

CS 440 - Homework 7

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1. Conceptual Questions

1. What is the example space, \mathbf{X} , for this problem?
2. Which model do you expect to be more expressive: a binary classifier perceptron or a binary classifier multi-layer perceptron with one hidden layer? Why?
3. Which one of the models described in question 2 do you think is more likely to overfit, and why?
4. Do you expect your perceptron to converge (assuming a constant learning rate)? Why or why not?

2. Implementing a Perceptron

1. Try adjusting each setting listed above, and report which combination (learning rate, training example ordering, and weight initialization) worked best. If you used random initial weights, specify what distribution the weights came from (uniform, Gaussian, or another distribution).
2. How many epochs were necessary to train your perceptron?
3. What accuracy did you achieve on the training set?
4. What accuracy did you achieve on the test set?

2. Using a Multilayer Perceptron

1. Which combinations of hyperparameters did you try, and which combination worked best?
2. How many epochs were necessary to train your multilayer perceptron?
3. What accuracy did you achieve on the training set?
4. What accuracy did you achieve on the test set?
5. How did the results obtained using the multilayer perceptron compare to those obtained using the single-layer perceptron in part 2? Explain the differences.