XL_Final

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

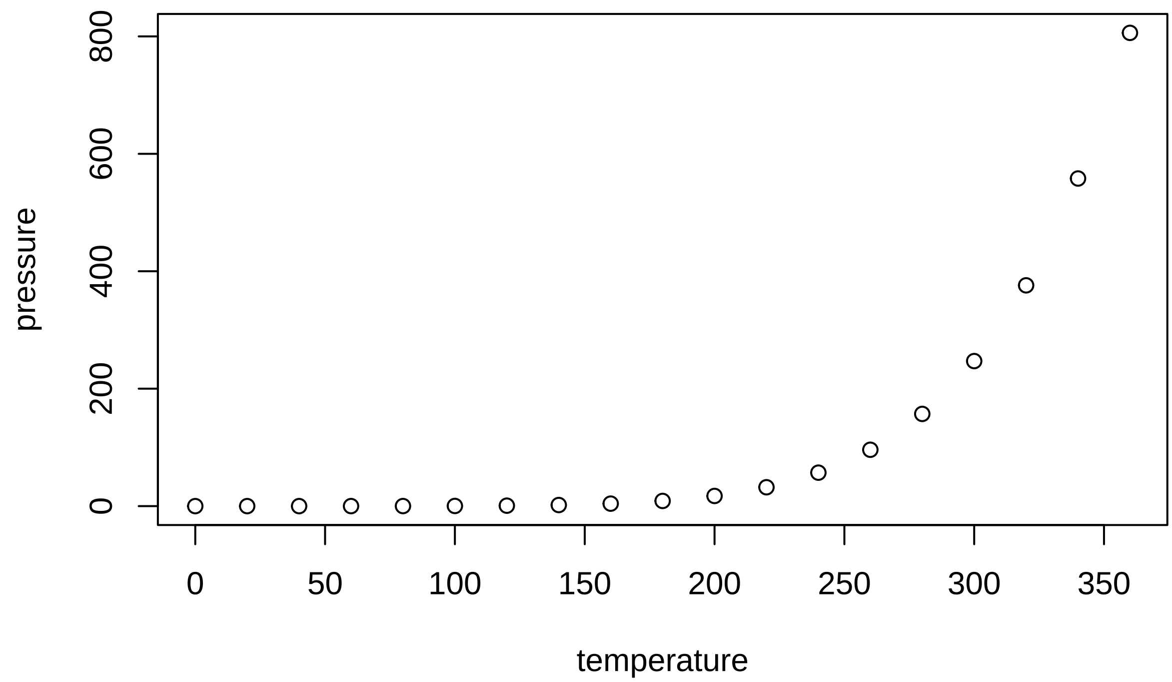
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist       
##  Min.   : 4.0   Min.   :  2.00  
##  1st Qu.:12.0   1st Qu.: 26.00  
##  Median :15.0   Median : 36.00  
##  Mean   :15.4   Mean   : 42.98  
##  3rd Qu.:19.0   3rd Qu.: 56.00  
##  Max.   :25.0   Max.   :120.00
```

Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

install.packages("caret") library(caret) library(dplyr) install.packages("tidyverse") library(tidyverse) install.packages("cluster") library(cluster) install.packages("factoextra") library(factoextra) install.packages("cowplot") library(cowplot) library(ggplot2) install.packages("tidyr") library(tidyr) library(dplyr) install.packages("tidyverse") library(tidyverse) install.packages("cluster") library(cluster) library(readr) library(tidyr) install.packages("devtools") library(devtools) library(cluster) install.packages("fpc") library(fpc) library(readr) library(dplyr) library(ggplot2) install.packages("ggcorrplot") library(ggcorrplot) library(tidyr) library(fastDummies) library(caret)

summary(test) summary(train)

head(test) head(train)

glimpse(test) glimpse(train)

diamond_test <- read_csv("XL_Final/test.csv") diamond_train <- read_csv("XL_Final/train.csv")

head(diamond_test) head(diamond_train)

sum(is.na(diamond_test)) sum(is.na(diamond_train))

converting character variables to factors

train %>% mutate(cut = as.factor(cut), color = as.factor(color),clarity <- as.factor(clarity))

summary(train)

bar plot on cut varaiable

ggplot(train, aes(x=cut, fill = cut)) + geom_bar() + theme_classic() + labs(title="Various types of diamond cuts", x="Cut categories", y = "Count")

bar plot on clarity varaiable

ggplot(train, aes(x=clarity, fill = clarity)) + geom_bar() + theme_classic() + labs(title="Various types of diamond clarity levels", x="diamond clarity levels", y = "Count")

Checking the distribution of depth column.

ggplot(train, aes(x = depth)) + geom_histogram(fill = 'blue', bins=100) + labs(x="depth", y="Count",title = "Probability Distribution of depth") + theme_classic()

Checking the distribution of carat column.

ggplot(train, aes(x = log(carat))) + geom_histogram(fill = 'blue', bins=100) + labs(x="carat", y="Count",title = "Probability Distribution of carat") + theme_classic()

apply(train,2,function(x){any(is.na(x))})

Correlation

train_cor <- round(cor(train %>% select_if(is.numeric)), 1)

ggcorrplot(train_cor, title = "Correlation", type = "lower") + theme(plot.title = element_text(hjust = 0.5), axis.text.x = element_text(angle = 90))

since x, y, z is highly correlated to each other and also it's highly correlated with caret variable, so removing from dataset

train <- train %>% select(-c(x,y,z))

box plot for all numeric variables

train %>% select_if(is.numeric) %>% mutate_all(scale) %>% gather("features","values") %>% na.omit() %>%

ggplot(aes(x = features, y = values)) + geom_boxplot(show.legend = FALSE) + stat_summary(fun = mean, geom = "point", pch = 1) +

Add average to the boxplot

scale_y_continuous(name = "Variable values", minor_breaks = NULL) + scale_fill_brewer(palette = "Set1") + coord_flip() + theme_minimal() + labs(x = "Variable names") + ggtitle(label = "Distribution of numeric variables in diamond train dataset")

Converting category variable to numeric variable.

train_d <- dummy_cols(train) train_d <- train_d %>% select(-c(cut, color, clarity)) View(train_d)

Splitting dataset into training (60%) and validation (40%) sets

set.seed(23) index <- createDataPartition(train_d$price, p=0.6, list = FALSE) train_df <- train_d[index,] test_df <- train_d[-index,]

Defining a function to normalize the data.

scale_fun <- preProcess(train_df %>% select(-price), method = c("center", "scale")) train_norm <- predict(scale_fun, train_df) test_norm <- predict(scale_fun, test_df)

Summary statistics of normalized data

summary(train_norm)

Building a model to estimate the diamond price value

diamond_train_model <- lm(price ~ . , data = train_norm) summary(diamond_train_model)

Performance metrics on test data

RMSE on test data

(linear_base_rsme <- sqrt(mean((test_norm$price - predict(diamond_train_model, test_norm))^2)))

R squared on test data

(linear_base_rsquare <- cor(test_norm$price, predict(diamond_train_model, test_norm))^2)

data was not straight forward needed a lot of transformation before predicting the model and the model is giving an accuracy of 91%