test

November 4, 2022

[ ]:
```
#wine
import time

import pandas as pd
import matplotlib.pyplot as plt
from pandas.plotting import radviz
from sklearn import preprocessing
from Annclass import  *
#  4    1   5    RadViz
def result_visualization(test_datas, test_labels, labels_pred, accuracy,epochs):

    cols = test_labels.shape[0]
    class_true = []
    class_pred = []

    labels_true = np.argmax(test_labels, axis=1)
    #
    for i in range(cols):
        if labels_true[i] == 2:
            class_true.append(' 3')
        elif labels_true[i] == 1:
            class_true.append(' 2')
        else:
            class_true.append(' 1')
    for j in range(cols):
        if labels_pred[j] == 2:
            class_pred.append(' 3')
        elif labels_pred[j] == 1:
            class_pred.append(' 2')
        elif labels_pred[j] == 0:
            class_pred.append(' 1')
        else:
            class_pred.append('  ')

    #
    real = np.column_stack((test_datas, class_true))
    pred = np.column_stack((test_datas, class_pred))
```

```
    print(real)
    df_real = pd.DataFrame(real, index=None,
                            columns=[' ', '  ', ' ',␣
↪'  ',' ',' ','  ','  ','  ','  ',' ','  0280/OD315',' ',' '])
    df_pred = pd.DataFrame(pred, index=None,
                            columns=[' ', '  ', ' ',␣
↪'  ',' ',' ','  ','  ','  ','  ',' ','  0280/OD315',' ',' '])

    print(df_real)
    df_real[[' ', '  ', ' ', '  ',' ',' ','  ','  ','  ','  ',' ','  0280/
↪OD315',' ']] = df_real[
        [' ', '  ', ' ', '  ',' ',' ','  ','  ','  ','  ',' ','  0280/
↪OD315',' ']].astype(float)
    df_pred[[' ', '  ', ' ', '  ',' ',' ','  ','  ','  ','  ',' ','  0280/
↪OD315',' ']] = df_pred[
        [' ', '  ', ' ', '  ',' ',' ','  ','  ','  ','  ',' ','  0280/
↪OD315',' ']].astype(float)

    #
    #
    plt.figure("  ")
    plt.plot(np.arange(1, epochs, 100), accuracy)
    plt.ylabel(' ')
    plt.xlabel('  ')

    #
    plt.figure(dpi=130, figsize=(16, 8))
    plt.subplot(1, 2, 1)
    radviz(df_real, ' ', color=['blue', 'green', 'yellow', 'red'])
    plt.title('  ')
    plt.subplot(1, 2, 2)
    radviz(df_pred, ' ', color=['blue', 'green', 'yellow', 'red'])
    plt.title('  ')
    plt.rcParams['font.sans-serif'] = ['SimHei']  #
    plt.rcParams['axes.unicode_minus'] = False
    plt.show()

def wine_pred():
    #
    inputSize=13             #
    hidSize = 10             #
    outputSize = 3           #
    learning_rate = 0.001    #
    epochs = 5000            #
    accuracy = []            #
    #  ann
```

```
    ann = Ann(inputSize, hidSize, outputSize, learning_rate)

    #
    data_set_path = "data\wine_training.csv"
    data_set = pd.read_csv(data_set_path, header=None)
    train_datas = data_set.iloc[:, 0:inputSize].values
    train_labels = data_set.iloc[:, inputSize:].values
    train_datas = (train_datas - np.mean(train_datas, axis=0)) / np.
 ↪std(train_datas, axis=0)

    #
    data_test_path = "data\wine_test.csv"
    data_test_set = pd.read_csv(data_test_path, header=None)
    test_datas = data_test_set.iloc[:, 0:inputSize].values
    test_labels = data_test_set.iloc[:, inputSize:].values
    test_datas = (test_datas - np.mean(test_datas, axis=0)) / np.
 ↪std(test_datas, axis=0)
    labels_pred = []  #
    error_index = []  #
    print("  ")
    s = time.time()
    for epoch in range(epochs):
        if (epoch + 1) % 100 == 0:
            print("   %d  " % (epoch + 1))
            acc, labels_pred, labels_true, error_index = ann.
