Google Stock Prediction

Closing price

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Google Stock Prediction

What to Know?

Introduction to Google Stock

Google is one of the largest most influential and successful technology companies in the world

Predicting the closing price of a stock is a complex problem because of several challenges but also can potentially help investors make more informed decisions about buying, selling, or holding stocks

Our class label is The closing price of a stock. It's one of the most commonly used prices to analyze a stock's performance

Google Stock Dataset sample

	symbol	date	close	high	low	open	volume	adjClose	adjHigh	adjLow	adjOpen	adjVolume	divCash	splitFactor
1	GOOG	2016-06-14 00:00:00+00:00	718.270	722.4700	713.1200	716.48	1306065	718.270	722.4700	713.1200	716.48	1306065	0	1
2	GOOG	2016-06-15 00:00:00+00:00	718.920	722.9800	717.3100	719.00	1214517	718.920	722.9800	717.3100	719.00	1214517	0	1
3	GOOG	2016-06-16 00:00:00+00:00	710.360	716.6500	703.2600	714.91	1982471	710.360	716.6500	703.2600	714.91	1982471	0	1
4	GOOG	2016-06-17 00:00:00+00:00	691.720	708.8200	688.4515	708.65	3402357	691.720	708.8200	688.4515	708.65	3402357	0	1
5	GOOG	2016-06-20 00:00:00+00:00	693.710	702.4800	693.4100	698.77	2082538	693.710	702.4800	693.4100	698.77	2082538	0	1

Our data consists of :
Number of Attributes: 14
Number of objects: 1258

Source :

