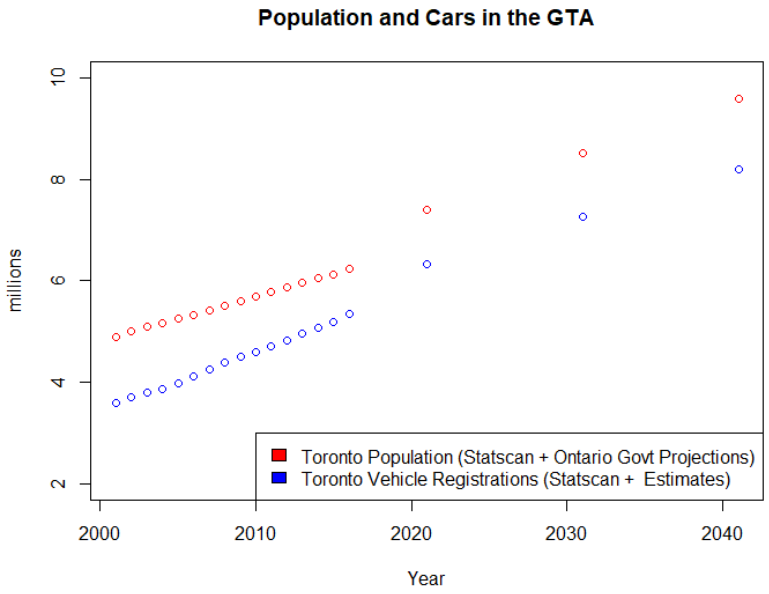
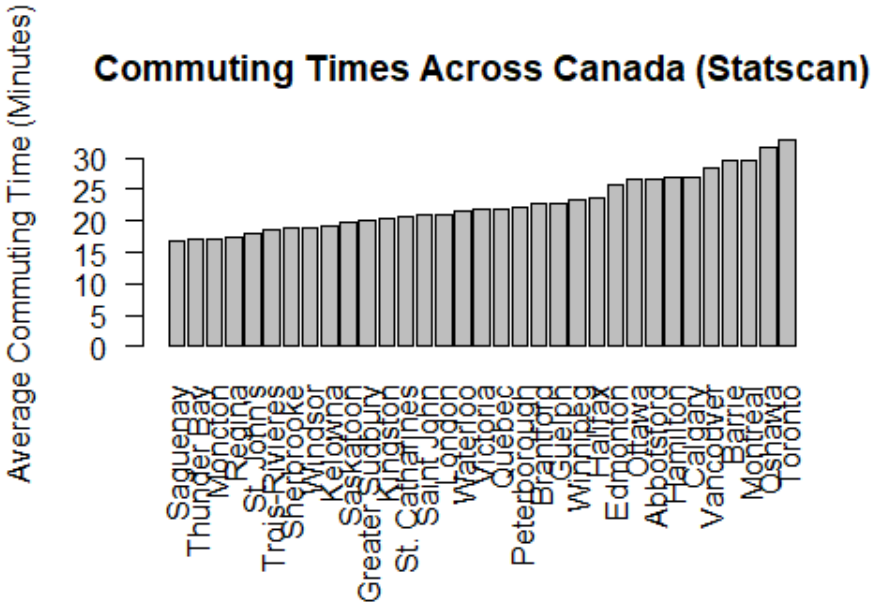
R_Graphs_and_Linear_Model_-_Veitch.R

Sun Jan 28 21:18:04 2018

```
setwd("####")

# IMPORT LIBRARIES NEEDED
import_libraries <- function(){
  library(dplyr)
  library(chron)
  library(plotly)
  library(ggplot2)
  library(gridExtra)
}

import_libraries()

# Chart of Population/Cars in GTA

ont_population <- read.csv("ont_population.csv")
plot(ont_population$Year, ont_population$Toronto.Population/1000000, xlab = "Year",
ylab="millions",
     ylim = c(2, 10), col=c("red"), main="Population and Cars in the GTA")
points(ont_population$Year, ont_population$Estimated.Toronto.Vehicle.Registrations/1000000,
col=c("blue"))
legend("bottomright","",c("Toronto Population (Statscan + Ontario Govt Projections)",
                          "Toronto Vehicle Registrations (Statscan +  Estimates)"),
fill=c("red","blue"))
```



```r
# Chart of Canadian Communiting Times
op <- par(mar = c(10,4,4,2) + 0.1)
commute_time <- read.csv("cad_commuting_time.csv")
barplot(commute_time$Average.time,names.arg=commute_time$CMA,
        main="Commuting Times Across Canada (Statscan)",ylab="Average Commuting Time
(Minutes)",las=2)
```




```r
# Subset Road Impediments Data to Toronto
road_impediments <- read.csv("road_impediments.csv")
toronto_impediments <- subset(road_impediments, city=="Toronto" &
average_monthly_vehicles>10000 & average_acceleration > 1.5)

# Fit a linear regression
truck_accel_fit <- lm(log(toronto_impediments$average_acceleration) ~
toronto_impediments$percent_hdt)
summary(truck_accel_fit)

##
## Call:
## lm(formula = log(toronto_impediments$average_acceleration) ~
##     toronto_impediments$percent_hdt)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.22029 -0.11004 -0.05363  0.07547  0.49838
##
## Coefficients:
##                                Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     0.47728    0.07124   6.700 4.53e-10 ***
## toronto_impediments$percent_hdt  0.47697    0.27772   1.717   0.0881 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1499 on 142 degrees of freedom
```

```
## Multiple R-squared:  0.02035,    Adjusted R-squared:  0.01345
## F-statistic:  2.95 on 1 and 142 DF,  p-value: 0.08807

# Plot graph
plot(toronto_impediments$percent_hdt,log(toronto_impediments$average_acceleration),
     xlab="% Heavy Duty Trucks",  ylab="Log Average Acceleration",
     main="Toronto - Heavy Duty Trucks vs. Average Acceleration\n (Average Monthly Vehicles >
10,000, Average Acceleration > 1.5)\n log(Average Acceleration) = 0.48 +
0.48*PercentHeavyDutyTrucks", cex.main=.75 )
abline(truck_accel_fit)
```