 ↪accuracy(test_datas, test_labels)
            print('  :', labels_pred, '\n  :', labels_true, '\n   :',␣
 ↪error_index)
            accuracy.append(acc)
        for i in range(len(train_datas)):
            ann.train(train_datas[i], train_labels[i])
    f = time.time()
    print(" %d   " % (epoch + 1))
    print("    ", accuracy[-1])
    print("   ", error_index)
    print("  ", f - s, 's')
    #
    for i in error_index:
        #
        labels_pred[i]=-1
    # 4    1        RadViz
    result_visualization(test_datas, test_labels, labels_pred, accuracy,epochs)


wine_pred()
```

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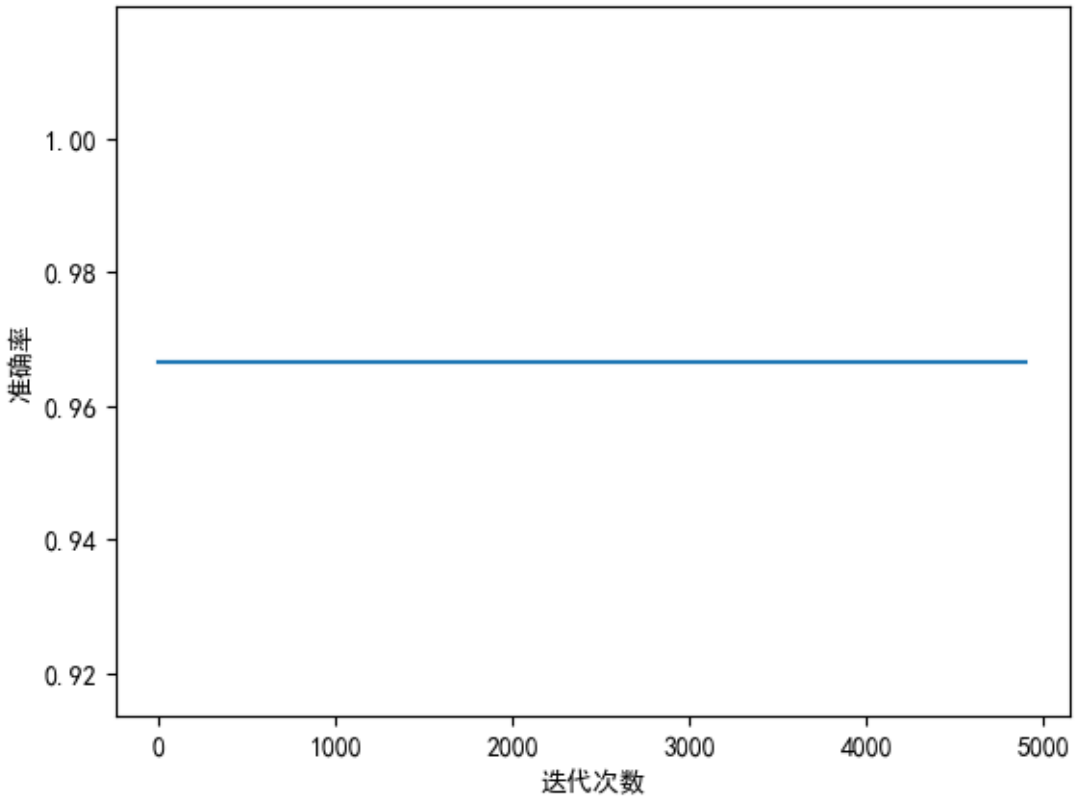
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0.96
0.94
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1000
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3000
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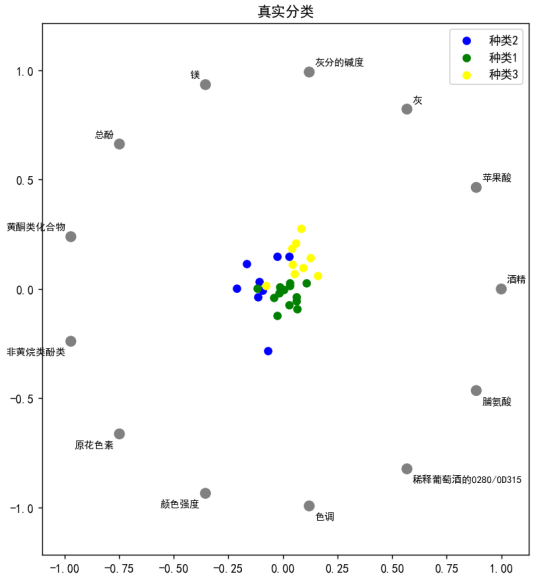
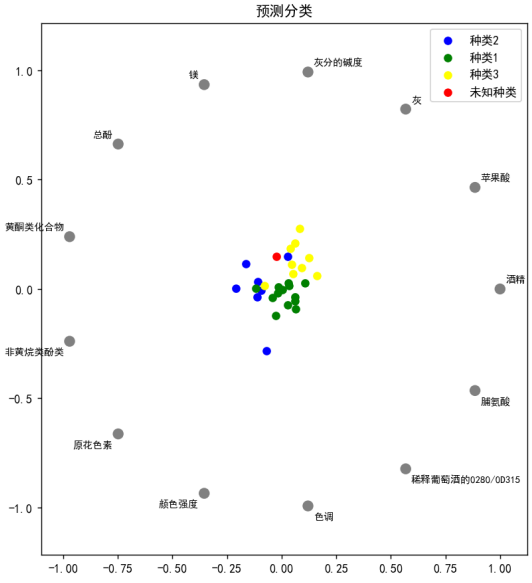
迭代次数


真实分类
种类2
种类1
种类3
灰分的碱度
镁
灰
总酚
苹果酸
黄酮类化合物
酒精
非黄烷类酚类
脯氨酸
原花色素
稀释葡萄酒的OD280/OD315
颜色强度
色调


预测分类
种类2
种类1
种类3
未知种类
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镁
灰
总酚
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黄酮类化合物
酒精
非黄烷类酚类
脯氨酸
原花色素
稀释葡萄酒的OD280/OD315
颜色强度
色调

[ ]:
```
#
import time

import pandas as pd
import matplotlib.pyplot as plt
from pandas.plotting import radviz
from Annclass import  *


#  4    1    5     RadViz
def result_visualization(test_datas, test_labels, labels_pred, accuracy,epochs):

    cols = test_labels.shape[0]
    class_true = []
    class_pred = []

    labels_true = np.argmax(test_labels, axis=1)
    #
    for i in range(cols):
        if labels_true[i] == 2:
            class_true.append('setosa')
        elif labels_true[i] == 1:
            class_true.append('versicolor')
        else:
            class_true.append('virginica')
    for j in range(cols):
        if labels_pred[j] == 2:
            class_pred.append('setosa')
        elif labels_pred[j] == 1:
            class_pred.append('versicolor')
        elif labels_pred[j] == 0:
            class_pred.append('virginica')
