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Team name on Kaggle leaderboard: PeacockNavigator

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.

The settings of hyperparameters (lr, n_epochs) tried were (0.1,10), (0.1,15), (0.01,10), (0.01,15), (0.01,20), (0.001,10), (0.001,15), (0.001,20). The learning rate decay used was e^{-k} , (so the learning rate was ηe^{-k}) where k is the number of epochs passed thus far, and adding a learning rate decay helped, adding 1-2% percentages to the overall accuracies. Decay of the form $\frac{1}{1+k}$ was also used with k=0,1..., K-1 (K is total number epochs), but the exponential decay gave slightly better results for the CIFAR dataset (for the MR dataset the two decays gave similar results), for the particular experiments run in this assignment.

MUSHROOM DATASET

Optimal hyperparameters:	lr = 0.01 n_epochs = 20
Training accuracy:	95.055396
Validation accuracy:	94.215385
Test accuracy:	94.707692

CIFAR DATASET

Optimal hyperparameters:	lr = 0.01 n_epochs = 10
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Training accuracy:	37.415
Validation accuracy:	31.49
Test accuracy:	31.14

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.

The settings of hyperparameters (lr, n_epochs, reg_const) tried were (0.1,10,0.05), (0.1,10,0.5), (0.01,10,0.05), (0.1,10,0.005), (0.1,10,0.0005), (0.1,15,0.0005), (0.1,20,0.0005). The learning rate decay used was ηe^{-k} , where k is the number of epochs passed thus far.

MUSHROOM DATASET

Optimal hyperparameters:	lr = 0.01 n_epochs = 10 reg_const = 0.05
Training accuracy:	94.523077
Validation accuracy:	94.523077
Test accuracy:	95.116947

CIFAR DATASET

Optimal hyperparameters:	lr = 0.1 n_epochs = 10 reg_const = 0.005
Training accuracy:	38.055000
Validation accuracy:	31.570000
Test accuracy:	31.090000

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.

The settings of hyperparameters (lr, n_epochs, reg_const) tried were (0.1,10,0.05), (0.1,10,0.5), (0.01,10,0.05), (0.01,10,0.005), (0.01,10,0.0005), (0.01,15,0.0005), (0.01,10,0.00005), (0.01,10,0.000005), (0.01,15,0.000005). The learning rate decay used was ηe^{-k} , where k is the number of epochs passed thus far.

MUSHROOM DATASET

Optimal hyperparameters:	lr = 0.01 n_epochs = 10 reg_const = 0.0005
Training accuracy:	92.553846
Validation accuracy:	92.492308
Test accuracy:	93.126795

CIFAR DATASET

Optimal hyperparameters:	lr = 0.01 n_epochs = 10 reg_const = 0.000005
Training accuracy:	40.905
Validation accuracy:	29.96
Test accuracy:	30.18

Logistic

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.

The settings of hyperparameters (lr, n_epochs) tried were (0.1,10), (0.1,15), (0.1,20), (0.01,10), (0.01,15), (0.01,20), (0.001,10), (0.001,15), (0.001,20). The learning rate decay used was ηe^{-k} , where k is the number of epochs passed thus far, and the learning rate helped.

MUSHROOM DATASET

Optimal hyperparameters:	learning_rate = 0.01 n_epochs = 10
Training accuracy:	93.208863
Validation accuracy:	92.369231
Test accuracy:	92.369231