Gold Price

Prediction

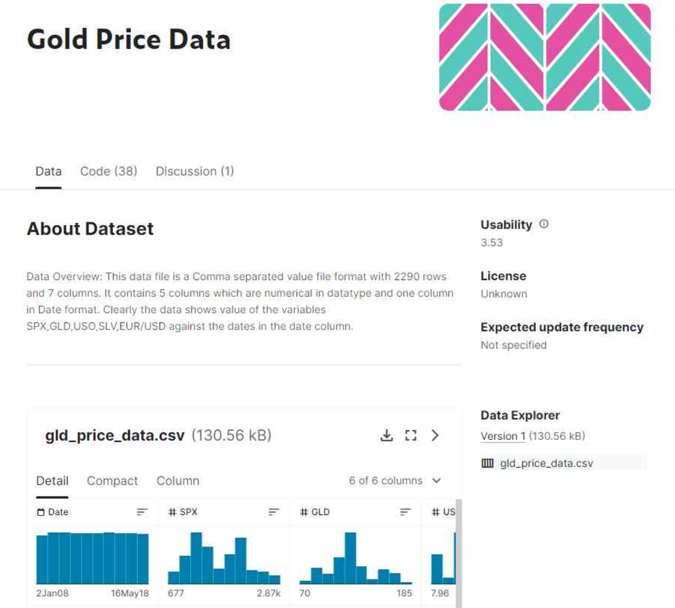
발표자 : 김홍범

DataSet

- https://www.kaggle.com/datasets/altruistdelhite04/gold-price-data

- gld_price_data.csv

- 여러 다른 지표들을 바탕으로 금값을 예측



Gold Price Data

Data Code (38) Discussion (1)

About Dataset

Data Overview: This data file is a Comma separated value file format with 2290 rows and 7 columns. It contains 5 columns which are numerical in datatype and one column in Date format. Clearly the data shows value of the variables SPX,GLD,USO,SLV,EUR/USD against the dates in the date column.

Usability 3.53

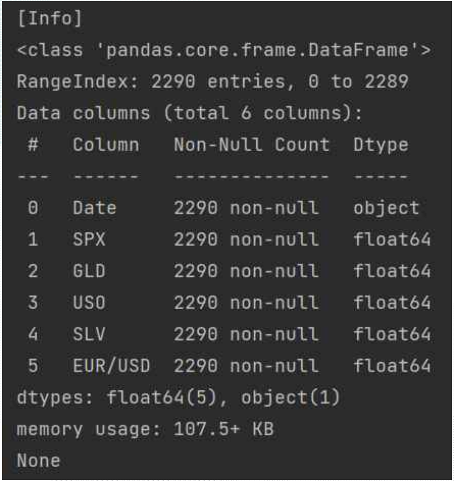
License Unknown

Expected update frequency Not specified

Data Explorer
Version 1 (130.56 kB)
gld_price_data.csv

gld_price_data.csv (130.56 kB)

DataSet



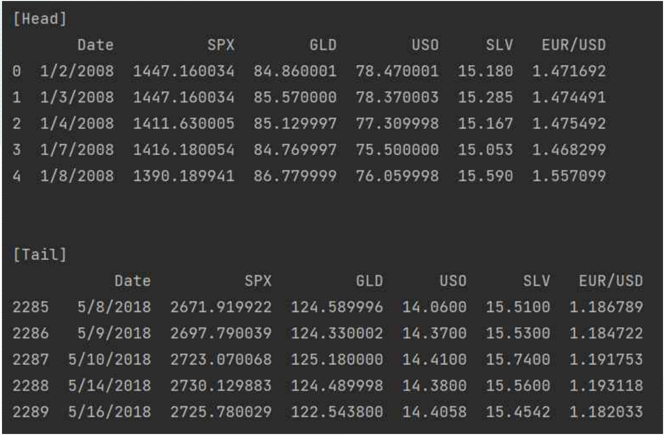
```
[Info]
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2290 entries, 0 to 2289
Data columns (total 6 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   Date      2290 non-null   object 
 1   SPX       2290 non-null   float64
 2   GLD       2290 non-null   float64
 3   USO       2290 non-null   float64
 4   SLV       2290 non-null   float64
 5   EUR/USD   2290 non-null   float64
dtypes: float64(5), object(1)
memory usage: 107.5+ KB
None
```

data_frame.info()

