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jcs188
ECE1395

1b) accuracy: 0.98

2b)
J: 0.20252633908551296
J: 0.9111150341988487
J: 1.6197037293121843

3) g_prime: [4.53958077e-05 2.50000000e-01 4.53958077e-05]

4d) alpha = .001

5)

	Epoch = 50	Epoch = 50	Epoch = 100	Epoch = 100
	Training data accuracy	Testing data accuracy	Training data accuracy	Tesging data accuracy
Lambda = 0	.213	.130	.346	.261
Lambda = .01	.331	.348	.346	.261
Lambda = .1	.331	.348	.331	.348
Lambda = 1	.346	.261	.323	.391

Results: You can see a general increase in accuracy with a lower value for lambda because as our regularization parameter increases we prioritize the simplicity of the model vs the accuracy of the fit. You can also see a higher accuracy with more epochs because it is running our stochastic gradient descent with more iterations. Finally, we can see similar accuracies between our training and testing data which proves that we our not overfitting or underfitting our model.

6) I would visualize the feature of the total number of cars or traffic on the highway by showing a bar graph of the total number of cars vs the time of day on the highway to show what times have the most traffic and would cause the car's battery to die faster. I would visualize the speed limit feature by graphing the speed limit vs the battery percentage used when traveling at a specific speed. Finally, I would visualize the elevation feature by graphing the elevation vs the battery percentage used when traveling at a specific elevation.