/PeerAssess/1")
OriginalData <- read.csv(file="activity.csv", head=TRUE, sep=",")
```

# What is mean total number of steps taken per day?

```
Mydata <- OriginalData
Date <- Mydata[,2]
DateTable <- table(Date)

NumIntervalPerDay <- DateTable[1] #each day has 288 intervals
NumDate <- length(DateTable) #It has 61 days

StepsPerDay <- rep(0, NumDate)

Mydata[which(is.na(Mydata[,1])),1]=0 #set na to 0

for(i in 1:NumDate)
  StepsPerDay[i] = sum(Mydata[(1+NumIntervalPerDay*(i-1)):(NumIntervalPerDay+NumIntervalPerDay*(i-1)),1])

hist(StepsPerDay, breaks=30, xlab="Steps Per Day", main="Histogram of Steps Per Day", xlim=c(0,25000), ylim=c(0,12))
```




```
mean(StepsPerDay)
```

```
## [1] 9354.23
```

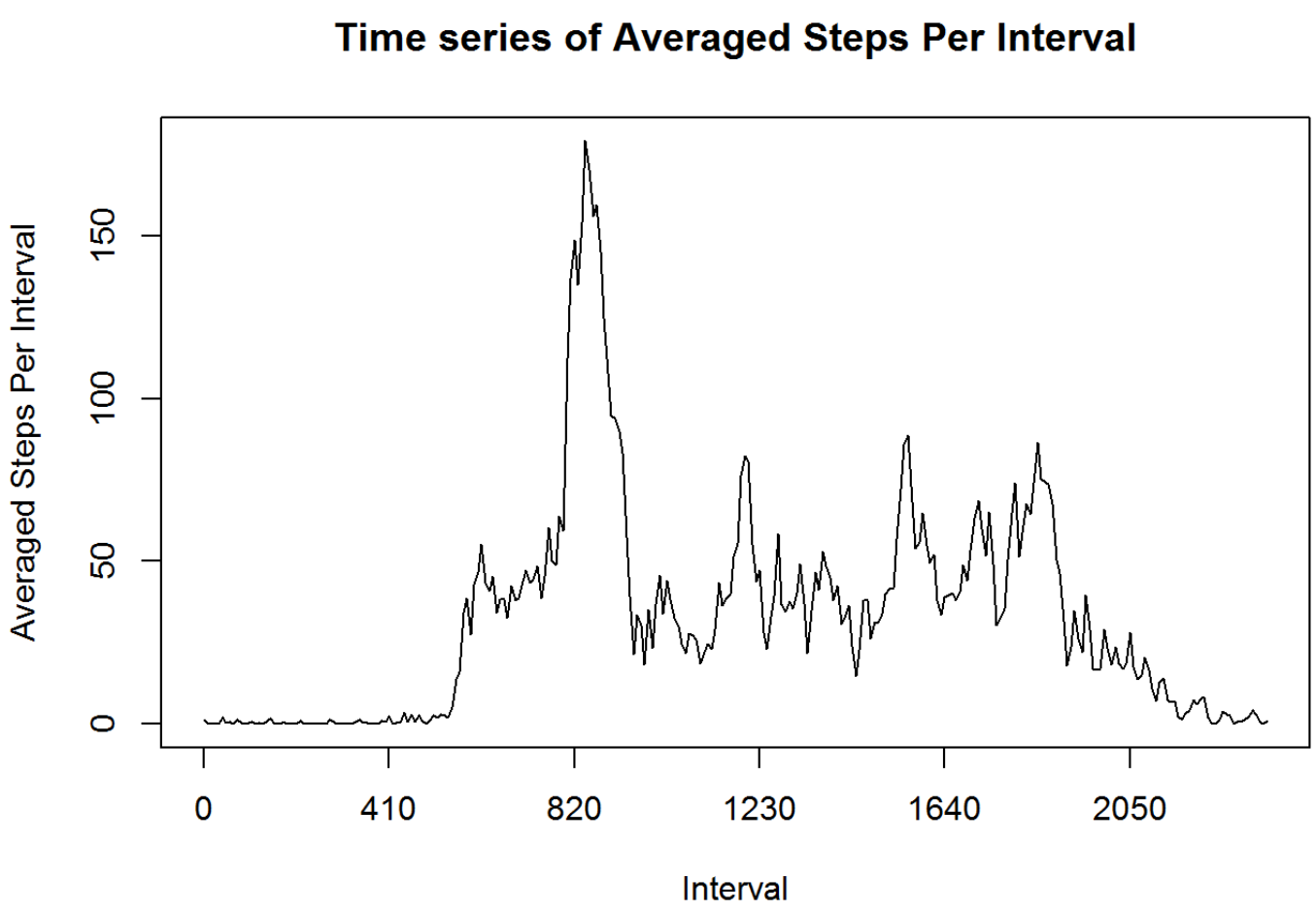
```
median(StepsPerDay)
```