- column의 종류

- Dtype

DataSet

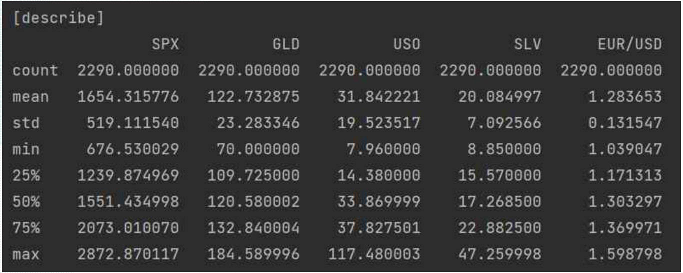


```
[Head]
       Date          SPX        GLD        USO     SLV   EUR/USD
0  1/2/2008  1447.160034  84.860001  78.470001  15.180  1.471692
1  1/3/2008  1447.160034  85.570000  78.370003  15.285  1.474491
2  1/4/2008  1411.630005  85.129997  77.309998  15.167  1.475492
3  1/7/2008  1416.180054  84.769997  75.500000  15.053  1.468299
4  1/8/2008  1390.189941  86.779999  76.059998  15.590  1.557099


[Tail]
           Date          SPX         GLD      USO      SLV   EUR/USD
2285   5/8/2018  2671.919922  124.589996  14.0600  15.5100  1.186789
2286   5/9/2018  2697.790039  124.330002  14.3700  15.5300  1.184722
2287  5/10/2018  2723.070068  125.180000  14.4100  15.7400  1.191753
2288  5/14/2018  2730.129883  124.489998  14.3800  15.5600  1.193118
2289  5/16/2018  2725.780029  122.543800  14.4058  15.4542  1.182033
```

.head()

.tail()

DataSet



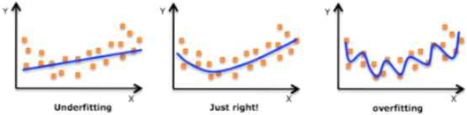
```
[describe]
              SPX          GLD          USO          SLV      EUR/USD
count  2290.000000  2290.000000  2290.000000  2290.000000  2290.000000
mean   1654.315776   122.732875    31.842221    20.084997     1.283653
std     519.111540    23.283346    19.523517     7.092566     0.131547
min     676.530029    70.000000     7.960000     8.850000     1.039047
25%    1239.874969   109.725000    14.380000    15.570000     1.171313
50%    1551.434998   120.580002    33.869999    17.268500     1.303297
75%    2073.010070   132.840004    37.827501    22.882500     1.369971
max    2872.870117   184.589996   117.480003    47.259998     1.598798
```

.describe()

