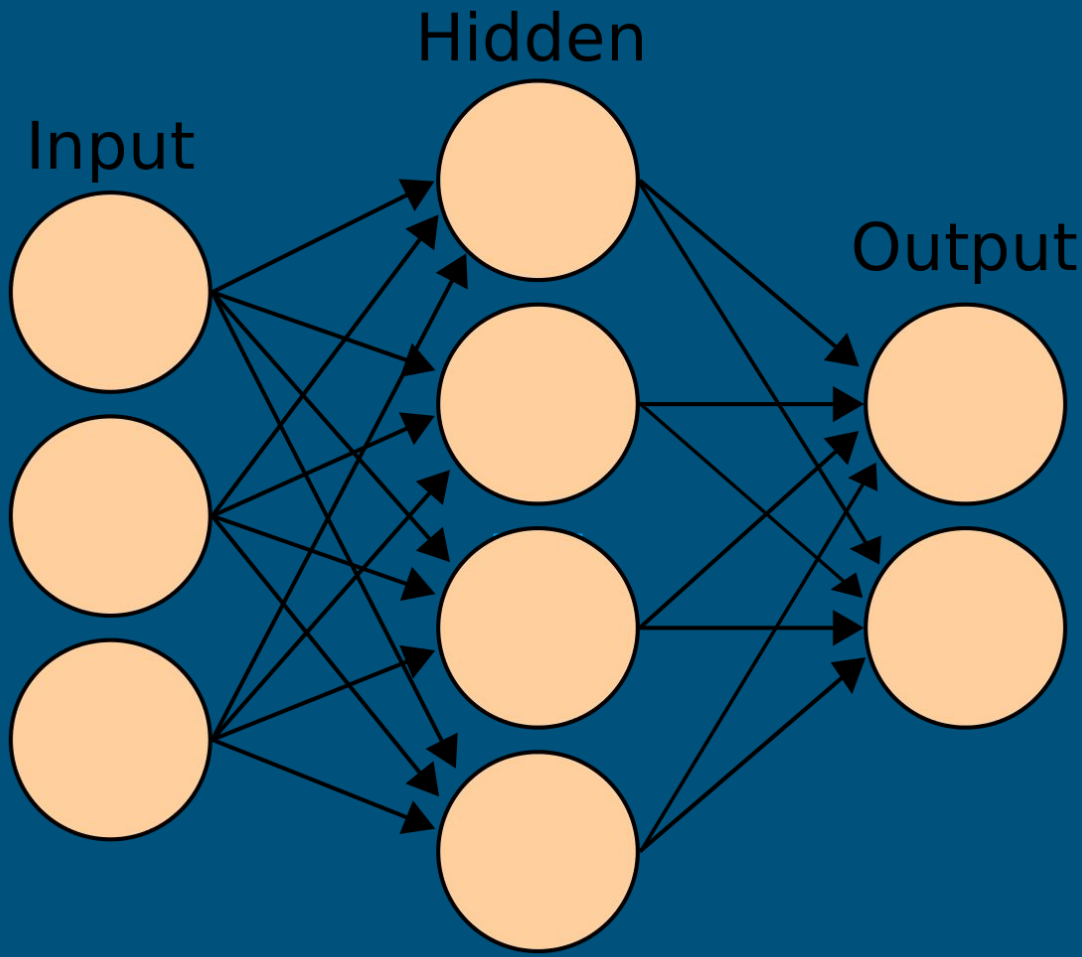
Machine Learning

By EvolkAI

Model Name:
Multi-Layer Perceptron Classifier

The MLP (Multilayer Perceptron) Classifier is a type of artificial neural network used for classification tasks. It is inspired by the structure and functioning of the human brain. MLP consists of multiple layers of interconnected nodes, called neurons. Each neuron receives inputs, performs calculations, and passes the result to the next layer.The input layer receives the features of the data, and the output layer gives the final classification result. The intermediate layers, called hidden layers, allow the network to learn complex patterns and relationships in the data.

During training, the network adjusts the weights and biases of the neurons based on the error between predicted and actual outputs. This process, called backpropagation, helps the network learn and improve its predictions. MLP is known for its ability to handle nonlinear relationships and complex datasets. It is widely used in various domains, including image recognition, natural language processing, and financial analysis. With its flexibility and learning capabilities, MLP Classifier is a powerful tool for solving classification problems.


Input
Hidden
Output

```
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
```

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)
```

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)
```

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

This imports the *MLPClassifier* module from the sklearn neural_network library, creates a *MLPClassifier* 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)
```

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 100.0
```

Conclusion

In conclusion, the MLP Classifier, or Multilayer Perceptron, is a powerful artificial neural network algorithm for classification tasks. With its multiple layers of interconnected neurons, it can learn and understand complex patterns in data. By adjusting weights and biases through backpropagation during training, the MLP Classifier improves its accuracy over time. Its ability to handle nonlinear relationships makes it suitable for a wide range of applications, such as image recognition, natural language processing, and financial analysis.

The flexibility and learning capabilities of the MLP Classifier empower researchers and practitioners to tackle challenging classification problems and make accurate predictions. It is a valuable tool in the field of machine learning, offering a sophisticated approach to solving complex classification tasks.

Thank You