

## STATISTICS

THE ART & SCIENCE OF LEARNING FROM DATA

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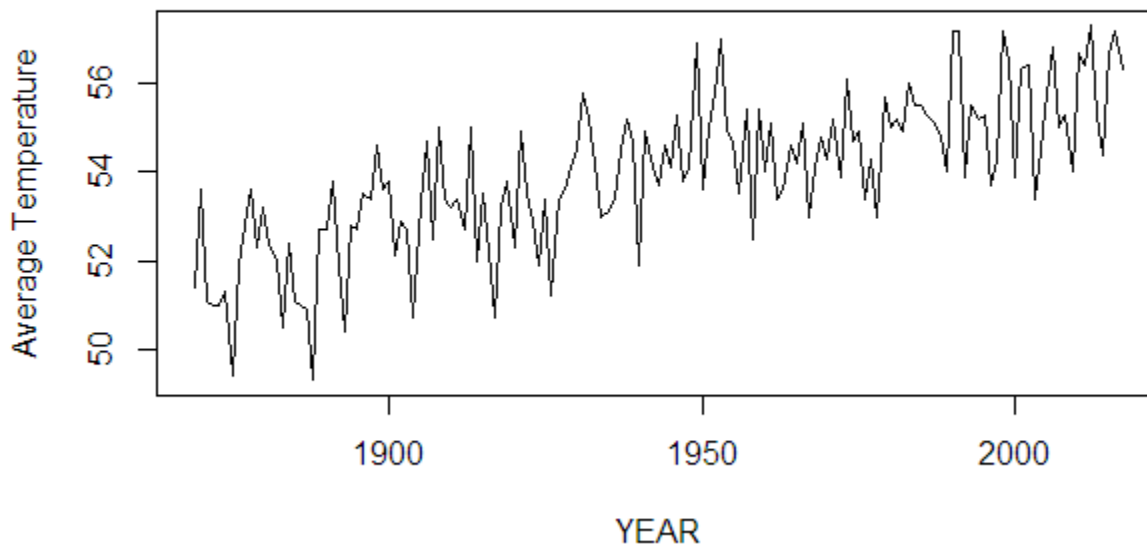
# Chapter 2

## Example 9: Warming Trends in NYC – Time Trends

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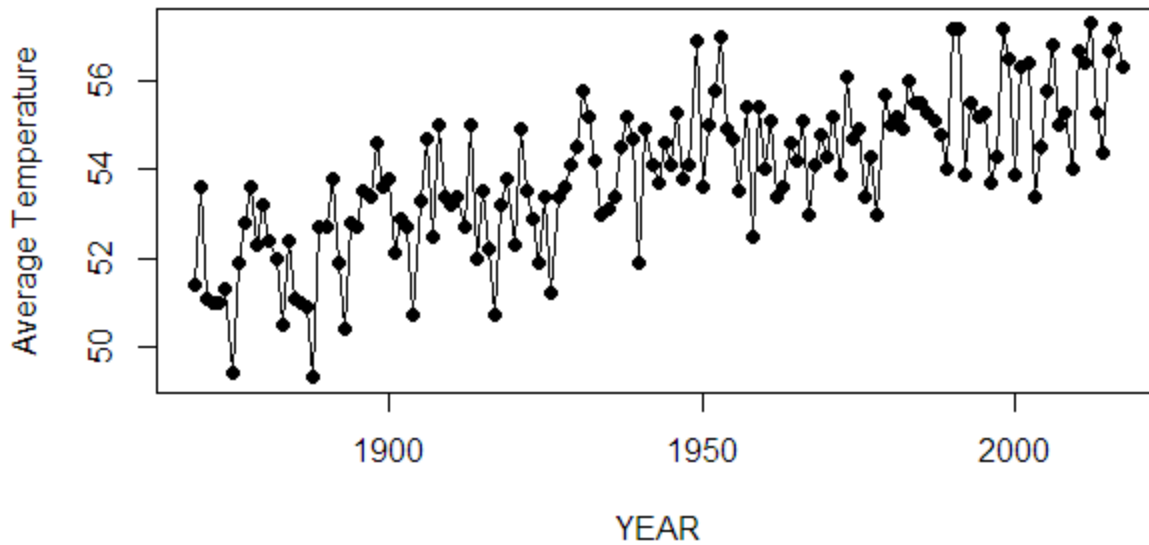
```
> # Read in dataset (using updated version):  
> temps <- read.csv('http://www.artofstats.com/data/chapter2/central_park_yearly  
_temps_upto2017.csv')  
> attach(temps) # so we can refer to variable names  
  
> # Basic Time Plot:  
> plot(x=YEAR, y=ANNUAL, type='l', ylab='Average Temperature', main='Annual Aver  
age Temperature in Central Park (1869-2017)')
```