```
## [1] 10395
```

2. The above pic is the histogram of the total number of steps taken each day.
3. The mean and median of the otal number of steps taken per day is 9354.23 and 10395.

# What is the average daily activity pattern?

```
StepsPerInterval <- rep(0, NumIntervalPerDay)

for(i in 1:NumIntervalPerDay)
  StepsPerInterval[i] = sum(Mydata[seq(from=i, to=i+NumIntervalPerDay*(NumDate-1), by=NumIntervalPerDay),1])/NumDate

Interval <- Mydata[,3]
IntervalTable <- table(Interval)
IntervalNames <- names(IntervalTable) #interval names like 0 5 10 ... for plot

StepsPerInterval <- ts(StepsPerInterval)
plot(StepsPerInterval,xaxt='n', main="Time series of Averaged Steps Per Interval", ylab="Averaged Steps Per Interval", xlab="Interval
")
axis(1, at=seq(1,NumIntervalPerDay,50),labels=IntervalNames[seq(1,NumIntervalPerDay,50)])
```




```
#max(StepsPerInterval)
#which.max(StepsPerInterval)   #This-th 5 minute interval
IntervalNames[which.max(StepsPerInterval)] #This 5 minute interval
```

```
## [1] "835"
```

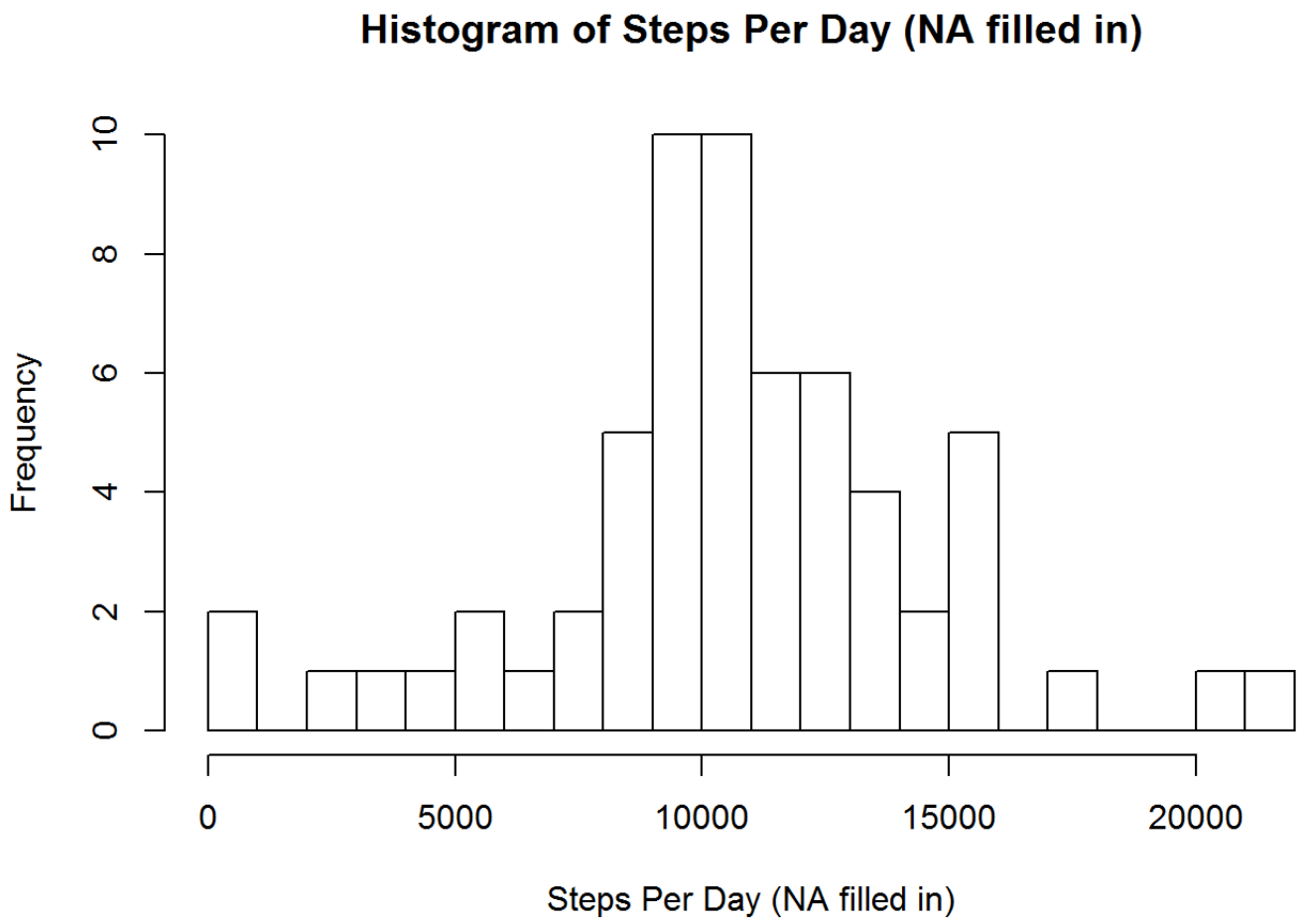
1. The above pic is the time series plot of the 5-minute interval and the average number of steps taken, averaged across all days.
2. The 835-th 5-minute interval, on average across all the days, contains the maximum number of steps.

# Imputing missing values