        else:
            class_pred.append('  ')

    #
    real = np.column_stack((test_datas, class_true))
    pred = np.column_stack((test_datas, class_pred))

    df_real = pd.DataFrame(real, index=None,
                           columns=['  ', '  ', '  ', '  ', ' '])
    df_pred = pd.DataFrame(pred, index=None,
                           columns=['  ', '  ', '  ', '  ', ' '])

    print(df_real)
    df_real[['  ', '  ', '  ', '  ']] = df_real[
        ['  ', '  ', '  ', '  ']].astype(float)
```

```
    df_pred[['  ', '  ', '  ', '  ']] = df_pred[
        ['  ', '  ', '  ', '  ']].astype(float)

    #
    #
    plt.figure("  ")
    plt.plot(np.arange(1, epochs, 100), accuracy)
    plt.ylabel('  ')
    plt.xlabel('  ')

    #
    plt.figure(dpi=130, figsize=(16, 8))
    plt.subplot(1, 2, 1)
    radviz(df_real, ' ', color=['blue', 'green', 'yellow', 'red'])
    plt.title('  ')
    plt.subplot(1, 2, 2)
    radviz(df_pred, ' ', color=['blue', 'green', 'yellow', 'red'])
    plt.title('  ')
    plt.rcParams['font.sans-serif'] = ['SimHei']  #
    plt.rcParams['axes.unicode_minus'] = False
    plt.show()
def iris_pred():
    #
    inputSize=4             #
    hidSize = 8            #
    outputSize = 3          #
    learning_rate = 0.002    #
    epochs = 10000          #
    accuracy = []           #
    #  ann
    ann = Ann(inputSize, hidSize, outputSize, learning_rate)
    #
    data_set_path = "data\iris_training.csv"
    data_set = pd.read_csv(data_set_path, header=None)
    train_datas = data_set.iloc[:, 0:inputSize].values
    train_labels = data_set.iloc[:, inputSize:].values
    #
    data_test_path = "data\iris_test.csv"
    data_test_set = pd.read_csv(data_test_path, header=None)
    test_datas = data_test_set.iloc[:, 0:inputSize].values
    test_labels = data_test_set.iloc[:, inputSize:].values
    labels_pred = [] #
    error_index = [] #
    print("  ")
    s = time.time()
    for epoch in range(epochs):
        if (epoch+1) % 100 == 0:
```

```
            print("   %d  " % (epoch+1))
            acc, labels_pred, labels_true, error_index = ann.
