# Лабораторная работа №3

Импорт библиотек:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

Загружаем данные:

```
data = pd.read_csv("heart.csv")

X = data.drop('target', axis=1)
y = data['target']

# разделяем модель

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.20)
```

Обучаем ее:

```
from sklearn.svm import SVC
svclassifier = SVC(kernel='linear')
svclassifier.fit(X_train, y_train)
```

Предсказываем результаты

```
y_pred = svclassifier.predict(X_test)
```

Оцениваем алгоритм:

```
from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test,y_pred))
print(classification_report(y_test,y_pred))
```

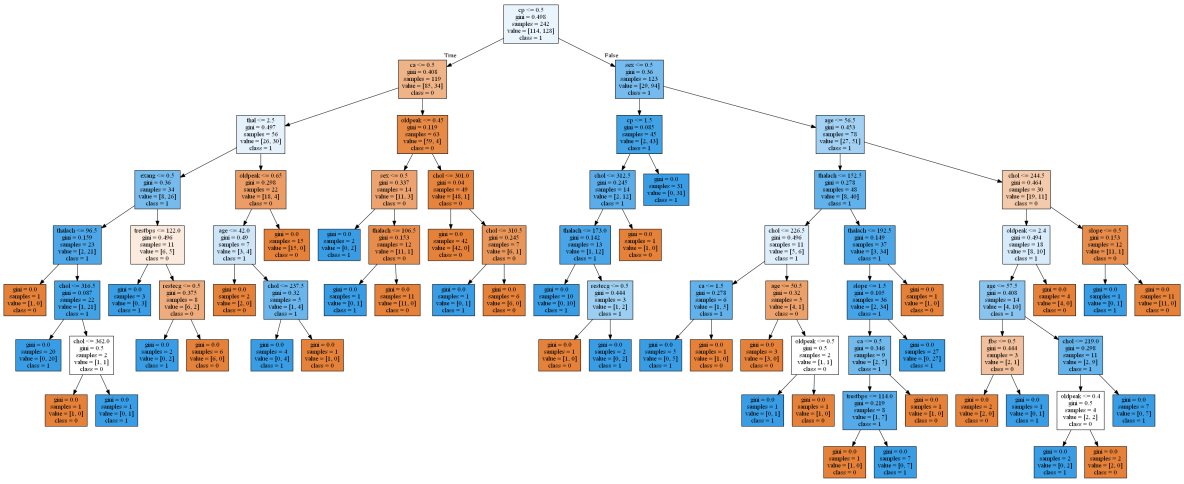
```
[[24  6]
 [ 6 25]]
              precision    recall  f1-score   support

           0       0.80      0.80      0.80        30
           1       0.81      0.81      0.81        31

    accuracy                           0.80        61
   macro avg       0.80      0.80      0.80        61
weighted avg       0.80      0.80      0.80        61
```

# Дерево

```
from sklearn.tree import DecisionTreeClassifier
TreeClassifier = DecisionTreeClassifier()
TreeClassifier.fit(X_train, y_train)

yTree_pred = TreeClassifier.predict(X_test)

print(confusion_matrix(y_test, yTree_pred))
print(classification_report(y_test, yTree_pred))
```

```
[[21  9]
 [ 8 23]]
              precision    recall  f1-score   support

           0       0.72      0.70      0.71        30
           1       0.72      0.74      0.73        31

    accuracy                           0.72        61
   macro avg       0.72      0.72      0.72        61
weighted avg       0.72      0.72      0.72        61
```

Строим дерево и получаем:

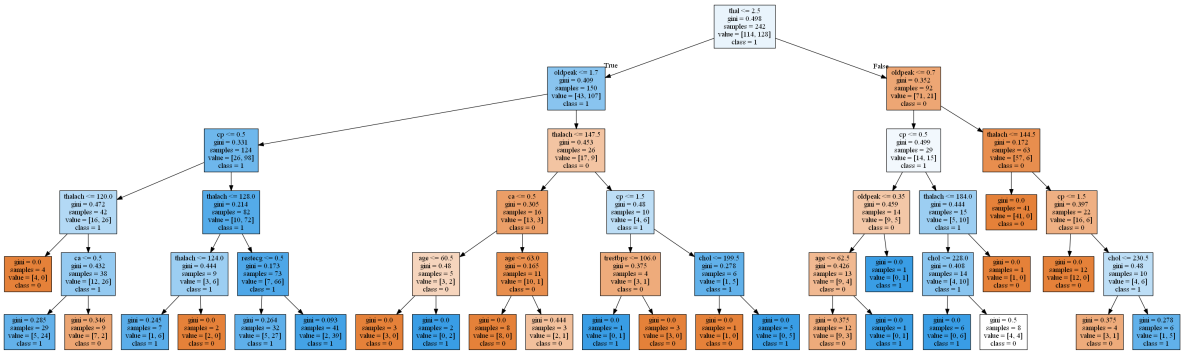


```
TreeClassifier2 = DecisionTreeClassifier(max_features=5, max_depth=5)
TreeClassifier2.fit(X_train, y_train)

yTree_pred = TreeClassifier2.predict(X_test)
```

Оценка:

```
print(confusion_matrix(y_test, yTree_pred))
print(classification_report(y_test, yTree_pred))
```

```
[[24  6]
 [10 21]]
              precision    recall  f1-score   support

           0       0.71      0.80      0.75        30
           1       0.78      0.68      0.72        31

    accuracy                           0.74        61
   macro avg       0.74      0.74      0.74        61
weighted avg       0.74      0.74      0.74        61
```



## Authors

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