roche_irises2

February 17, 2020

0.1 1. Preparing the data

0.1.1 1.1 Sniffing around the dataset (exploration)

- I opened the document in notebook and looked at the data to have general impression of the dataset.
- I found one value with minus in front, I just deleted the '-' sign.
- I also found 'NA' value, which later I replaced with the mean value of the column
- I found that all values in 'petal.width' column are inside quote marks which gonna make them be read as strings.

```
In [1]: import pandas as pd
```

```
In [2]: irises = pd.read_csv("/home/bartek/Documents/ROCHE_zadanie/rochepolskajuniordatascience
```

Looking at basic information on dataset. There are no outliers, the column 'Species' has the same count for every category which gonna be predicted.

```
In [3]: irises.describe()
```

```
Out[3]:        Sepal.Length  Sepal.Width  Petal.Length
        count    150.000000   149.000000    150.000000
        mean       5.843333     3.061745      3.758000
        std        0.828066     0.433963      1.765298
        min        4.300000     2.000000      1.000000
        25%        5.100000     2.800000      1.600000
        50%        5.800000     3.000000      4.350000
        75%        6.400000     3.300000      5.100000
        max        7.900000     4.400000      6.900000
```

```
In [4]: irises.groupby('Species').count()
```

```
Out[4]:             Sepal.Length  Sepal.Width  Petal.Length  Petal.Width
        Species
        setosa                50           50            50           50
        versicolor            50           49            50           50
        virginica             50           50            50           50
```

Checking again which column needs data type to changed and which one has missing value

```
In [5]: irises.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 150 entries, 1 to 150
Data columns (total 5 columns):
Sepal.Length    150 non-null float64
Sepal.Width     149 non-null float64
Petal.Length    150 non-null float64
Petal.Width     150 non-null object
Species         150 non-null object
dtypes: float64(3), object(2)
memory usage: 7.0+ KB
```

0.1.2 1.2 Preprocessing the data

Changing the 'Petal.Width' to float, so the model could use this column

```
In [6]: irises['Petal.Width'] = irises['Petal.Width'].str.replace(',' , '.')
```

```
In [7]: irises['Petal.Width'] = irises['Petal.Width'].astype(float)
```

Now I have data types ready to be used in model, but there is still missing value in one column

```
In [8]: irises.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 150 entries, 1 to 150
Data columns (total 5 columns):
Sepal.Length    150 non-null float64
Sepal.Width     149 non-null float64
Petal.Length    150 non-null float64
Petal.Width     150 non-null float64
Species         150 non-null object
dtypes: float64(4), object(1)
memory usage: 7.0+ KB
```

```
In [9]: irises.isnull().sum()
```

```
Out[9]: Sepal.Length    0
        Sepal.Width     1
        Petal.Length    0
        Petal.Width     0
        Species         0
        dtype: int64
```

I filled the missing value with mean value from the column. The data is ready to be used in model.

```
In [10]: irises['Sepal.Width'].fillna(irises['Sepal.Width'].mean(), inplace=True)
```

```
In [11]: irises.isnull().sum()
```

```
Out[11]: Sepal.Length    0
         Sepal.Width     0
         Petal.Length    0
         Petal.Width     0
         Species         0
         dtype: int64
```

0.2 2. Preparing the model

0.2.1 2.1 creating dependent and independent datasets

Species is the dependent value(y) the one that's gonna be predicted. The rest of values(X) are the independent which are the basis to predict the 'Species'.

```
In [12]: X = irises.drop('Species',axis='columns')
         y = irises.Species
```

```
In [13]: from sklearn.model_selection import train_test_split
```

I split the data into training and testing sets

```
In [14]: X_train, X_test, y_train, y_test = train_test_split(X,y,test_size=0.2)
```

I decided to check the performance of the Random Forest Classifier as I know this model should perform well and fast on this small dataset. Random forest is an ensemble method, a technique that combines the predictions from multiple algorithms together to make more accurate predictions than any individual model.

```
In [15]: from sklearn.ensemble import RandomForestClassifier
```

I checked the performance with different numbers of estimators(trees). The defualt is 10, I tried increasing the number up to 100, but it didn't change the performance of the model, so I left the deafualt number. Reading the documentation for the RandomForestClassifier I found that 0 and 42 are the optimal values of 'random_state'. I left the rest of features default as the model performed well.

```
In [16]: model = RandomForestClassifier(random_state = 42)
```

