

### Loading the data

```
>>> import numpy as np
>>> X = np.random.random((10,5))
>>> y = np.array(['M', '-M', 'F', 'F', 'M', 'F', 'M', '-M', 'F', 'F', 'F'])
>>> X[X < 0.7] = 0
```

### Training and Test data

```
>>> from sklearn.model_selection
import train_test_split
>>> X_train, X_test, y_train,
y_test = train_test_split(X, y,
random_state=0)
```

### Prediction

#### Supervised Estimators

```
>>> y_pred = svc.predict(np.random.random((2,5)))
>>> y_pred = lr.predict(X_test)
>>> y_pred = knn.predict_proba(X_test)
```

#### Unsupervised Estimators

```
>>> y_pred = k_means.predict(X_test)
```

### Pre-processing the data

### Model Fitting

#### Supervised Learning

```
>>> lr.fit(X, y)
>>> knn.fit(X_train, y_train)
>>> svc.fit(X_train, y_train)
```

#### Unsupervised Learning

```
>>> k_means.fit(X_train)
>>> pca_model = pca.fit_transform(X_train)
```

### Create model

#### Supervised Learning Estimators

##### Linear Regression

```
>>> from sklearn.linear_model import
LinearRegression
>>> lr = LinearRegression(normalize=True)
```

##### Support Vector Machines (SVM)

```
>>> from sklearn.svm import SVC
>>> svc = SVC(kernel='linear')
```

##### Naive Bayes

```
>>> from sklearn.naive_bayes import
GaussianNB
>>> gnb = GaussianNB()
```

##### KNN

```
>>> from sklearn import neighbors
>>> knn = neighbors.KNeighborsClassifier(n_neighbors=5)
```

#### Unsupervised Learning Estimators

##### Principal Component Analysis (PCA)

```
>>> from sklearn.decomposition import
PCA
>>> pca = PCA(n_components=0.95)
```

##### K Means

```
>>> from sklearn.cluster import KMeans
>>> k_means = KMeans(n_clusters=3,
random_state=0)
```

### Tune Your Model

### Evaluate Your Model's Performance

#### Classification Metrics

##### Accuracy Score

```
>>> knn.score(X_test, y_test)
>>> from sklearn.metrics import accuracy_score
>>> accuracy_score(y_test, y_pred)
```

##### Classification Report

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

##### Confusion Matrix

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

#### Regression Metrics

##### Mean Absolute Error

```
>>> from sklearn.metrics import
mean_absolute_error
>>> y_true = [3, -0.5, 2]
>>> mean_absolute_error(y_true,
y_pred)
```

##### Mean Squared Error

```
>>> from sklearn.metrics import
mean_squared_error
>>> mean_squared_error(y_test,
y_pred)
```

##### R<sup>2</sup> Score

```
>>> from sklearn.metrics import
r2_score
>>> r2_score(y_true, y_pred)
```

### Standardization

```
>>> from sklearn.preprocessing import
StandardScaler
>>> scaler = StandardScaler().fit(X_train)
>>> standardized_X = scaler.transform(X_train)
>>> standardized_X_test = scaler.transform(X_test)
```

### Normalization

```
>>> from sklearn.preprocessing import
Normalizer
>>> scaler = Normalizer().fit(X_train)
>>> normalized_X = scaler.transform(X_train)
>>> normalized_X_test = scaler.transform(X_test)
```

### Encoding Categorical Features

```
>>> from sklearn.preprocessing import
LabelEncoder
>>> enc = LabelEncoder()
>>> y = enc.fit_transform(y)
```

### Imputing Missing Values

```
>>> from sklearn.preprocessing import
Imputer
>>> imp = Imputer(missing_values=0,
strategy='mean', axis=0)
>>> imp.fit_transform(X_train)
```

### Grid Search

```
>>> from sklearn.grid_search import
GridSearchCV
>>> params = {"n_neighbors": np.arange(1,3), "metric": ["euclidean", "cityblock"]}
>>> grid = GridSearchCV(estimator=knn,
param_grid=params)
>>> grid.fit(X_train, y_train)
>>> print(grid.best_score_)
>>> print(grid.best_estimator_.n_neighbors)
```

### Randomized Parameter Optimization

```
>>> from sklearn.grid_search import
RandomizedSearchCV
>>> params = {"n_neighbors": range(1,5), "weights": ["uniform", "distance"]}
>>> rsearch = RandomizedSearchCV(
(estimator=knn, param_distributions=params,
cv=4, n_iter=8, random_state=5))
>>> rsearch.fit(X_train, y_train)
>>> print(rsearch.best_score_)
```

### Clustering Metrics

#### Adjusted Rand Index

```
>>> from sklearn.metrics import adjusted_rand_score
>>> adjusted_rand_score(y_true, y_pred)
```

#### Homogeneity

```
>>> from sklearn.metrics import
homogeneity_score
>>> homogeneity_score(y_true, y_pred)
```

#### V-measure

```
>>> from sklearn.metrics import
v_measure_score
>>> metrics.v_measure_score(y_true, y_pred)
```

#### Cross-Validation

```
>>> from sklearn.cross_validation import
cross_val_score
>>> print(cross_val_score(knn, X_train,
y_train, cv=4))
>>> print(cross_val_score(lr, X, y, cv=2))
```



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Not published yet.

Last updated 31st March, 2020.

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