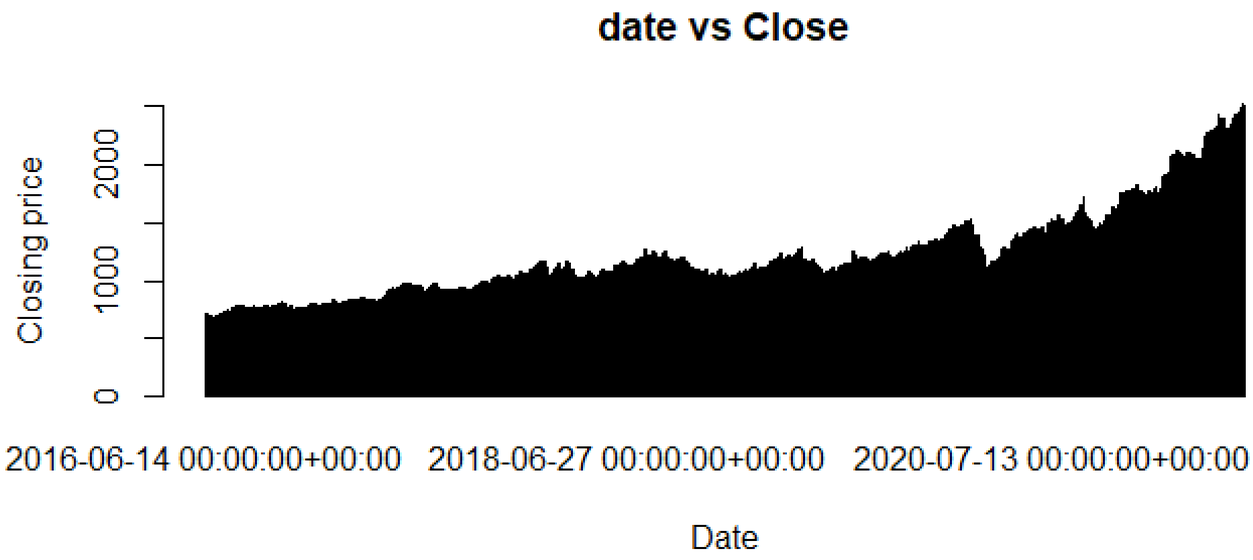
Google Stock Prediction

Regression, LSTM, Keras, Tensorflow

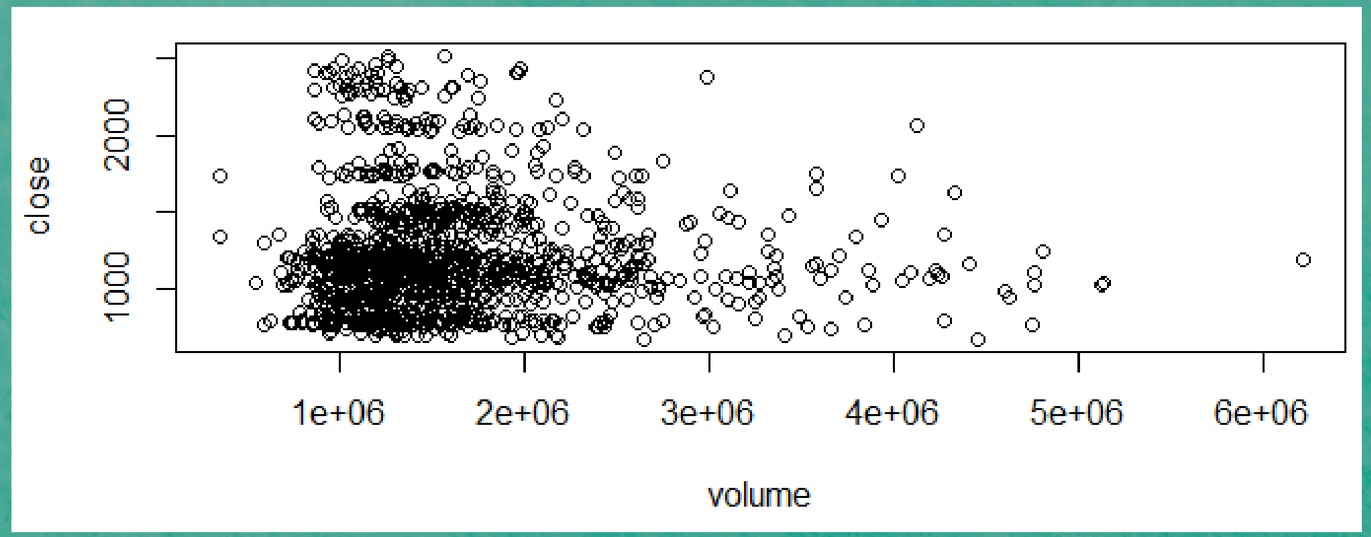
k kaggle.com

Graphs codes

- histogram
- Scatter Plot
- Barplot

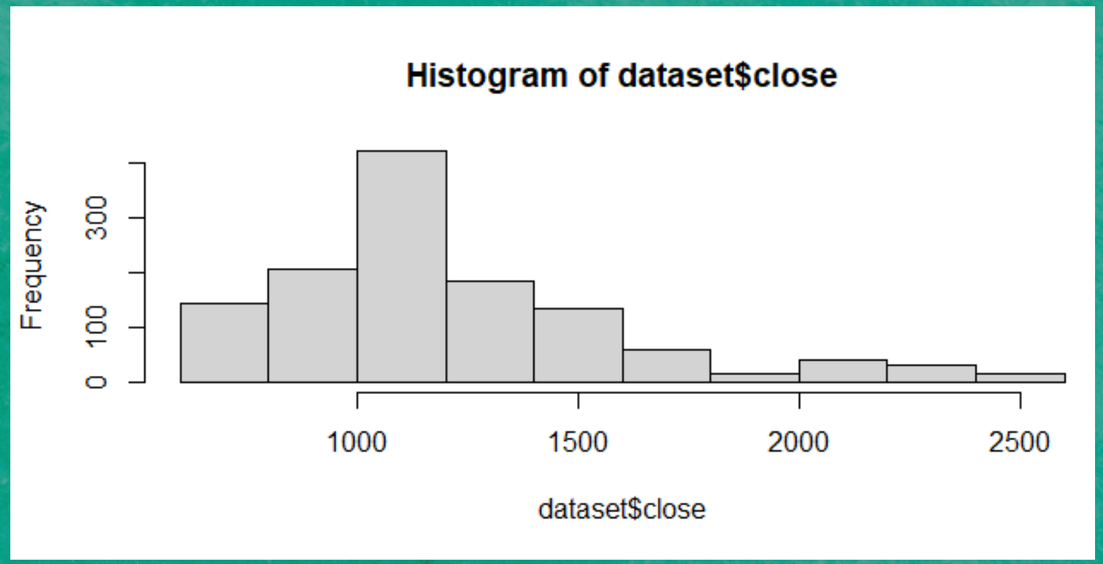


Graphs codes



Scatter Plot

Histogram



Data Summarization and Preprocessing

We applied several preprocessing techniques to improve the accuracy and efficency of the data which is :