0.2.2 2. 2 Training the model

```
In [17]: model.fit(X_train, y_train)
```

```
/home/bartek/anaconda3/lib/python3.7/site-packages/sklearn/ensemble/forest.py:245: FutureWarni
  "10 in version 0.20 to 100 in 0.22.", FutureWarning)
```

```
Out[17]: RandomForestClassifier(bootstrap=True, class_weight=None, criterion='gini',
                                max_depth=None, max_features='auto', max_leaf_nodes=None,
                                min_impurity_decrease=0.0, min_impurity_split=None,
                                min_samples_leaf=1, min_samples_split=2,
                                min_weight_fraction_leaf=0.0, n_estimators=10,
                                n_jobs=None, oob_score=False, random_state=42, verbose=0,
                                warm_start=False)
```

```
In [18]: y_predicted = model.predict(X_test)
```

The model performance

```
In [19]: from sklearn.metrics import accuracy_score
         acc = accuracy_score(y_test, y_predicted)
         print("acc: ", acc)
```

```
acc:  0.9333333333333333
```

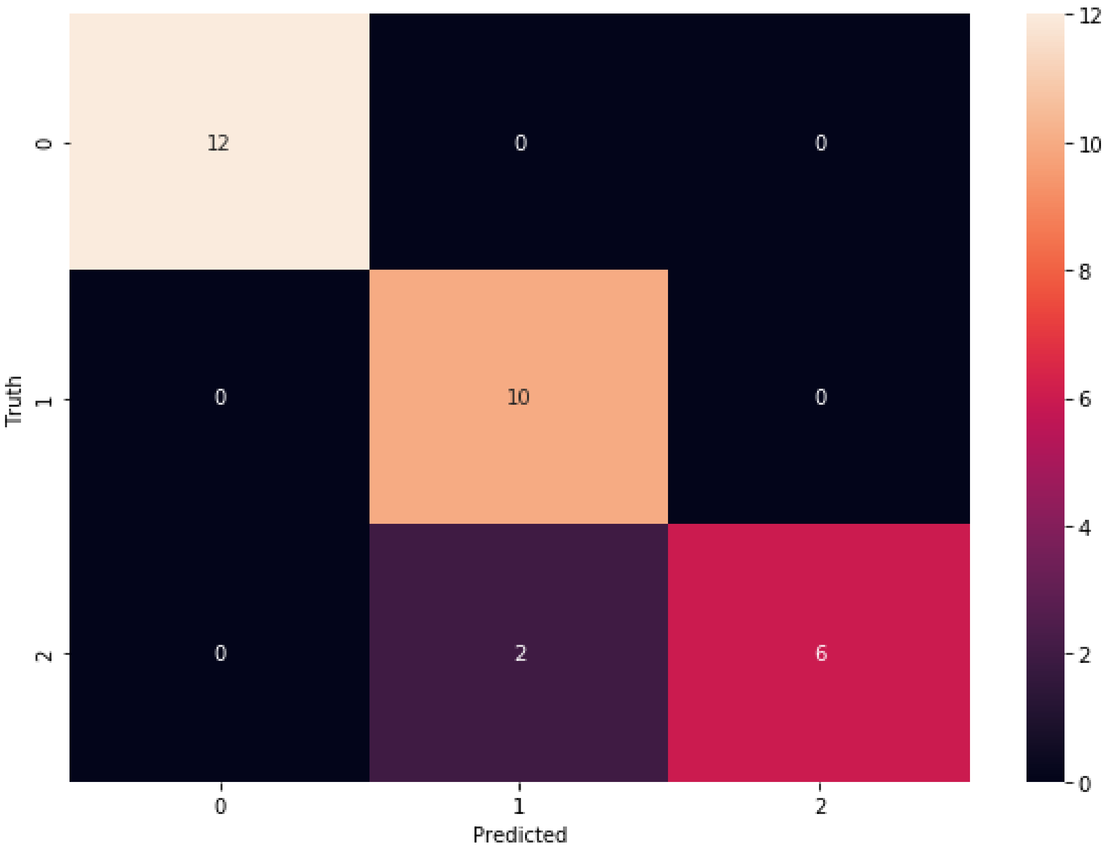
The confusion matric shows model accuracy

```
In [20]: from sklearn.metrics import confusion_matrix
         cm = confusion_matrix(y_test, y_predicted)
         cm
```

```
Out[20]: array([[12,  0,  0],
                [ 0, 10,  0],
                [ 0,  2,  6]])
```

```
In [21]: %matplotlib inline
         import matplotlib.pyplot as plt
         import seaborn as sn
         plt.figure(figsize=(10,7))
         sn.heatmap(cm, annot=True)
         plt.xlabel('Predicted')
         plt.ylabel('Truth')
```

```
Out[21]: Text(69.0, 0.5, 'Truth')
```


12
0
0
0
10
0
0
2
6
Truth
0
1
2
Predicted
0
1
2
12
10
8
6
4
2
0