knn

Efficiency of knn with sample data from scikit-learn

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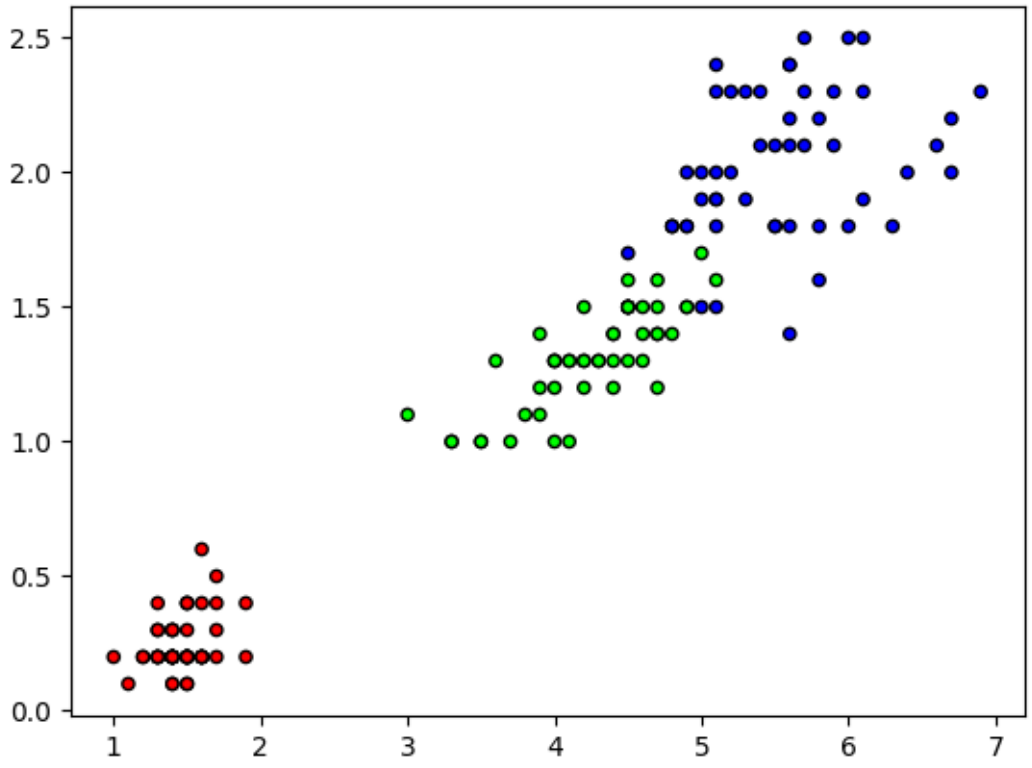
```
import numpy as np



from sklearn import datasets
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
from matplotlib.colors import ListedColormap


cmap = ListedColormap(['#FF0000','#00FF00','#0000FF'])

iris = datasets.load_iris()
X, y = iris.data, iris.target

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=1234

plt.figure()
plt.scatter(X[:,2],X[:,3], c=y, cmap=cmap, edgecolor='k', s=20)
plt.show()
```




```
from collections import Counter

def euclidean_distance(x1, x2):
    np.sqrt(np.sum((x1-x2)**2))

class KNN:
    def __init__(self, k=3):
        self.k = k

    def fit(self, X, y):
        self.X_train = X
        self.y_train = y

    def predict(self, X):
        predictions = [self._predict(x) for x in X]
        return predictions

    def _predict(self, x):
```

```
        # conmpute the distance
        distances = [euclidean_distance(x, x_train) for x_train in self.X_train]

        # get the closest k
        k_indices = np.argsort(distances)[:self.k]
        k_nearest_labels = [self.y_train[i] for i in k_indices]
        return predictions

        # majority vote
        most_common = Counter(k_nearest_labels).most_common()
        return most_common[0][0]
```

```
from collections import Counter
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def euclidean_distance(x1, x2):
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class KNN:
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    def _predict(self, x):
        # Compute the distance
        distances = [euclidean_distance(x, x_train) for x_train in self.X_train]

        # Get the closest k indices
        k_indices = np.argsort(distances)[:self.k]

        # Get the labels of the k nearest neighbors
        k_nearest_labels = [self.y_train[i] for i in k_indices]
```

```
        # Majority vote, most common class label
        most_common = Counter(k_nearest_labels).most_common()
        return most_common  # Return the most common label
```

```
clf = KNN(k=5)
clf.fit(X_train, y_train)
predictions = clf.predict(X_test)

print(predictions)
```

```
[[(1, 4), (2, 1)], [(2, 3), (1, 2)], [(2, 5)], [(0, 5)], [(1, 5)], [(0, 5)], [(0, 5)], [(0, 5
```

```
from collections import Counter
import numpy as np

def euclidean_distance(x1, x2):
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class KNN:
    def __init__(self, k=3):
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    def _predict(self, x):
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        distances = [euclidean_distance(x, x_train) for x_train in self.X_train]

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        k_indices = np.argsort(distances)[:self.k]

        # Get the labels of the k nearest neighbors
        k_nearest_labels = [self.y_train[i] for i in k_indices]
```

```
        # Majority vote, most common class label
        # refining the class to get the first label
        most_common = Counter(k_nearest_labels).most_common()
        return most_common[0][0]  # Return the most common label
```

```
clf = KNN(k=5)
clf.fit(X_train, y_train)
predictions = clf.predict(X_test)

print(predictions)
```

```
[1, 2, 2, 0, 1, 0, 0, 0, 1, 2, 1, 0, 2, 1, 0, 1, 2, 0, 2, 1, 1, 1, 1, 1, 2, 0, 2, 1, 2, 0]
```

```
# calculating the accuracy

acc = np.sum(predictions == y_test) / len(y_test)

print(acc)
```

```
0.9666666666666667
```

Resources:-

1. https://medium.com/@Khuranasoils/linear-regression-is-a-fundamental-statistical-method-used-for-modelling-the-relationship-between-a-e0544296fe56
2. https://www.youtube.com/watch?v=rTEtEy5o3X0