- mean : 평균
- std : 표준편차
- min : 최솟값
- max : 최댓값

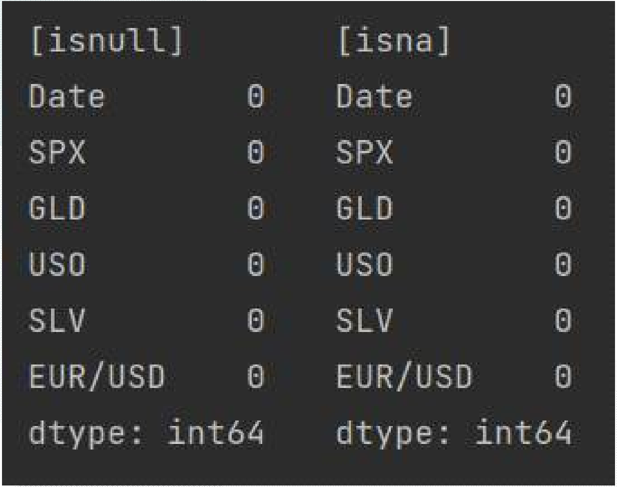
고려사항

- 결측치
  - Dataset의 결측, 누락, 손실 등
- 과적합



- 정규화/표준화
  - scaling
- 검증
  - KFold, Stratified KFold

DataSet

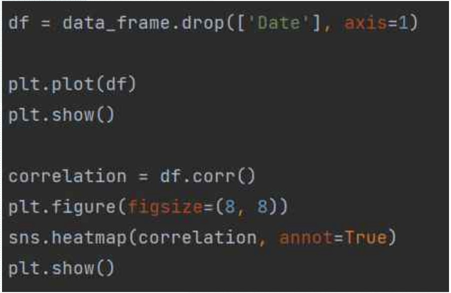


```
[isnull]             [isna]
Date         0       Date         0
SPX          0       SPX          0
GLD          0       GLD          0
USO          0       USO          0
SLV          0       SLV          0
EUR/USD      0       EUR/USD      0
dtype: int64         dtype: int64
```

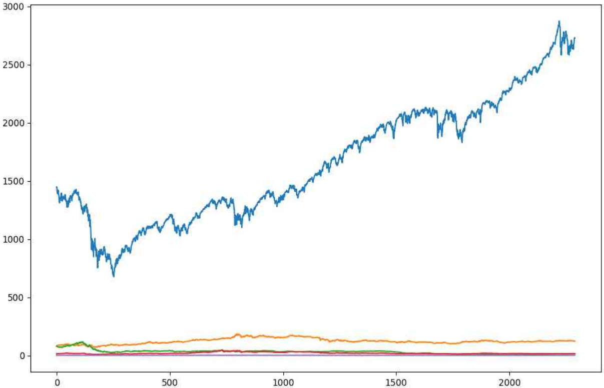
```
.isnull().sum()
.isna().sum()
```

결측 데이터의 수를
합산

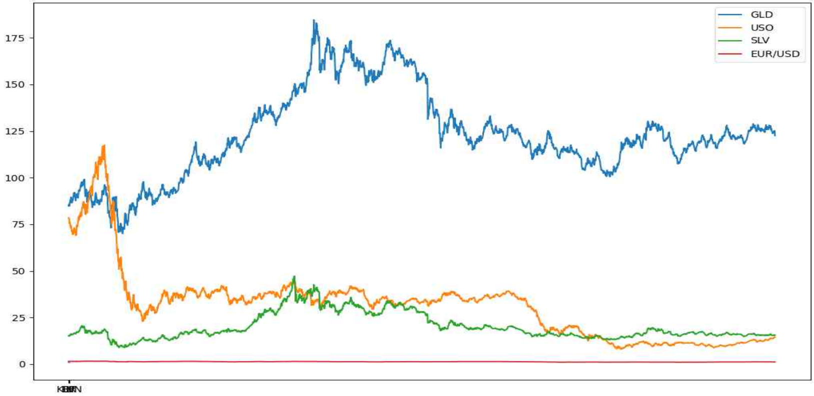
Visualization



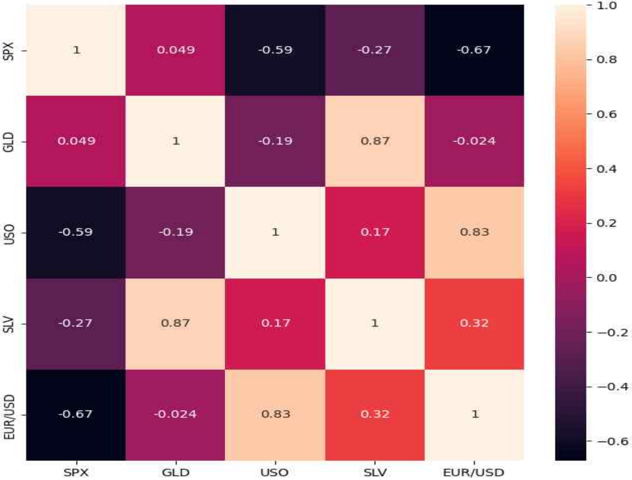
```
df = data_frame.drop(['Date'], axis=1)

plt.plot(df)
plt.show()

correlation = df.corr()
plt.figure(figsize=(8, 8))
sns.heatmap(correlation, annot=True)
plt.show()
```