 ↪accuracy(test_datas, test_labels)
            print('  :', labels_pred, '\n  :', labels_true, '\n  :',␣
 ↪error_index)
            accuracy.append(acc)
        for i in range(len(train_datas)):
            ann.train(train_datas[i], train_labels[i])
    f = time.time()
    print(" %d   " % (epoch+1))
    print("    ", accuracy[-1])
    print("   ", error_index)
    print("  ", f-s, 's')
    #
    for i in error_index:
        #
        labels_pred[i]=-1
    # 4    1        RadViz
    result_visualization(test_datas, test_labels, labels_pred, accuracy,epochs)
iris_pred()
```

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   : [13]
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  : [2 2 1 1 0 1 2 1 1 1 2 1 1 1 2 1 2 1 2 2 2 0 0 2 1 0 0 0 1 1]
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    [13]
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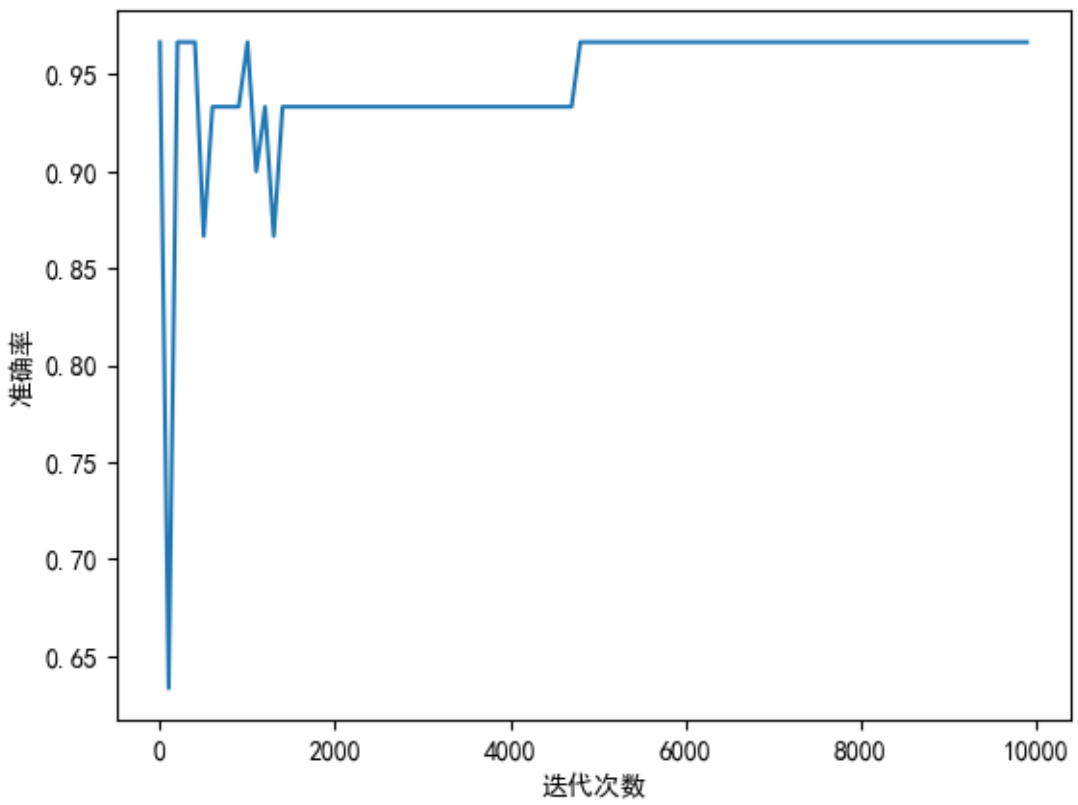
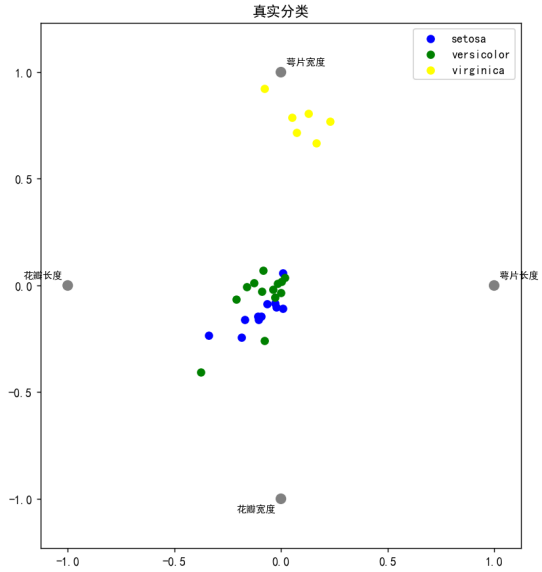
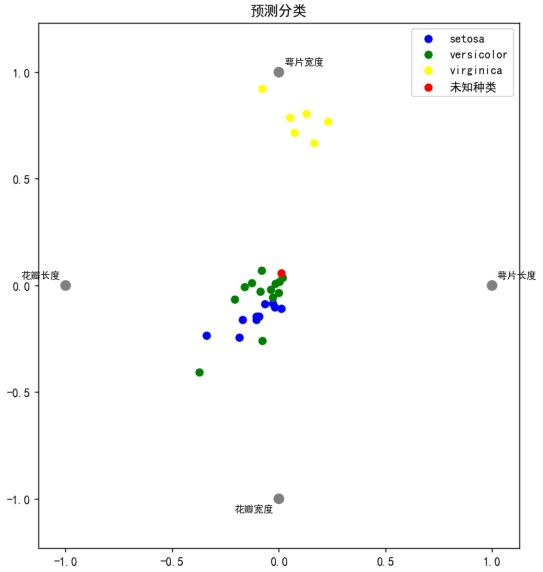
0   7.7  3.0  6.1  2.3      setosa
1   7.4  2.8  6.1  1.9      setosa
2   6.8  2.8  4.8  1.4  versicolor
3   6.7  3.1  4.4  1.4  versicolor
```

```
4   5.5  3.5  1.3  0.2   virginica