```
Mydata <- OriginalData
sum(is.na(Mydata[,1])) #the total number of missing values
```

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

```
NAposition = which(is.na(Mydata[,1]))

for(i in NAposition)
  Mydata[i,1] = StepsPerInterval[which(IntervalNames==Mydata[i,3])]  #My strategy: the mean for that 5-minute interval

StepsPerDay_fillin <- rep(0, NumDate)

for(i in 1:NumDate)
  StepsPerDay_fillin[i] = sum(Mydata[(1+NumIntervalPerDay*(i-1)):(NumIntervalPerDay+NumIntervalPerDay*(i-1)),1])

hist(StepsPerDay_fillin, breaks=30, xlab="Steps Per Day (NA filled in)", main="Histogram of Steps Per Day (NA filled in)")
```




```
mean(StepsPerDay_fillin)
```

```
## [1] 10581.01
```

```
median(StepsPerDay_fillin)
```

```
## [1] 10395
```

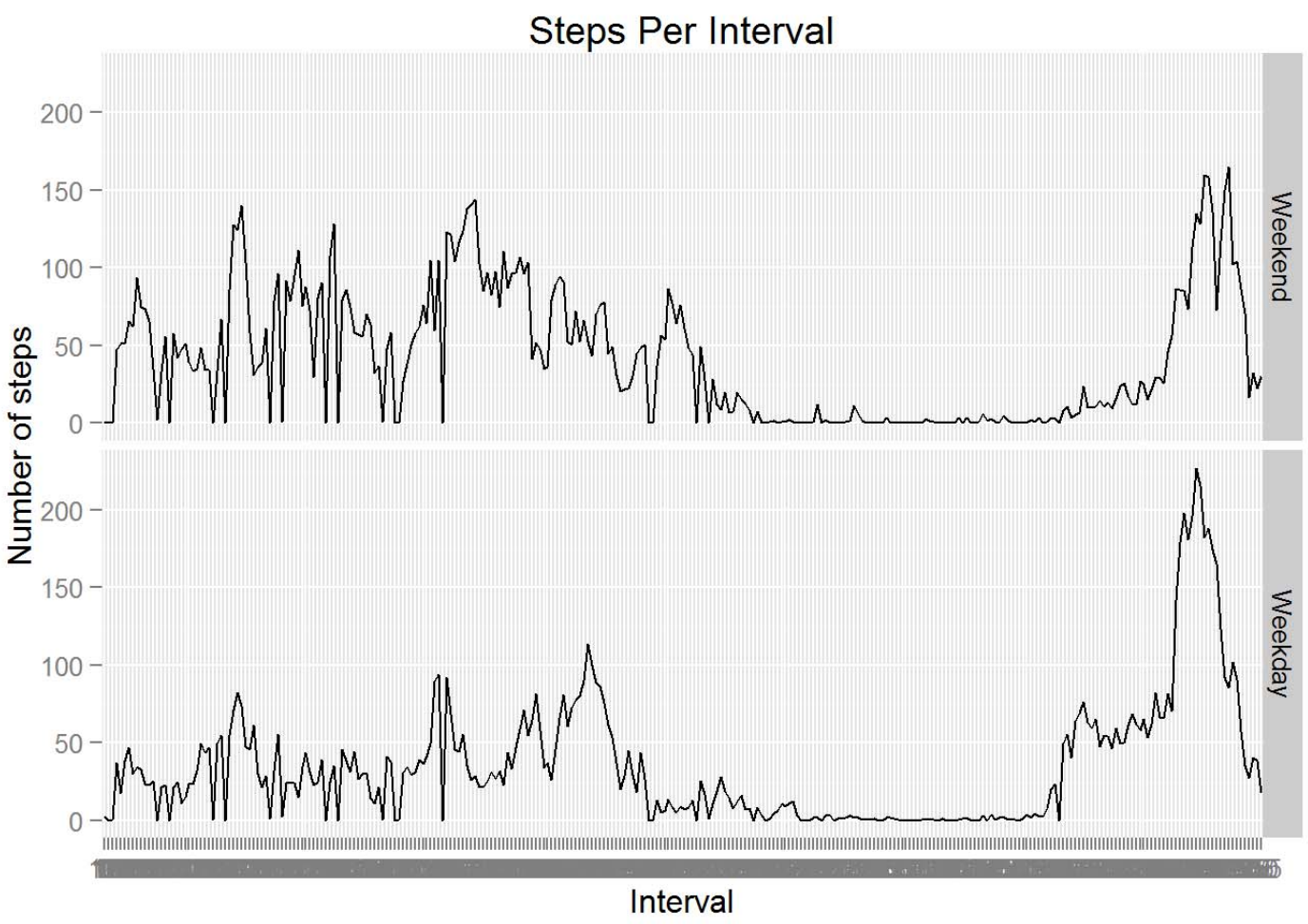
1. 2304 is the total number of missing values in the dataset.
2. I use the mean for that 5-minute interval for filling in all of the missing values in the dataset.
3. The mean and median of the NA-filled dataset is 10581.01 and 10395. The mean value is different from the previou one, while the median value is still the same. This is because I use the mean for that 5-minute interval to fill in the NA. When calculating mean value, the denominator doesn't change and the numerator increases. The number of values being equal to median increases, while the value doesn't change which is still the mean.