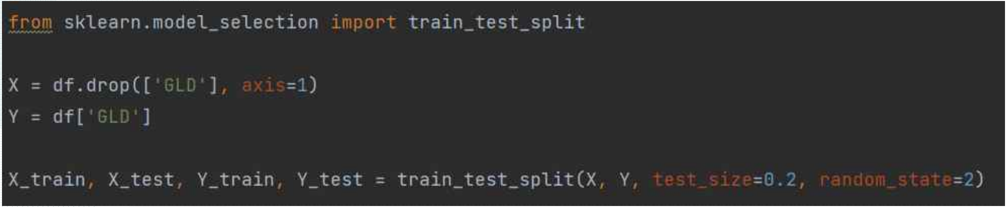
Visualization



Visualization



Train Test Split



```
from sklearn.model_selection import train_test_split

X = df.drop(['GLD'], axis=1)
Y = df['GLD']

X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.2, random_state=2)
```

X : 문제지　　Y : 정답지

X_train　+　Y_train

X_test　+　Y_test

Scaling

```
from sklearn.preprocessing import ---
```

◆ StandardScaler

- 평균이 0, 분산이 1 인 정규 분포
- 이상치가 존재한다면, 평균과 분산에 크게 영향을 줌

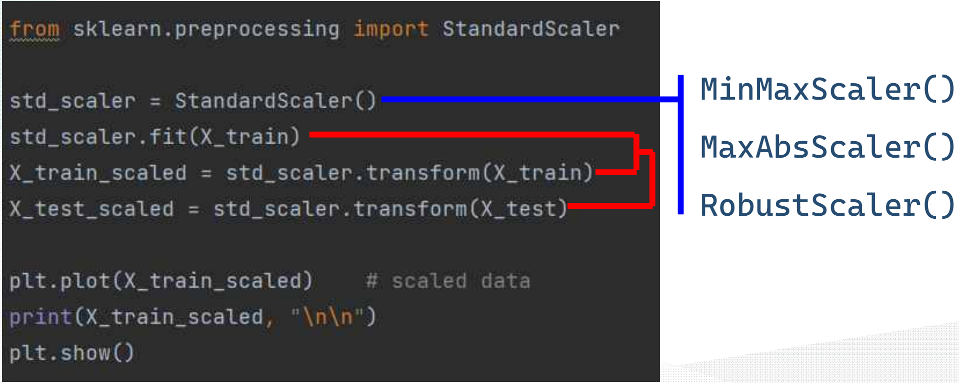
◆ MinMaxScaler

- 모든 데이터를 0과 1사이의 값으로 스케일

◆ MaxAbsScaler

- 절대값이 0과 1사이의 값이 되도록 스케일

Scaling

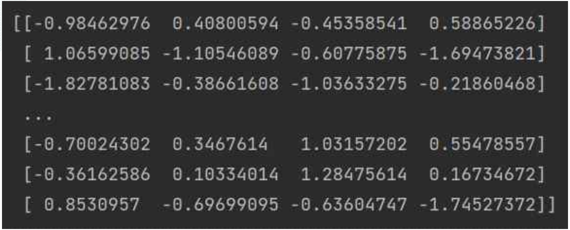


```
from sklearn.preprocessing import StandardScaler

std_scaler = StandardScaler()
std_scaler.fit(X_train)
X_train_scaled = std_scaler.transform(X_train)
X_test_scaled = std_scaler.transform(X_test)

plt.plot(X_train_scaled)    # scaled data
print(X_train_scaled, "\n\n")
plt.show()
```

