Attention

1. Implement the models in Python. Use the independent libraries matplotlib, NumPy and pandas for implementation and display.

2. It is not allowed to use ready-made libraries to implement models such as scikit-learn.

3. Please, in addition to attaching the code, analyze the results and attach them to your report file.

4. The code can be in .py format or Jupyter, but note that you use relative addressing to access the data (your code should be able to run without modification)

The first question

According to the definition of machine learning from Tom Mitchell's point of view, categorize the following issues. Then, for each task, introduce an evaluation criterion based on previous experiences. Now determine whether the problem is supervised or unsupervised. In the event that the issue is Supervised, mention its sub-branches.

1. Identifying the breed of horse in the images available on the Internet.

2. Categorizing site visitors to represent products more suited to them.

3. checking requests to the server and preventing suspicious requests.

4. Detecting the trend of product price changes in the stock market.

The second question

The data is divided into two parts, training and testing, and is located in the data folder, where the first two columns are independent features and the last column is dependent features.

1. Read the training data set and display the examples of each class in two-dimensional space (the examples of different classes should be distinguishable from each other)

2. Does the Perceptron model based on the Pocket algorithm converge on the data? Why?

3. Implement the Perceptron model based on the Pocket algorithm and train it on the training data. If the Perceptron model does not converge on the data (according to the previous question), run the Pocket algorithm for a certain number of iterations.

4. Report accuracy on training and test data. Display the training and test data in two separate shapes along with the separating line that the Perceptron has learned (examples of different classes) should be distinguishable from each other.