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For each of the sections below, your reported test accuracy should approximately match the accuracy reported on Kaggle.

Perceptron

Briefly describe the hyperparameter settings you tried. In particular, you should list the different values for learning rate and number of epochs you tried. You should also mention whether adding a learning rate decay helped and how you implemented this decay. Report the optimal hyperparameter setting you found in the table below. Report your training, validation, and testing accuracy with your optimal hyperparameter setting.
Originally I began with a small learning rate, high epochs, and no learning rate decay. This included rates such as lr=.005 and n_epochs=100. This led to an oscillating loss and accuracy graphs. Once I added learning rate decay, there was convergence. Originally I used less aggressive decay such as 0.9 and 0.8. While this did have a training accuracy of about 0.84 to 0.85, the validation and tests were <0.8 for the fashion dataset . This meant that the training was over fitting. To fix this I changed to a higher learning rate with a more aggressive decay of lr =lr*0.2 per epoch, and I found the optimal values below for the fashion dataset. For the rice dataset I kept the default hyperparameters and got >0.99 accuracy.

RICE DATASET

Optimal hyperparameters:	lr = 0.5
	n_epochs = 10

Training accuracy:	99.880854
Validation accuracy:	99.862524
Test accuracy:	99.780038

Fashion-MNIST DATASET

Optimal hyperparameters:	lr = .7
	n_epochs = 25

Training accuracy:	85.062000

Validation accuracy:	82.740000
Test accuracy:	81.550000

SVM

Describe the hyperparameter tuning you tried for learning rate, number of epochs, and regularization constant. Report the optimal hyperparameter setting you found in the table below. Also report your training, validation, and testing accuracy with your optimal hyperparameter setting.

Following the pattern from the perceptron hyperparameters. I started with a high learning rate and an aggressive decay. I used the same decay of lr*=.2 per epoch. Most of the trial and error was in the regulation constant. I started with values close to the default of .05 in order to avoid overfitting. However I found better success with larger values. In order to get an upper bound for the constant I tried 0.9. This led to the best accuracy, and hence chose it as the optimal value for the fashion data set.

RICE DATASET

Optimal hyperparameters:	lr = 0.5
	n_epochs = 10
	reg_const = 0.05

Training accuracy:	99.679223
Validation accuracy:	99.725048
Test accuracy:	99.560077

Fashion-MNIST DATASET

Optimal hyperparameters:	lr = 0.5
	n_epochs = 20
	reg_const = 0.9

Training accuracy:	84.676000
Validation accuracy:	83.200000
Test accuracy:	82.300000

Softmax

Once again, describe the hyperparameter tuning you tried for learning rate, number of epochs, and regularization constant. Report the optimal hyperparameter setting you found in the table below. Also report your training, validation, and testing accuracy with your optimal hyperparameter setting.
Originally I began soft max with values similar to the previous models. A high learning rate with an aggressive decay over a small amount of epochs. Unlike the previous models this did not produce good results. I began to see improvement once I began decreasing the learning rate. With a smaller learning rate, I had to increase the number of epochs as well as slowing down the decay to lr*=.95. This produced the best results. The regularization constant was just luck. I originally meant to train with a smaller regularization of .01, but I made a typo and ended up with optimal results.

RICE DATASET

Optimal hyperparameters:	lr = 0.0001
	n_epochs = 100
	reg_const = 0.1

Training accuracy:	99.917514
Validation accuracy:	99.807534
Test accuracy:	99.862524

Fashion-MNIST DATASET

Optimal hyperparameters:	lr = 0.0001
	n_epochs = 100
	reg_const = 0.1

Training accuracy:	88.116000
Validation accuracy:	83.870000
Test accuracy:	83.190000

Logistic

Once again, describe the hyperparameter tuning you tried for learning rate, number of epochs, and threshold. Report the optimal hyperparameter setting you found in the table below. Also report your training, validation, and testing accuracy with your optimal hyperparameter setting.

RICE DATASET

Optimal hyperparameters:	learning_rate = .5
	n_epochs = 1000
	threshold = .5

Training accuracy:	78.929521
Validation accuracy:	78.773715
Test accuracy:	79.241133