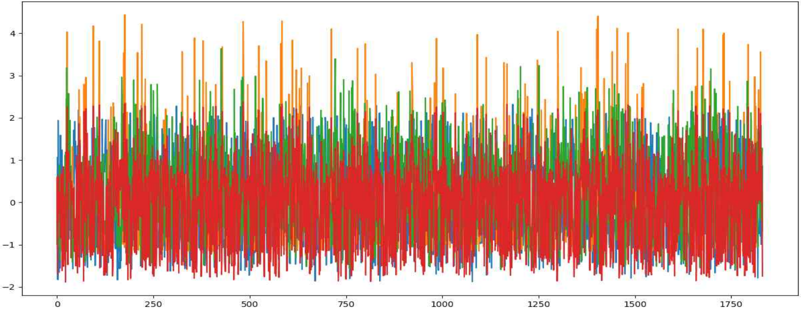
MinMaxScaler()

MaxAbsScaler()

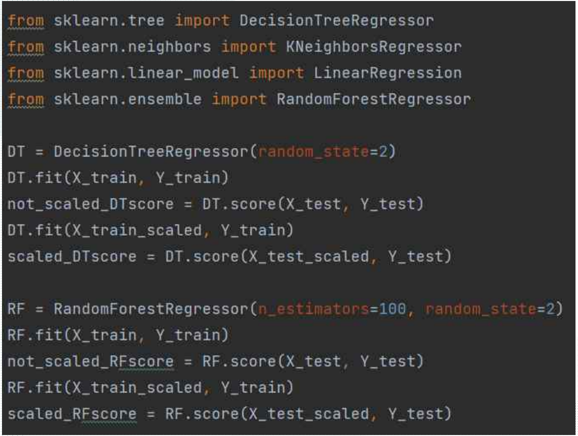
RobustScaler()



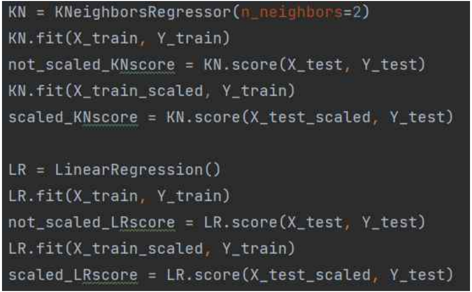
```
[[-0.98462976  0.40800594 -0.45358541  0.58865226]
 [ 1.06599085 -1.10546089 -0.60775875 -1.69473821]
 [-1.82781083 -0.38661608 -1.03633275 -0.21860468]
 ...
 [-0.70024302  0.3467614   1.03157202  0.55478557]
 [-0.36162586  0.10334014  1.28475614  0.16734672]
 [ 0.8530957  -0.69699095 -0.63604747 -1.74527372]]
```



Regressor



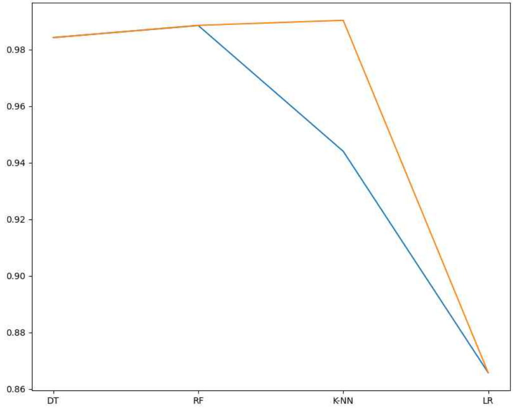
```python
from sklearn.tree import DecisionTreeRegressor
from sklearn.neighbors import KNeighborsRegressor
from sklearn.linear_model import LinearRegression
from sklearn.ensemble import RandomForestRegressor

DT = DecisionTreeRegressor(random_state=2)
DT.fit(X_train, Y_train)
not_scaled_DTscore = DT.score(X_test, Y_test)
DT.fit(X_train_scaled, Y_train)
scaled_DTscore = DT.score(X_test_scaled, Y_test)

RF = RandomForestRegressor(n_estimators=100, random_state=2)
RF.fit(X_train, Y_train)
not_scaled_RFscore = RF.score(X_test, Y_test)
RF.fit(X_train_scaled, Y_train)
scaled_RFscore = RF.score(X_test_scaled, Y_test)
```