5   5.6  3.0  4.5  1.5  versicolor
6   6.4  2.8  5.6  2.1      setosa
7   5.8  2.7  3.9  1.2  versicolor
8   6.9  3.1  4.9  1.5  versicolor
9   6.4  2.9  4.3  1.3  versicolor
10  6.4  2.8  5.6  2.2      setosa
11  6.2  2.2  4.5  1.5  versicolor
12  5.0  2.0  3.5  1.0  versicolor
13  7.9  3.8  6.4  2.0      setosa
14  7.6  3.0  6.6  2.1      setosa
15  5.7  2.9  4.2  1.3  versicolor
16  6.4  2.7  5.3  1.9      setosa
17  5.5  2.6  4.4  1.2  versicolor
18  5.8  2.7  5.1  1.9      setosa
19  4.9  2.5  4.5  1.7      setosa
20  6.7  3.3  5.7  2.5      setosa
21  4.7  3.2  1.6  0.2   virginica
22  5.7  3.8  1.7  0.3   virginica
23  5.7  2.5  5.0  2.0      setosa
24  6.5  2.8  4.6  1.5  versicolor
25  5.3  3.7  1.5  0.2   virginica
26  5.1  3.7  1.5  0.4   virginica
27  5.0  3.0  1.6  0.2   virginica
28  6.1  2.8  4.0  1.3  versicolor
29  6.0  3.4  4.5  1.6  versicolor
```


准确率
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0
2000
4000
6000
8000
10000
迭代次数


真实分类
setosa
versicolor
virginica
萼片宽度
花瓣长度
萼片长度
花瓣宽度
1.0
0.5
0.0
-0.5
-1.0
-1.0
-0.5
0.0
0.5
1.0


预测分类
setosa
versicolor
virginica
未知种类
萼片宽度
花瓣长度
萼片长度
花瓣宽度
1.0
0.5
0.0
-0.5
-1.0
-1.0
-0.5
0.0
0.5
1.0