XGBoost 2

December 19, 2022

[1]:
```
import numpy as np
import pandas as pd
import xgboost
from sklearn.model_selection import train_test_split
from sklearn.model_selection import GridSearchCV
from sklearn.metrics import roc_auc_score

import matplotlib.pyplot as plt
```

```
C:\Users\Deepak\ana-conda-3\lib\site-packages\xgboost\compat.py:36:
FutureWarning: pandas.Int64Index is deprecated and will be removed from pandas
in a future version. Use pandas.Index with the appropriate dtype instead.
  from pandas import MultiIndex, Int64Index
```

[2]:
```
df = pd.read_csv("pima-indians-diabetes.csv")
df.head()
```

[2]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	\
0	6	148	72	35	0	33.6	
1	1	85	66	29	0	26.6	
2	8	183	64	0	0	23.3	
3	1	89	66	23	94	28.1	
4	0	137	40	35	168	43.1	

	DiabetesPedigreeFunction	Age	Outcome
0	0.627	50	1
1	0.351	31	0
2	0.672	32	1
3	0.167	21	0
4	2.288	33	1

[3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to 767
Data columns (total 9 columns):
 #   Column                    Non-Null Count  Dtype
---  ------                    --------------  -----
 0   Pregnancies               768 non-null    int64
```

```
 1   Glucose                   768 non-null    int64
 2   BloodPressure             768 non-null    int64
 3   SkinThickness             768 non-null    int64
 4   Insulin                   768 non-null    int64
 5   BMI                       768 non-null    float64
 6   DiabetesPedigreeFunction  768 non-null    float64
 7   Age                       768 non-null    int64
 8   Outcome                   768 non-null    int64
dtypes: float64(2), int64(7)
memory usage: 54.1 KB
```

[4]:
```
x = df.iloc[:,0:8]
y = df.iloc[:,8]
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.
  ↪33,random_state=42)
```

[5]:
```
from xgboost import XGBClassifier
model = XGBClassifier()
eval_set =[(x_test,y_test)]
model.
  ↪fit(x_train,y_train,early_stopping_rounds=10,eval_metric="logloss",eval_set=eval_set,verbos
```

```
[0]     validation_0-logloss:0.60697
[1]     validation_0-logloss:0.56261
[2]     validation_0-logloss:0.53835
[3]     validation_0-logloss:0.52276
[4]     validation_0-logloss:0.51074
[5]     validation_0-logloss:0.50890
[6]     validation_0-logloss:0.50851
[7]     validation_0-logloss:0.51019
[8]     validation_0-logloss:0.51279
[9]     validation_0-logloss:0.52036
[10]    validation_0-logloss:0.52229
[11]    validation_0-logloss:0.52651
[12]    validation_0-logloss:0.52992
[13]    validation_0-logloss:0.53040
[14]    validation_0-logloss:0.54070
[15]    validation_0-logloss:0.54597
[16]    validation_0-logloss:0.54907
C:\Users\Deepak\ana-conda-3\lib\site-packages\xgboost\sklearn.py:1224:
UserWarning: The use of label encoder in XGBClassifier is deprecated and will be
removed in a future release. To remove this warning, do the following: 1) Pass
option use_label_encoder=False when constructing XGBClassifier object; and 2)
Encode your labels (y) as integers starting with 0, i.e. 0, 1, 2, …,
[num_class - 1].
  warnings.warn(label_encoder_deprecation_msg, UserWarning)
C:\Users\Deepak\ana-conda-3\lib\site-packages\xgboost\data.py:250:
FutureWarning: pandas.Int64Index is deprecated and will be removed from pandas
```