- Data cleaning
- Data transformation
- Feature selection

Data cleaning

- Handling wrong values
- Handling all outliers

Data transformation

- Normlization
  1-min-max
  2-encoding

- Discretization

Data Summarization and Preprocessing

summary

Min , 1st Qu , Median
Mean , 3rd Qu , Max

mean &variance

```
mean(dataset$close)
[1] 1216.317

 var(dataset$close)
[1] 146944.5
```

Data cleaning

```
#Checking NULL
is.na(dataset)

#find the total null values
sum(is.na(dataset))
```

Detec the outliers

```
OutClose = outlier(dataset$close, logical =TRUE)
sum(OutClose)
Find_outlier = which(OutClose ==TRUE, arr.ind = TRUE)
OutClose
Find_outlier

#Remove outlier
dataset= dataset[-Find_outlier,]
```

Data transformation

Feature selection

we used 2 feature selection methods provided by the caret R package which is :

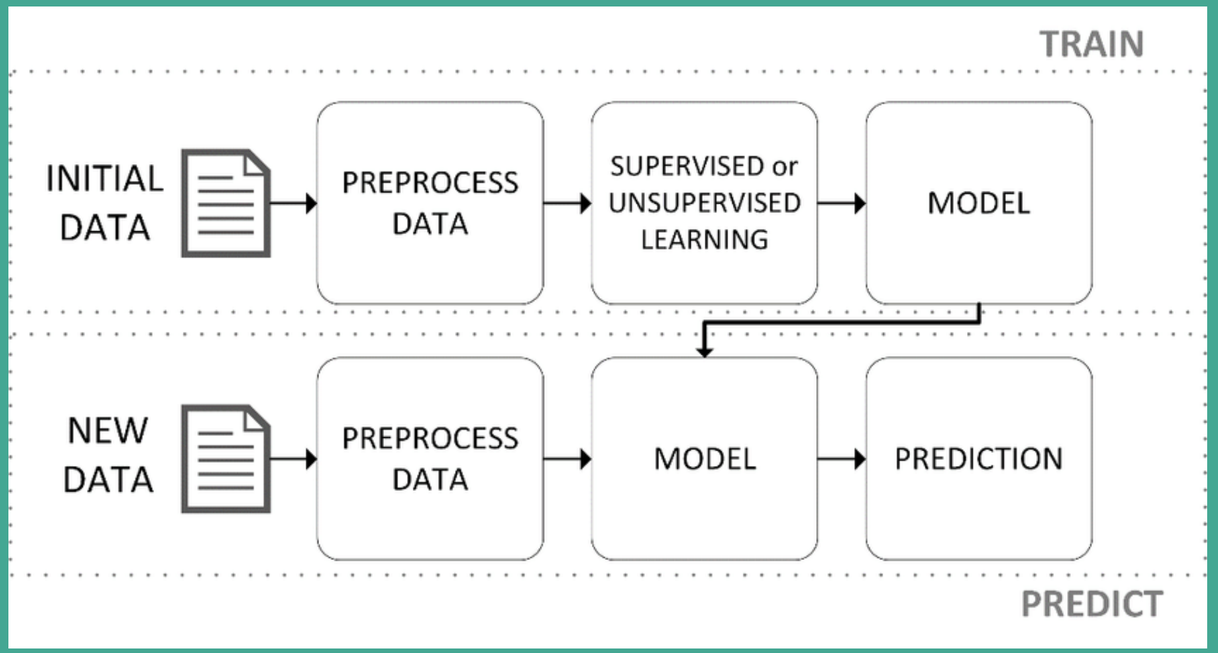
1- using Recursive Feature Elimination or RFE

2- Remove Redundant Features

Classification

The goal of classification is to assign predefined labels or categories to input data based on its characteristics or features.

classification is a supervised ,



Splitting criteria and algorithms

we implemented 3 algorithms on each split to evaluate 9 models in total.

