

Part A Report

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Assignment 6: Perceptron Classification and Training

CSE 415 Introduction to Artificial Intelligence, Spring 2021, University of Washington

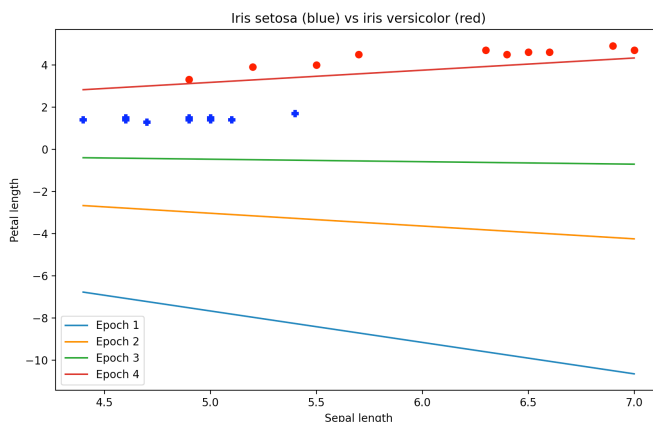
Please answer each question using text in **Blue**, so your answers stand out from the questions.

Note: If not otherwise specified, use the default parameters present in the starter code to answer the questions.

A1. How many epochs were required to train your perceptron on the 2-class Iris data having 2 features?
What was the performance of your perceptron on the test data?

4 epochs, which is very fast performance to achieve the optimal classifier.

A2. Include a graphic produced using matplotlib that shows both the training data points (in separate colors) and the “separating” lines implied by the weights at the end of each training epoch.” (Reduce the graphic as necessary to make it fit here without taking up more than half the page.)



A3. In the above plot, was there any thrashing (oscillation in the separator, such as flipping slope back and forth between positive and negative values, or having its y intercept jumping up and down as epochs proceed)? How would you describe the progress of the learning, on the basis of the plot?

No, the slope moved gradually from negative to positive without jumping back and forth. For progress of learning, there's increment of the slope from negative to more positive in each epoch compare to the previous one.

A4. After plotting the ring data, describe its distribution in words.

There's two ring-looking distributions, one outer ring (red) and one inner ring (blue)

A5. Describe the sequence of separators obtained when training your perceptron for 25 epochs using the ring data. Is there any thrashing? To what extent did it achieve convergence? And finally, do you think if the model is run for more epochs it will eventually fully converge?

There's thrashing and no convergence. I don't think the model will converge with more epochs.

A6. After you have re-mapped the ring data with the provided non-linear mapping function, plot the data and describe the distribution.

by providing the non-linear mapping function, the re-mapped data now has linear distributions.

A7. After training your perceptron on the re-mapped ring data, did it achieve convergence, and if so, how many epochs were used?

Yes it converged and 11 epochs were used.

A8. What do these results suggest about the power of perceptrons to classify data that may consist of clusters that cannot be separated by a linear manifold (such as a line or plane)? perceptron can classify the data as long as there is linear prediction function that linearizes the data.