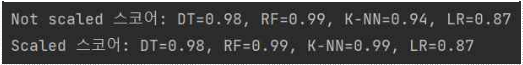


```python
KN = KNeighborsRegressor(n_neighbors=2)
KN.fit(X_train, Y_train)
not_scaled_KNscore = KN.score(X_test, Y_test)
KN.fit(X_train_scaled, Y_train)
scaled_KNscore = KN.score(X_test_scaled, Y_test)

LR = LinearRegression()
LR.fit(X_train, Y_train)
not_scaled_LRscore = LR.score(X_test, Y_test)
LR.fit(X_train_scaled, Y_train)
scaled_LRscore = LR.score(X_test_scaled, Y_test)
```

random_state : 난수 seed
n_estimators :생성할 트리의 수

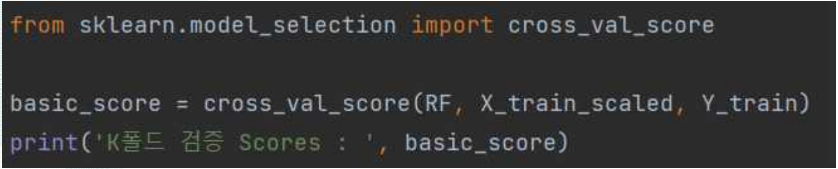
Regressor





```
Not scaled 스코어: DT=0.98, RF=0.99, K-NN=0.94, LR=0.87
Scaled 스코어: DT=0.98, RF=0.99, K-NN=0.99, LR=0.87
```

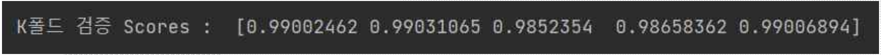
Validation : KFold & Stratified KFold



```
from sklearn.model_selection import cross_val_score

basic_score = cross_val_score(RF, X_train_scaled, Y_train)
print('K폴드 검증 Scores : ', basic_score)
```

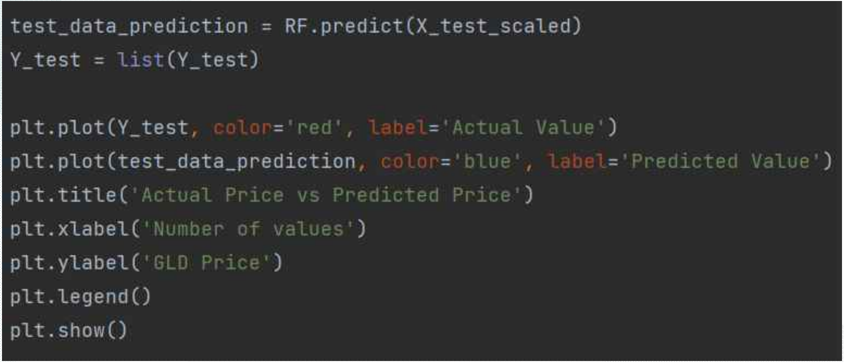
```
cross_val_score(estimator, feature_X, label_Y, scoring, cv)
```

