Pricing Analytics Store Locations

```
library(glmnet)
```

```
## Warning: package 'glmnet' was built under R version 3.6.2
```

```
## Loading required package: Matrix
```

```
## Loaded glmnet 3.0-2
```

```
library(ISLR)
```

```
## Warning: package 'ISLR' was built under R version 3.6.2
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.6.2
```

```
##
## 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
```

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.6.2
```

```
SafeBabies <- Carseats %>% select("Sales", "Price", "ShelveLoc")
Good<-subset(SafeBabies, ShelveLoc=="Good")
Medium<-subset(SafeBabies, ShelveLoc=="Medium")
Bad<-subset(SafeBabies, ShelveLoc=="Bad")
```

```
#Defining the Formula for the regressions
formula=Sales~Price
```

```
#Determining The Optimal Price For Good Shelf Locations
Good_Model <- glm(formula = formula, family = "gaussian", data = Good)
Coeff_Good<-data.frame(Good_Model$coefficients, stringsAsFactors = TRUE)
Left_Good <- matrix(c(2*Coeff_Good[c(2), ]),nrow=1,ncol=1)
Right_Good <- matrix(c(Coeff_Good[c(2), ]*55 +Coeff_Good[c(1), ]-Coeff_Good[c(1), ]*5
5),nrow=1,ncol=1)
solve(Left_Good, Right_Good)
```

```
##          [,1]
## [1,] 7402.449
```

```
#Determining The Optimal Price For Medium Shelf Locations
Medium_Model <- glm(formula = formula, family = "gaussian", data = Medium)
Coeff_Medium<-data.frame(Medium_Model$coefficients, stringsAsFactors = TRUE)
Left_Medium <- matrix(c(2*Coeff_Medium[c(2), ]),nrow=1,ncol=1)
Right_Medium <- matrix(c(Coeff_Medium[c(2), ]*55 +Coeff_Medium[c(1), ]-Coeff_Medium[c
(1), ]*55),nrow=1,ncol=1)
solve(Left_Medium, Right_Medium)
```

```
##          [,1]
## [1,] 6855.854
```

```
#Determining The Optimal Price For Bad Shelf Locations
Bad_Model <- glm(formula = formula, family = "gaussian", data = Bad)
Coeff_Bad<-data.frame(Bad_Model$coefficients, stringsAsFactors = TRUE)
Left_Bad <- matrix(c(2*Coeff_Bad[c(2), ]),nrow=1,ncol=1)
Right_Bad <- matrix(c(Coeff_Bad[c(2), ]*55 +Coeff_Bad[c(1), ]-Coeff_Bad[c(1), ]*55),nr
ow=1,ncol=1)
solve(Left_Bad, Right_Bad)
```

```
##          [,1]
## [1,] 5813.247
```

```
#Plotting the Optimal Shelf Locations When Production Costs Vary For Good, Medium, and
Bad Locations
#Good Locations
data<- c()
v <- c(40:85)
for ( i in v) {
  Left_Good <- matrix(c(2*Coeff_Good[c(2), ]),nrow=1,ncol=1)
Right_Good <- matrix(c(Coeff_Good[c(2), ]*i +Coeff_Good[c(1), ]-Coeff_Good[c(1), ]*i),
nrow=1,ncol=1)
value<-solve(Left_Good, Right_Good)
  data<-append(data, value)
}
Good_Prices <- data.frame(Production_Costs=v, Optimal_Prices=data, Location="Good")
```

```
#Medium Locations
data<- c()
v <- c(40:85)
for ( i in v) {
  Left_Medium <- matrix(c(2*Coeff_Medium[c(2), ]),nrow=1,ncol=1)
Right_Medium <- matrix(c(Coeff_Medium[c(2), ]*i +Coeff_Medium[c(1), ]-Coeff_Medium[c
(1), ]*i),nrow=1,ncol=1)
value<-solve(Left_Medium, Right_Medium)
  data<-append(data, value)
}
Medium_Prices <- data.frame(Production_Costs=v, Optimal_Prices=data, Location="Mediu
m")
#Plot For Medium Locations
```

```
#Bad Locations
data<- c()
v <- c(40:85)
for ( i in v) {
  Left_Bad <- matrix(c(2*Coeff_Bad[c(2), ]),nrow=1,ncol=1)
Right_Bad <- matrix(c(Coeff_Bad[c(2), ]*i +Coeff_Bad[c(1), ]-Coeff_Bad[c(1), ]*i),nrow
=1,ncol=1)
value<-solve(Left_Bad, Right_Bad)
  data<-append(data, value)
}
Bad_Prices <- data.frame(Production_Costs=v, Optimal_Prices=data, Location="Bad")
```

```
#Plot For Locations
#The prices increase as production costs increase. However, it is apparent that the sl
ope for good locations
#is steeper than the bad locations, which makes sense since there is likely diminishin
g returns involved with raising #prices in bad locations.
Prices<- rbind(Good_Prices, Medium_Prices, Bad_Prices)
Plot<- ggplot(data = Prices, aes(x = Production_Costs, y = Optimal_Prices, col=Locatio
n)) + geom_line() + geom_point()+labs(title="Optimal Prices by Production Costs by She
lf Location")
Plot
```