report

Practical work 01

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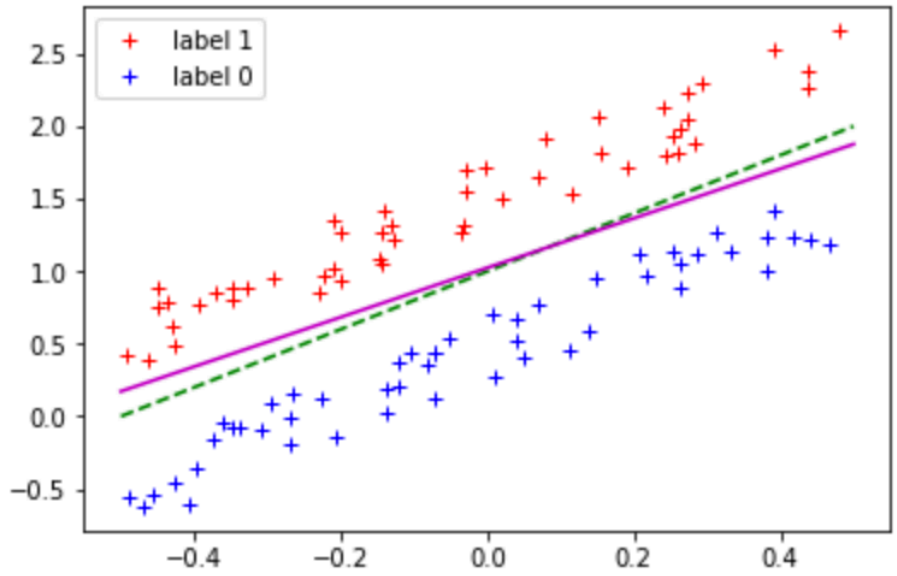
Exercise 3 Perceptron Learning Algorithm

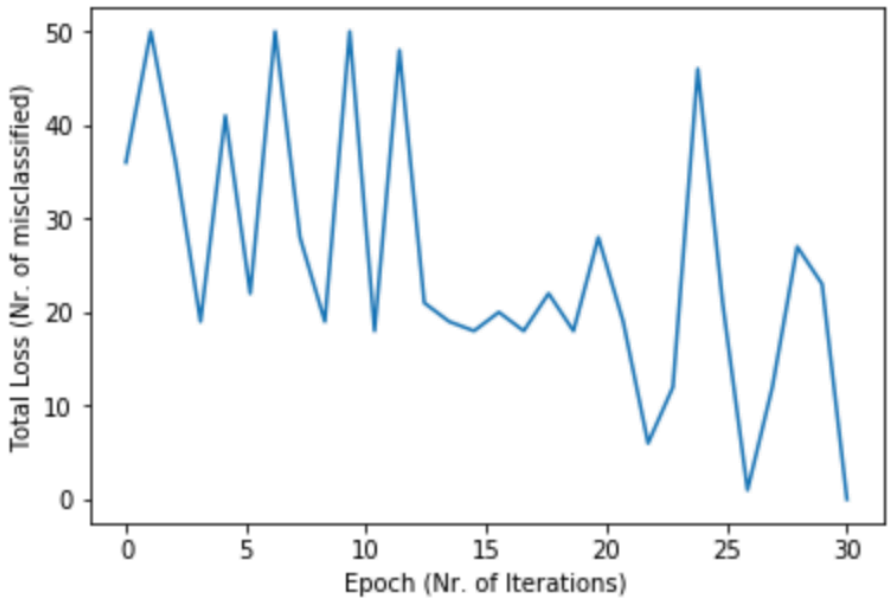
After 30 iterations (epochs) we had no more missclasified lables. For more information see github repo.

```
Trained Params:  [[-4.99046876  2.92867787]] [-3.]
```



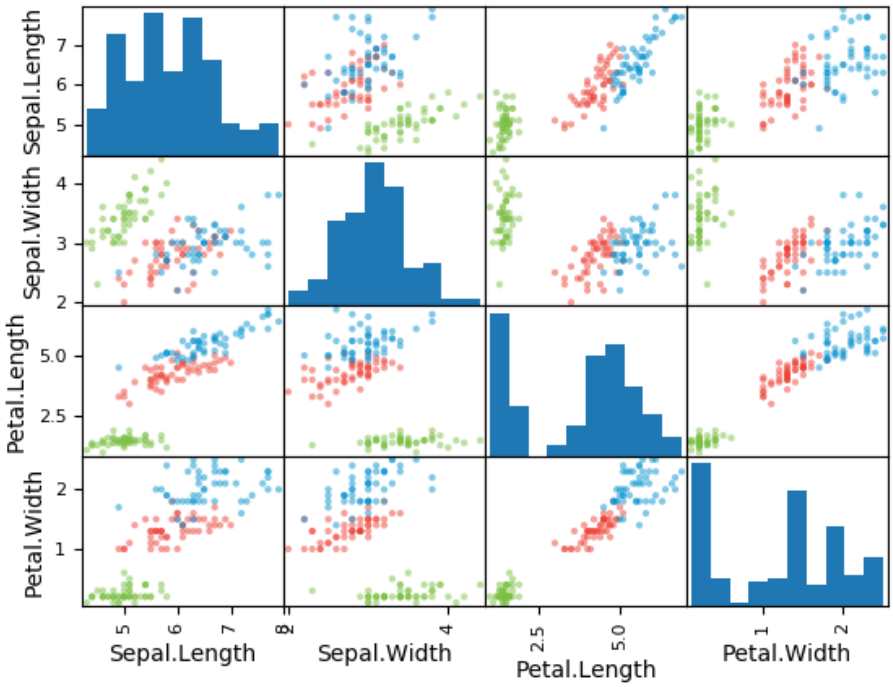
```
nit = len(misclassified_counts)
it = np.linspace(0,nit,nit)

plt.plot(it, misclassified_counts)
#plt.xlabel("Iterations")
#plt.ylabel("Nr. of misclassified")
plt.xlabel('Epoch (Nr. of Iterations)')
plt.ylabel('Total Loss (Nr. of misclassified)')
plt.show()
```



Exercise 4

see iris data generator



Exercise 5

Supervised (s) vs. unsupervised systems (us)

- Given email labeled as spam/not spam, learn a spam filter. (s) Because the program can classify as spam some email adresses and cause the loss of important information.
- Given a set of news articles found on the web, group them into sets of related articles. (us) Because it's possibile to create specific rules to group the articles.
- Given a database of customer data, automatically discover market segments and group customers into different market segments. (us) Because the segmentation can be done based on objective information.
- Given a dataset of patients diagnosed as either having glaucoma or not, learn to classify new patients as having glaucoma or not. (s) In the medical sector it's always good to have a system Supervised because of the big responsability.

Classification vs. regression systems

Can we transform a regression problem into a classification problem? What would be the benefits of doing so ? Yes, use regression and then divide the results in the different classes. The benefit is, that the division can be done arbitrary. For

example the reggression gives result between [0, 10] the classification could be done all smaller than 2 and the rest.

Perceptron

- For what kind of problems are Perceptrons suited ?
- For problems which the data can be splitted in a straight line. — For what kind of problems will the Perceptron Learning Algorithm converge?
- Clear distinguished groups of data. — Give an example for which the Perceptron Learning Algorithm will not converge. Explain why not.
  - When the training data has each two groups and those can't be separated by a straight line.

A ----- B
|.....|
|.....|
B ----- A

Exercise 6