```
in a future version. Use pandas.Index with the appropriate dtype instead.
  elif isinstance(data.columns, (pd.Int64Index, pd.RangeIndex)):
```

[5]:
```
XGBClassifier(base_score=0.5, booster='gbtree', colsample_bylevel=1,
              colsample_bynode=1, colsample_bytree=1, enable_categorical=False,
              gamma=0, gpu_id=-1, importance_type=None,
              interaction_constraints='', learning_rate=0.300000012,
              max_delta_step=0, max_depth=6, min_child_weight=1, missing=nan,
              monotone_constraints='()', n_estimators=100, n_jobs=16,
              num_parallel_tree=1, predictor='auto', random_state=0,
              reg_alpha=0, reg_lambda=1, scale_pos_weight=1, subsample=1,
              tree_method='exact', validate_parameters=1, verbosity=None)
```

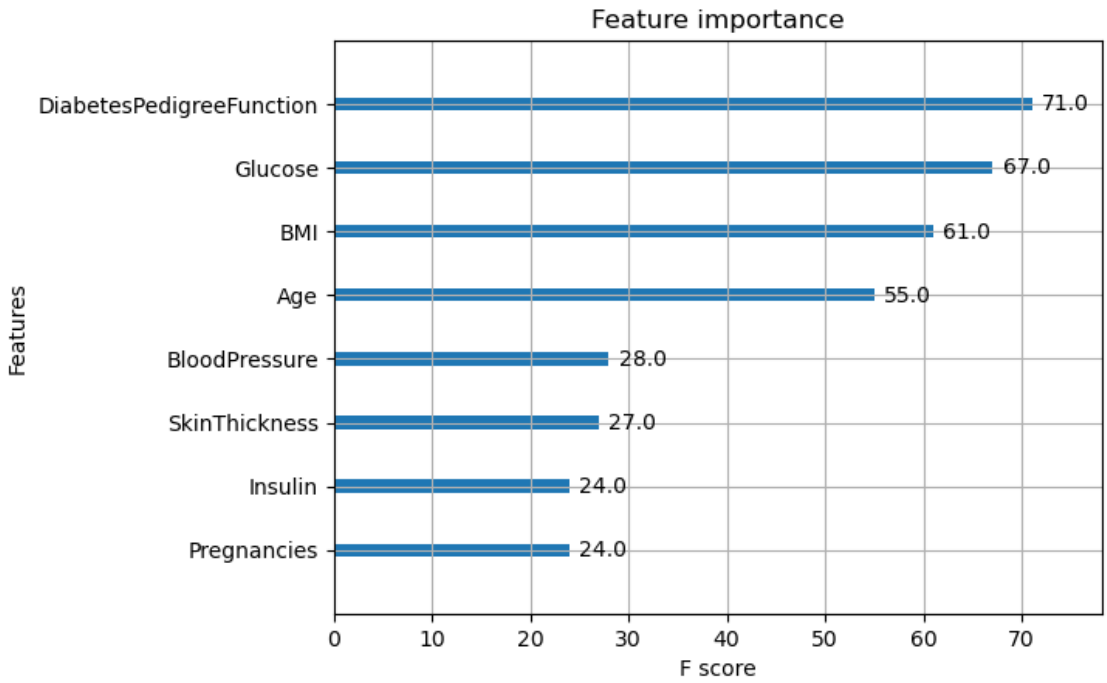
[6]:
```
from sklearn.metrics import accuracy_score

predictions = model.predict(x_test)
```

[7]:
```
accuracy = accuracy_score(y_test,predictions)
print("Accuracy: %.2f%%" % (accuracy * 100.0))
```

```
Accuracy: 73.23%
```

[8]:
```
from xgboost import plot_importance
from matplotlib import pyplot
```

[9]:
```
plot_importance(model)
pyplot.show()
```



[10]:
```
import xgboost as xgb
```

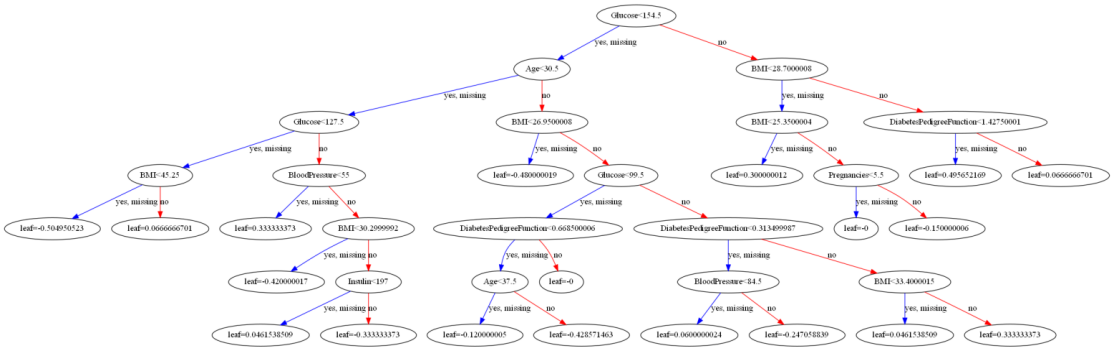
[11]:
```
from sklearn.tree import export_graphviz
```

[12]:
```
!pip install graphviz
```

```
Requirement already satisfied: graphviz in c:\users\deepak\ana-conda-3\lib\site-
packages (0.20.1)
```

[13]:
```
import graphviz
```

[14]:
```
plt.figure(figsize=(20,15))
xgb.plot_tree(model,ax=plt.gca());
```



[ ]:
```
```