Home Exercise 02

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Problem 1: Tensorflow playground

1. No, a single perceptron with no hidden layer is not suitable for this dataset. Because a single perceptron is a linear classifier. Thus, it can only handle a linearly separable dataset, in this case the circular dataset is not linearly separable because we cannnot separate the positive and the negative instances by a line or a hyperplane.

2. The scenario with more neurons towards the input, less neuron towards the out produces the best result in term of convergence.

Problem 2: Sentiment Polarity in Movie Review

2.1 Dataset reader

Line 11 - 55 in code

2.3 Numpy implementation

* Note:
- The **excercise2.py** contains the scripts. You can run it by simply run the following command python excercise2.py. It will print out the log loss value of the screen.
In case, you obsverve a stagnant (unchanged) loss value, maybe it will help to just cancel the process and run it one or twice again. I can still not explain this cold start problem with my implemenation. It will most likely due to my shuffle function, which fails to randomly shuffle the training instances or a bad random seed of the initial weights, contributes to the stucking in a local minima.

- You can find the calculated value of the weights in the **weight.txt** file

- The implementation uses log loss, which is more representative for our logistic regression then MSE, since the learning algorithm is differentiated from the log loss and the calculation

with log loss is faster from my observations. However, the implementation of MSE is still available in the code.

The **best result** achieved with the following setup
- Batch size: 10
- Epoch: 1000
- Learning rate: 0.01

- Accuracy on validation set : $0.7073170731707317 \approx 70,73\%$

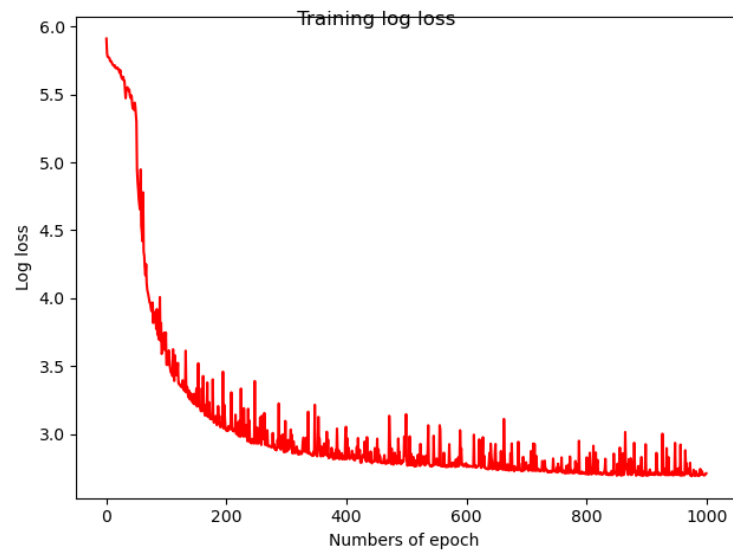- Accuracy on test set : $0.7004377736085053 \approx 70,04\%$

Figure 1: Log loss with batch size $= 10$ and $\alpha = 0.01$