



# Machine Learning



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# Model Name: Passive Aggressive Classifier



The Passive Aggressive Classifier is a machine learning algorithm used for classification tasks.

The algorithm gets its name from its behavior when encountering misclassified examples. Instead of retraining the model from scratch, like many other algorithms, the Passive Aggressive Classifier takes a more "aggressive" approach by updating the model parameters in a more efficient manner. When presented with a new example, the classifier makes a prediction. If the prediction is incorrect, it adjusts the model parameters in a way that minimizes the loss while still considering the magnitude of the error. This allows the model to quickly adapt to changes in the data stream and make accurate predictions.

The Passive Aggressive Classifier is known for its simplicity and efficiency, making it suitable for online learning scenarios where resources are limited. It is commonly used in applications such as text classification, sentiment analysis, and recommendation systems.



```
● import pandas as pd  
  data = pd.read_csv('iris_dataset.csv')  
  data.info()
```

In First line we Import pandas library as pd, then we read iris\_dataset.csv file using the read\_csv() function, and prints information about the data using the info() method.

---



```
feature = ['sepal_length', 'sepal_width', 'petal_length', 'petal_width']
predection_class = ['species']
X = data[feature].values
y = data[predection_class].values
```

```
lambda = lr.LinearRegression()
lambda.fit(X, y)
```

This defines the 'feature' and 'predection\_class' variables, which specify the columns of the data to use as 'features' and the column to use as the prediction target.

The code then creates 'X' and 'y' arrays containing the values of these columns from the data DataFrame.

---



```
from sklearn.model_selection import train_test_split
X_train, X_test, Y_train, Y_test = train_test_split(X,y,test_size=0.30)
```

```
X_train, Y_train, X_test, Y_test = train_test_split(X, y, test_size=0.30)
```

This imports the `train_test_split` function from the `sklearn.model_selection` module and uses it to split the data into training and testing sets. The `test_size` parameter specifies that 30% of the data should be used for testing.



```
print(f"Shape of X_test is {X_test.shape}")  
print(f"Shape of X_train is {X_train.shape}")  
print(f"Shape of Y_test is {Y_test.shape}")  
print(f"Shape of Y_train is {Y_train.shape}")
```

These lines print the shapes of the training and testing data arrays. This output totally depends on the test size we took while `train_test_split`.

## OUTPUT

```
Shape of X_test is (45, 4)  
Shape of X_train is (105, 4)  
Shape of Y_test is (45, 1)  
Shape of Y_train is (105, 1)
```

```
Shape of X_train is (105, 4)
```



```
from sklearn.linear_model import PassiveAggressiveClassifier
clf = PassiveAggressiveClassifier()
clf.fit(X_train, Y_train)
Y_pred = clf.predict(X_test)
```

```
λ-1 b1 eq = c1 t1 · b1 eq t1 c1 (X-1 t1 e2 t1)
```

This imports the *PassiveAggressiveClassifier* module from the sklearn linear\_model library, creates a *PassiveAggressiveClassifier* classifier object, fits the classifier with the training data using the *fit()* method, and use the *predict()* method to generate predictions for the testing data.





```
from sklearn import metrics
print("Accuracy", metrics.accuracy_score(Y_test, Y_pred)*100)
```

```
Output: Accuracy: 86.66666666666667
```

This imports the metrics module from sklearn and uses the accuracy\_score() function to calculate the accuracy of the model on the testing data. The result is printed in the console.

## OUTPUT

```
Accuracy 86.66666666666667
```



# Conclusion

In conclusion, the Passive Aggressive Classifier is a powerful machine learning algorithm designed for real-time classification tasks. Its adaptive nature allows it to quickly update and adjust model parameters when encountering misclassified examples, making it suitable for dynamic and evolving data streams. The algorithm's simplicity and efficiency make it well-suited for online learning scenarios, where resources are limited.

The Passive Aggressive Classifier is widely used in various applications, such as text classification and sentiment analysis, where timely and accurate predictions are crucial. With its ability to swiftly adapt to changes in the data and make efficient updates, the Passive Aggressive Classifier provides an effective solution for classification tasks in dynamic environments.



# Thank You