The algorithms:

- Information Gain(ID3)
- Gain Ratio(C5.0)
- Gini index(CART)

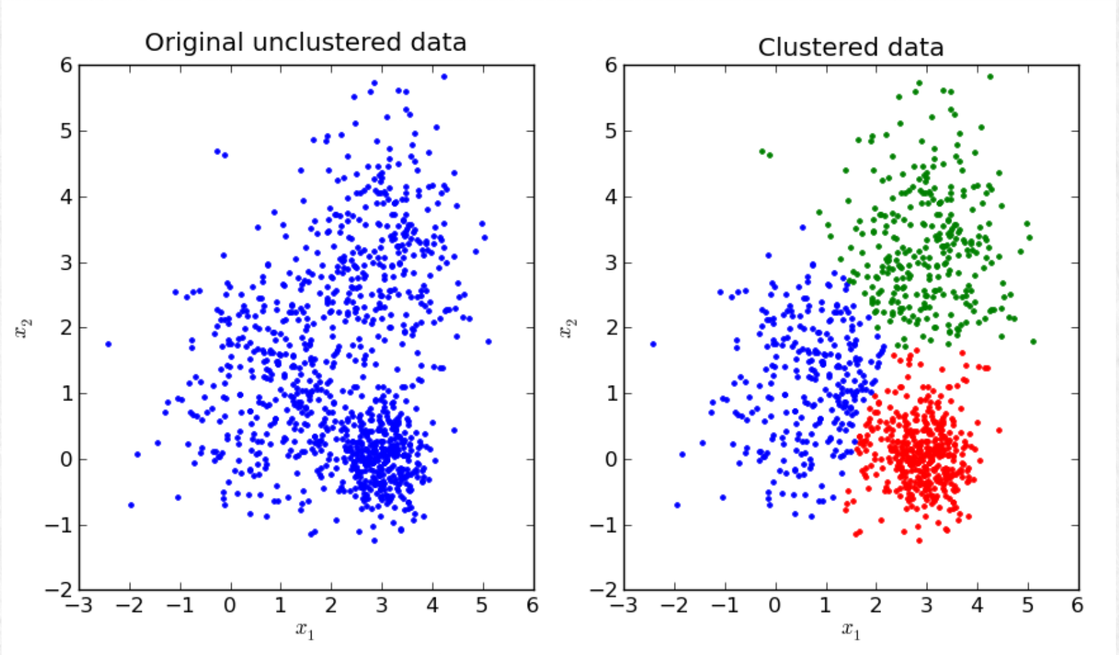
Evaluation and Comparison

	70% Training and 30% Testing data			80% Training and 20% Testing data			60% Training and 40% Testing data		
	IG	IG ratio	Gini andex	IG	IG ratio	Gini andex	IG	IG ratio	Gini andex
Accuracy	%98.6	%99	%98.6	%98.4	%99.5	%98.4	%98.8	%98.8	%98.8
precision	%97.3	99	%97.3	%97.3	1	%97.3	%96	%97.3	%96
sensitivity	%99.5	%98.2	%99.5	%99.4	%98.6	%99.4	%99.4	%99.3	%99.4
specificity	%96.8	%99.5	%96.8	%96.5	1	%96.5	%96.5	%98.6	%96.5

Clustring

The goal of clustering is to group a set of objects or data points into subsets or clusters based on the similarity between them.

Unlike classification , Clustering is an unsupervised.



Apply k-means clustering for different values of K:

We used K-means technique that represents the clusters by the center of cluster

- The average silhouette
- Total within-cluster sum of square
- The BCubed (precision and recall)

k= 2

k= 3

k= 4

Evaluation and Comparison

	K=4	K=3	K=2
average silhouette width	0.43	0.37	0.45
total withn-cluster sum of squares	1900.127	2908.955	4126
BCubed precision	70.30498	80.95238	100
BCubed recall	79.63636	9.272727	0.1818182