### Annual Average Temperature in Central Park (1869-2017)



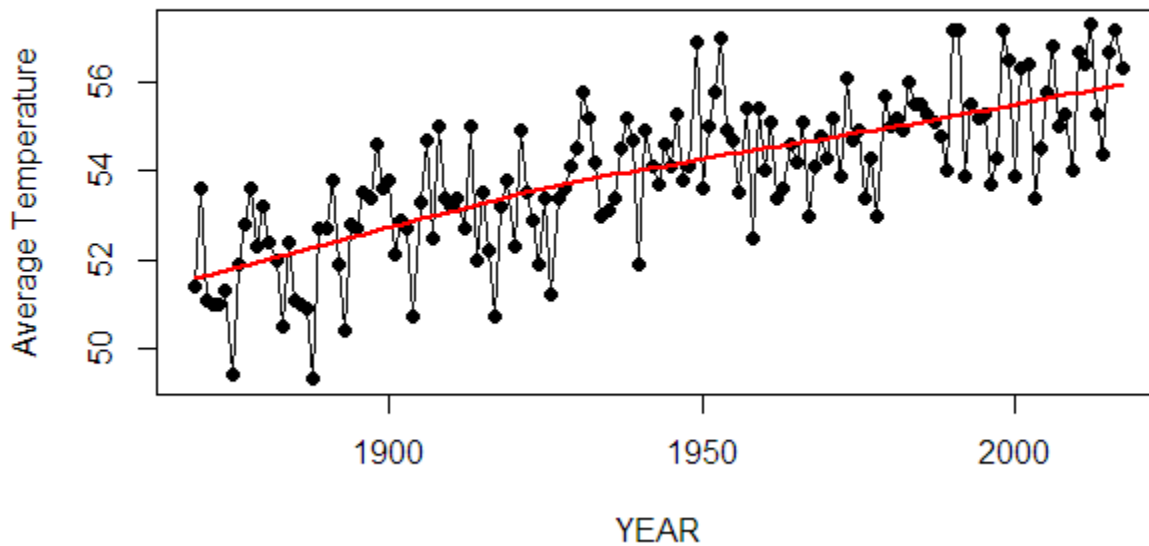
```
> # Include Points:  
> plot(x=YEAR, y=ANNUAL, type='o', pch=19, ylab='Average Temperature', main='Ann  
ual Average Temperature in Central Park (1869-2017)')
```

## Annual Average Temperature in Central Park (1869-2017)



```
> # Include Smooth Trend Line:  
> scatter.smooth(x=YEAR, y=ANNUAL, type='o', pch=19, lpar=list(col='red', lwd=2), ylab='Average Temperature', main='Annual Average Temperature in Central Park (1869-2017)')
```

## Annual Average Temperature in Central Park (1869-2017)



```

> # For more fine tuning, it is better to use the ggplot2 library.
> # If you haven't installed it already, first type: install.packages(ggplot2)
> library(ggplot2)
> ggplot(data=temps, aes(x=YEAR, y=ANNUAL)) +
+   geom_point(color='blue') +
+   geom_line() +
+   geom_smooth(col='red', fill='orange') +
+   labs(y='Average Temperature', title='Annual Average Temperature in Central P
ark (1869-2017)') +
+   scale_x_continuous(breaks=seq(min(YEAR),max(YEAR),10)) +
+   theme_bw() +
+   theme(panel.grid.minor.x=element_blank())
`geom_smooth()` using method = 'loess' and formula 'y ~ x'

```

