Here is a brief explanation of each library or module you've imported, along with an example for each:

Data Wrangling Libraries:

1. **pandas (pd)**: Used for data manipulation and analysis, particularly data frames.

Example:
python
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```
df = pd.DataFrame({'A': [1, 2], 'B': [3, 4]})
print(df)
```

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2. **numpy (np)**: Provides support for large multi-dimensional arrays and matrices, and many mathematical functions.

Example:
python
Copy code

```
arr = np.array([1, 2, 3])
print(np.mean(arr))
```

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3. **scipy.stats**: Part of SciPy, used for statistical computations and tests.

Example:
python
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```
from scipy.stats import norm
print(norm.cdf(0))
```

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4. **math**: Python's standard library for mathematical functions.

Example:
python
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```
import math
print(math.sqrt(16))
```

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Data Preprocessing Libraries:

1. **LabelEncoder**: Encodes target labels with values between 0 and n_classes-1.

Example:
python
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```
le = LabelEncoder()
y = le.fit_transform(['dog', 'cat', 'cat'])
print(y)
```

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2. **StandardScaler**: Standardizes features by removing the mean and scaling to unit variance.

Example:
python
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```
scaler = StandardScaler()
scaled_data = scaler.fit_transform([[1, 2], [3, 4], [5, 6]])
print(scaled_data)
```

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3. **LabelBinarizer**: Binarizes labels in a one-vs-all fashion.

Example:
python
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```
lb = LabelBinarizer()
y = lb.fit_transform([1, 2, 3])
print(y)
```

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4. **MinMaxScaler**: Scales features to a given range, typically between 0 and 1.

Example:
python
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```
scaler = MinMaxScaler()
scaled_data = scaler.fit_transform([[1, 2], [3, 4]])
print(scaled_data)
```

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5. **scale**: A shorthand to scale data to zero mean and unit variance.

Example:
python
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```
from sklearn.preprocessing import scale
scaled_data = scale([1, 2, 3, 4])
print(scaled_data)
```

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6. **cosine_similarity**: Computes cosine similarity between samples.

Example:
python
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```
from sklearn.metrics.pairwise import cosine_similarity
sim = cosine_similarity([[1, 0], [0, 1]])
print(sim)
```

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ML Model Libraries:

1. **statsmodels.api**: Provides classes for statistical models, including linear regression.

Example:
python
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```
import statsmodels.api as sm
X = sm.add_constant([1, 2, 3])
y = [1, 2, 4]
model = sm.OLS(y, X).fit()
print(model.summary())
```

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2. **LinearRegression**: Performs linear regression.

Example:
python
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```
model = LinearRegression()
model.fit([[1], [2], [3]], [1, 2, 3])
```

```
print(model.predict([[4]]))
```

○

3. **LogisticRegression**: Performs logistic regression.

Example:
python
Copy code

```
model = LogisticRegression()
model.fit([[1], [2], [3]], [0, 1, 0])
print(model.predict([[4]]))
```

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4. **DecisionTreeRegressor / DecisionTreeClassifier**: Implements decision trees for regression and classification.

Example:
python
Copy code

```
model = DecisionTreeRegressor()
model.fit([[1], [2], [3]], [1, 2, 3])
print(model.predict([[4]]))
```

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5. **KNeighborsRegressor / KNeighborsClassifier**: Implements k-nearest neighbors for regression and classification.

Example:
python
Copy code

```
model = KNeighborsRegressor()
model.fit([[1], [2], [3]], [1, 2, 3])
print(model.predict([[4]]))
```

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6. **BaggingRegressor / BaggingClassifier**: Implements bagging for regression and classification.

Example:
python
Copy code

```
from sklearn.ensemble import BaggingRegressor
model = BaggingRegressor()
model.fit([[1], [2], [3]], [1, 2, 3])
```

```
print(model.predict([[4]]))
```

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7. **RandomForestRegressor / RandomForestClassifier**: Implements random forests for regression and classification.

Example:
python
Copy code

```
model = RandomForestRegressor()
model.fit([[1], [2], [3]], [1, 2, 3])
print(model.predict([[4]]))
```

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8. **GradientBoostingRegressor / GradientBoostingClassifier**: Implements gradient boosting for regression and classification.

Example:
python
Copy code

```
model = GradientBoostingRegressor()
model.fit([[1], [2], [3]], [1, 2, 3])
print(model.predict([[4]]))
```

○

9. **XGBRegressor / XGBClassifier**: XGBoost implementation for regression and classification.

Example:
python
Copy code

```
model = XGBRegressor()
model.fit([[1], [2], [3]], [1, 2, 3])
print(model.predict([[4]]))
```

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10. **DBSCAN**: Density-based clustering.

Example:
python
Copy code

```
from sklearn.cluster import DBSCAN
model = DBSCAN()
model.fit([[1, 2], [2, 3], [8, 9]])
```

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11. **kmeans**: K-means clustering.

Example:
python
Copy code

```
from sklearn.cluster import KMeans
model = KMeans(n_clusters=2)
model.fit([[1, 2], [2, 3], [8, 9]])
```

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Model Tuning and Performance Libraries:

1. **RandomizedSearchCV**: Randomized search for hyperparameter optimization.

Example:
python
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```
from sklearn.model_selection import RandomizedSearchCV
```

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2. **cross_val_score**: Cross-validation for model performance.

Example:
python
Copy code

```
from sklearn.model_selection import cross_val_score
```

  ○

3. **roc_auc_score**: Computes ROC AUC score.

Example:
python
Copy code

```
from sklearn.metrics import roc_auc_score
```

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Data Visualization Libraries:

1. **seaborn (sns)**: High-level data visualization.

Example:
python

Copy code

```
sns.pairplot(df)
plt.show()
```

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2. **matplotlib.pyplot**: Core plotting library.

Example:
python
Copy code

```
plt.plot([1, 2, 3], [4, 5, 6])
plt.show()
```

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3. **Basemap**: Visualizing maps.

Example:
python
Copy code

```
from mpl_toolkits.basemap import Basemap
```

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NLP Libraries:

1. **re**: Regular expressions for string manipulation.

Example:
python
Copy code

```
re.sub(r'\d+', '', 'abc123')
```

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2. **string**: Contains string constants.

Example:
python
Copy code

```
string.ascii_letters
```

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3. **nltk.corpus.stopwords**: Contains stopwords for NLP.

Example:
python

Copy code

```
from nltk.corpus import stopwords
```

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4. **word_tokenize**: Tokenizes words.

Example:
python
Copy code

```
word_tokenize('Hello World!')
```

○

5. **CountVectorizer / TfidfVectorizer**: Text feature extraction.

Example:
python
Copy code

```
vec = CountVectorizer()
print(vec.fit_transform(['Hello World']))
```

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6. **WordNetLemmatizer**: Performs lemmatization.

Example:
python
Copy code

```
lemmatizer = WordNetLemmatizer()
```

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Deep Learning Libraries:

1. **Sequential, Dense, LSTM, Dropout**: Used for building neural networks in Keras.

Example:
python
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```
model = Sequential()
model.add(Dense(32, input_shape=(10,)))
```

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2. **MLPClassifier / MLPRegressor**: Multi-layer perceptron classifiers and regressors.
   - Example:
     python

Copy code

```
model = MLPClassifier()
```