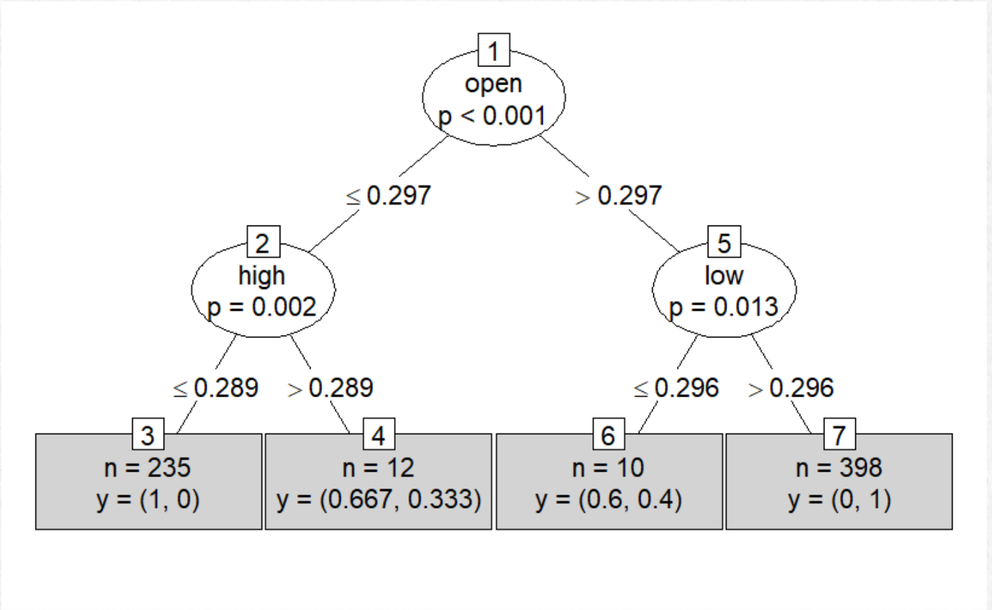
Findings

we found that

- the best decision tree was IG with 60-40 split

- Gain ratio tree has highest accuracy in genral

- classification is not directly applicable for predicting continuous variables

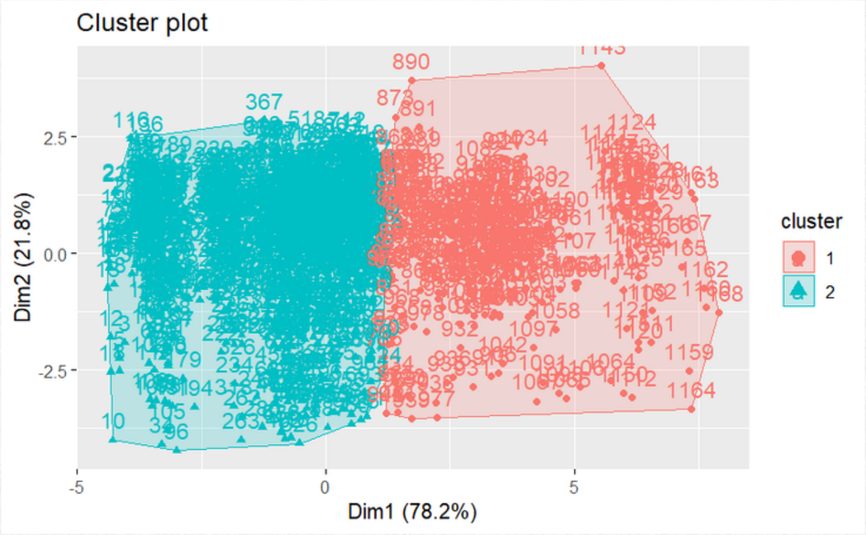


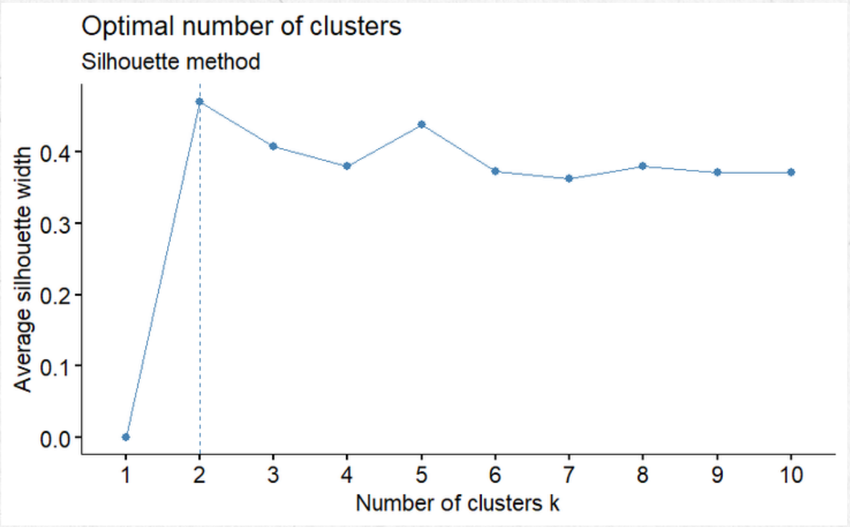
Accuracy	%99.5	%99	%98.8
precision	1	%99	%97.3
sensitivity	%98.6	%98.2	%99.3
specificity	1	%99.5	%98.6

Findings

we found that clustering with k=2 is better suited for our Dataset

has highest average silhouette width





Thank you very much!

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