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

```
Sys.setlocale("LC_TIME", "English") #set weekdays to be in English language
```

```
## [1] "English_United States.1252"
```

```
DateNames <- names(DateTable)

DayorEnd <- weekdays(as.Date(DateNames))
Seq_end <- c(which(DayorEnd=="Saturday"),which(DayorEnd=="Sunday"))

DayorEnd[Seq_end] = "weekend"
DayorEnd[which(DayorEnd!="weekend")] = "weekday"
DayorEnd = factor(DayorEnd)

Weekend <- rep(0, NumIntervalPerDay)
Weekday <- rep(0, NumIntervalPerDay)
NumDate_end <- length(Seq_end)
NumDate_day <- NumDate - NumDate_end

for(i in 1:NumIntervalPerDay)
{ DateOneInterval <- seq(from=i, to=i+NumIntervalPerDay*(NumDate-1), by=NumIntervalPerDay)#coresponse to DateNames and DayorEnd.

  Weekend[i] = sum(Mydata[DateOneInterval[Seq_end],1])/NumDate_end
  Weekday[i] = sum(Mydata[DateOneInterval[-Seq_end],1])/NumDate_day
}

df <- data.frame(IntervalNames, Weekend, Weekday)
library(reshape2)
mm <- melt(df,id.var="IntervalNames")
library(ggplot2)
ggplot(mm, aes(IntervalNames, value, group=1)) +
#geom_point() +
geom_line() +
facet_grid(variable~.) +
labs(x="Interval",y="Number of steps",title="Steps Per Interval")
```




2. The above pic is the panel plot containing a time series plot of the 5 minutes interval (x-axis) and the average number of steps taken, averaged across all weekday days or weekend days (y-axis).