Project_01_PLA

Program questions (1) fill in the blanks

- Where the code (PLA.ipynb) is None (as shown below), please fill in the correct code.

  (The code PLA.ipynb will be uploaded to ecourse2)

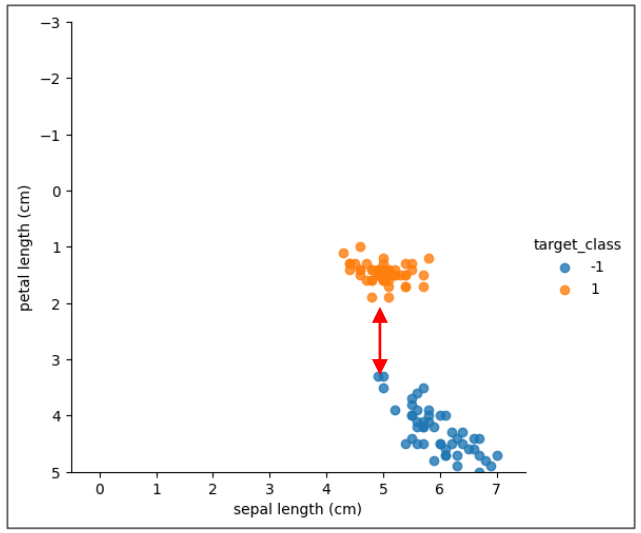
```
def sign(z):
    if z > 0:
        return None
    else:
        return None
```

```
#如果分類錯誤
if sign(np.dot(w,x)) != None:
    print("iterator: "+str(iterator))
    iterator += 1
    error += 1
    sns.lmplot(x='sepal length (cm)',y='petal length (cm)',data=data, fit_reg=False, hue ='target_class')

    # 前一個Decision boundary 的法向量
    if w[1] != 0:
        x_last_decision_boundary = np.linspace(0,w[1])
        y_last_decision_boundary = (w[2]/w[1])*x_last_decision_boundary
        plt.plot(x_last_decision_boundary, y_last_decision_boundary,'c--')

    #更新w
    w += None
    print("x: " + str(x))
    print("w: " + str(w))
```

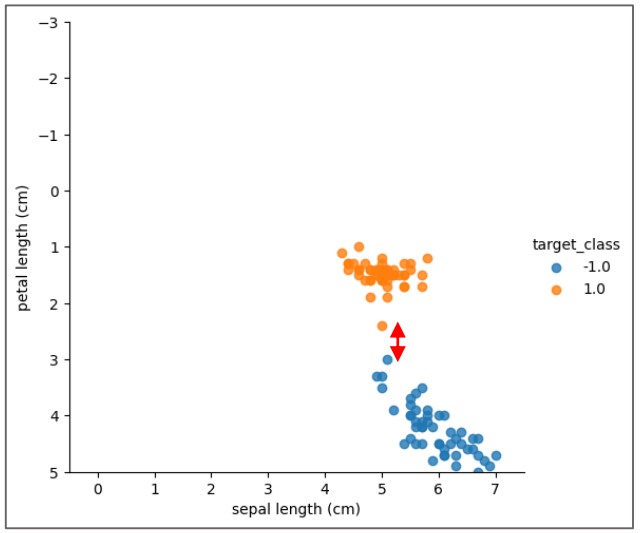
Comparison of Classification Results from Different Datasets

Given three different iris datasets :

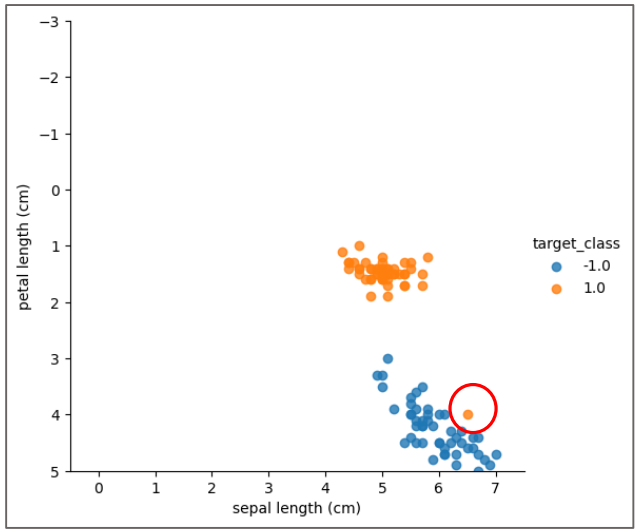
```
iris_data1, iris_data2, iris_data3 = iris_data, iris_data, iris_data
iris_data1 = iris_data1.drop(98)
iris_data2 = iris_data2.append({'sepal length (cm)':5, 'petal length (cm)':2.4, 'target_class':1},ignore_index=True)
iris_data3 = iris_data3.append({'sepal length (cm)':6.5, 'petal length (cm)':4.0, 'target_class':1},ignore_index=True)
```



iris_data1



iris_data2



iris_data3

Comparison of Classification Results from Different Datasets

- **Question 1:** Please explain why the number of iterations between **iris_data1** and **iris_data2** is different, and the possible reasons?
- **Question 2:** Importing **iris_data3** will find that there is no way to converge, please explain the possible reasons?

Program questions (2) Pocket Algorithm

- Importing **iris_data3 cannot converge**, so the program will keep iterating.

  Please refer to **Pocket Algorithm** to modify the program so that the program will not iterate all the time.

Pocket Algorithm

- Initialize pocket weight $\hat{\mathbf{w}}$
- For $t = 0,1, \ldots$
  1. Find a (random) mistake of $\mathbf{w_t}$ called $(\mathbf{x}_{n(t)}, y_{n(t)})$
  2. Correct the mistake by
     $$\mathbf{w_{t+1}} \leftarrow \mathbf{w}_t + y_{n(t)}\mathbf{x}_{n(t)}$$
  3. If $\mathbf{w}_{t+1}$ makes fewer mistakes than $\hat{\mathbf{w}}$, replace $\hat{\mathbf{w}}$ by $\mathbf{w_{t+1}}$.

  Until enough iterations. $g = \hat{\mathbf{w}}$

Submit file

- Code : StudentNumber_Name.ipynb
- Explanation of comparison results : StudentNumber_Name.pdf
- Deadline : 3/29(Wed.) 11:59 p.m.