

```
import numpy as np
from sklearn.neighbors import KNeighborsClassifier
from sklearn.datasets import load_wine
import seaborn as sns
import pandas as pd
import matplotlib.pyplot as plt
```

```
data=load_wine()
```

```
X = pd.DataFrame(data=data['data'], columns=data['feature_names'])
y = data['target']
alcohol=X['alcohol']
color=X['color_intensity']
cyanins=X['proanthocyanins']
```

```
X.describe()
```

	alcohol	malic_acid	ash	alcalinity_of_ash	magnesium	total_phe
count	178.000000	178.000000	178.000000	178.000000	178.000000	178.000000
mean	13.000618	2.336348	2.366517	19.494944	99.741573	2.290185
std	0.811827	1.117146	0.274344	3.339564	14.282484	0.621111
min	11.030000	0.740000	1.360000	10.600000	70.000000	0.980000
25%	12.362500	1.602500	2.210000	17.200000	88.000000	1.740000
50%	13.050000	1.865000	2.360000	19.500000	98.000000	2.350000
75%	13.677500	3.082500	2.557500	21.500000	107.000000	2.800000
max	14.830000	5.800000	3.230000	30.000000	162.000000	3.880000

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
classifier = KNeighborsClassifier(n_neighbors=13)
classifier.fit(X_train,y_train);
```

```
y=[]
```

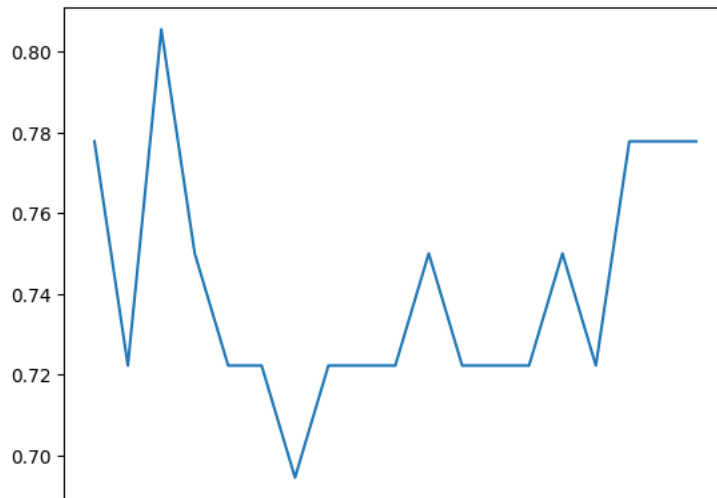
```
for i in range(1,20):
    classifier = KNeighborsClassifier(n_neighbors=i)
    classifier.fit(X_train,y_train)
    y_pred = classifier.predict(X_test)
    score =classifier.score(X_test,y_test)
    y.append(score)
    print(score)
```

```
0.7777777777777778
0.7222222222222222
0.8055555555555556
0.75
0.7222222222222222
0.7222222222222222
0.6944444444444444
0.7222222222222222
0.7222222222222222
0.7222222222222222
0.75
0.7222222222222222
0.7222222222222222
0.7222222222222222
0.75
0.7222222222222222
0.7777777777777778
0.7777777777777778
0.7777777777777778
```

```
k=[i for i in range(1,20)]
plt.plot(k,y)
```

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[<matplotlib.lines.Line2D at 0x7f43f32d91b0>]



At $n_neighbors = 3$ accuracy is maximum

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