estimator : 알고리즘
feature : X
label : Y
scoring : 지표 종류
cv : 횟수



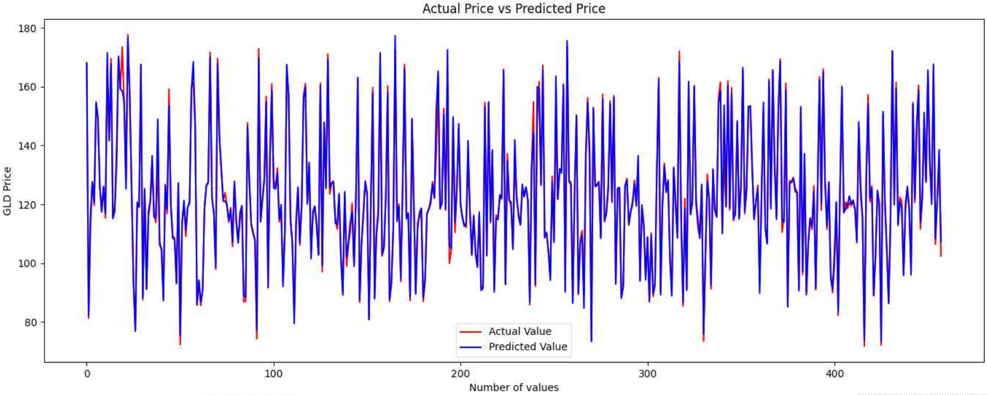
```
K폴드 검증 Scores :  [0.99002462 0.99031065 0.9852354  0.98658362 0.99006894]
```

Predict



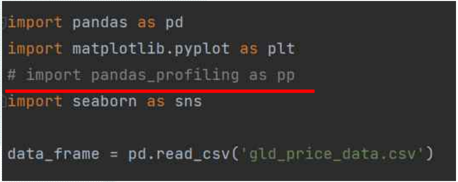
```
test_data_prediction = RF.predict(X_test_scaled)
Y_test = list(Y_test)

plt.plot(Y_test, color='red', label='Actual Value')
plt.plot(test_data_prediction, color='blue', label='Predicted Value')
plt.title('Actual Price vs Predicted Price')
plt.xlabel('Number of values')
plt.ylabel('GLD Price')
plt.legend()
plt.show()
```

Predict

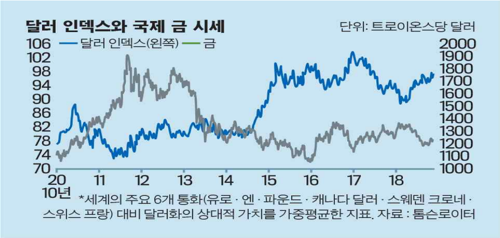


Actual Price vs Predicted Price
GLD Price
180
160
140
120
100
80
0
100
200
300
400
Number of values
Actual Value
Predicted Value

아쉬운점



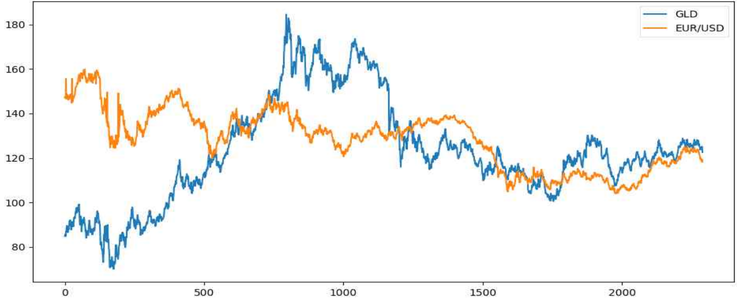
```
import pandas as pd
import matplotlib.pyplot as plt
# import pandas_profiling as pp
import seaborn as sns

data_frame = pd.read_csv('gld_price_data.csv')
```



달러 인덱스와 국제 금 시세

단위: 트로이온스당 달러

*세계의 주요 6개 통화(유로 · 엔 · 파운드 · 캐나다 달러 · 스웨덴 크로네 · 스위스 프랑) 대비 달러화의 상대적 가치를 가중평균한 지표. 자료 : 톰슨로이터



참고링크

- 전처리 기초 : https://datascienceschool.net - 머신러닝편 2.1 데이터 전처리 기초
- pandas : https://javapp.tistory.com/161
- 스케일링
  - [illegible]
  - https://jaaamj.tistory.com/20
- random forest : https://woolulu.tistory.com/28
- 검증
  - [illegible]
  - [illegible]