CSE 474 Assignment 1 Report

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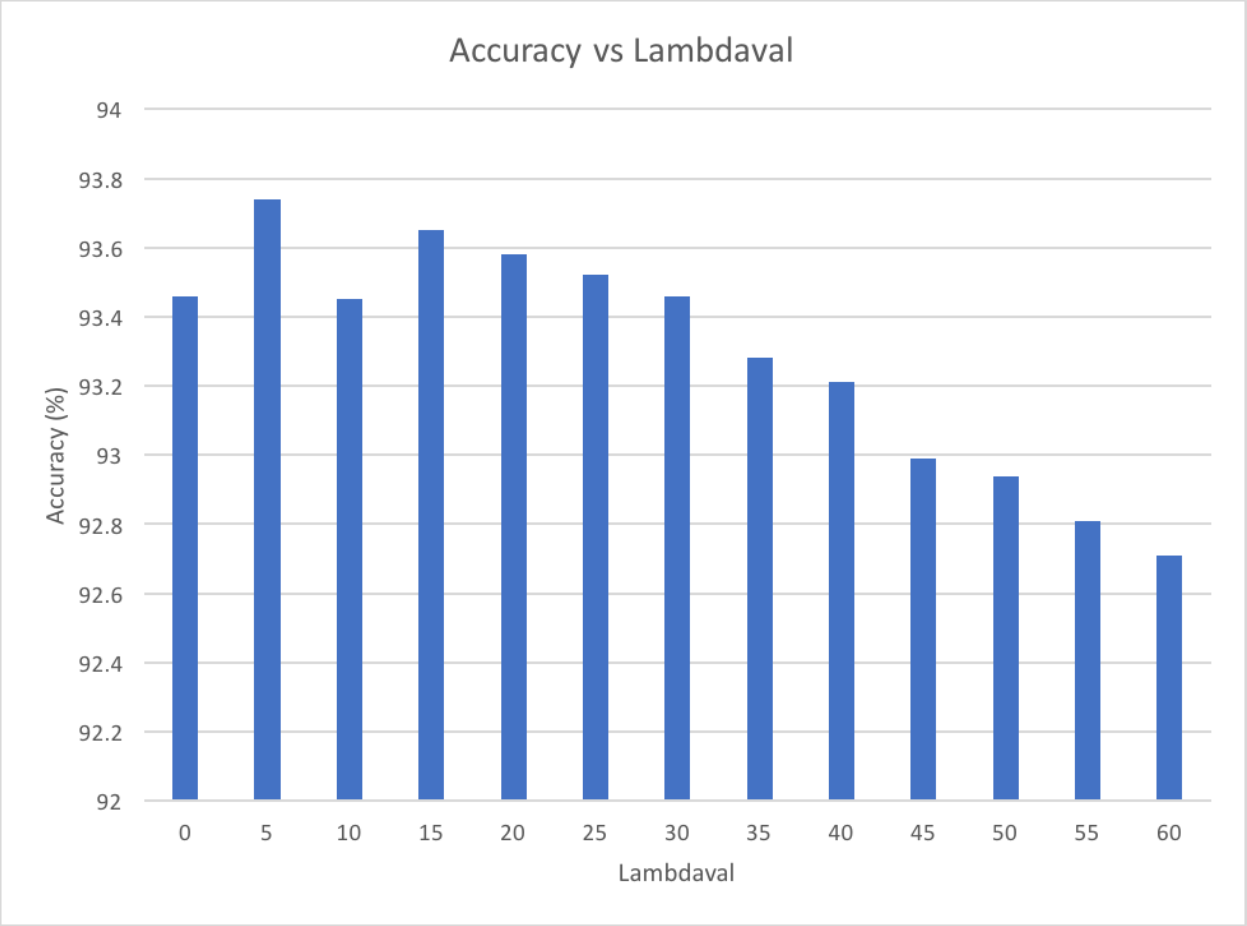
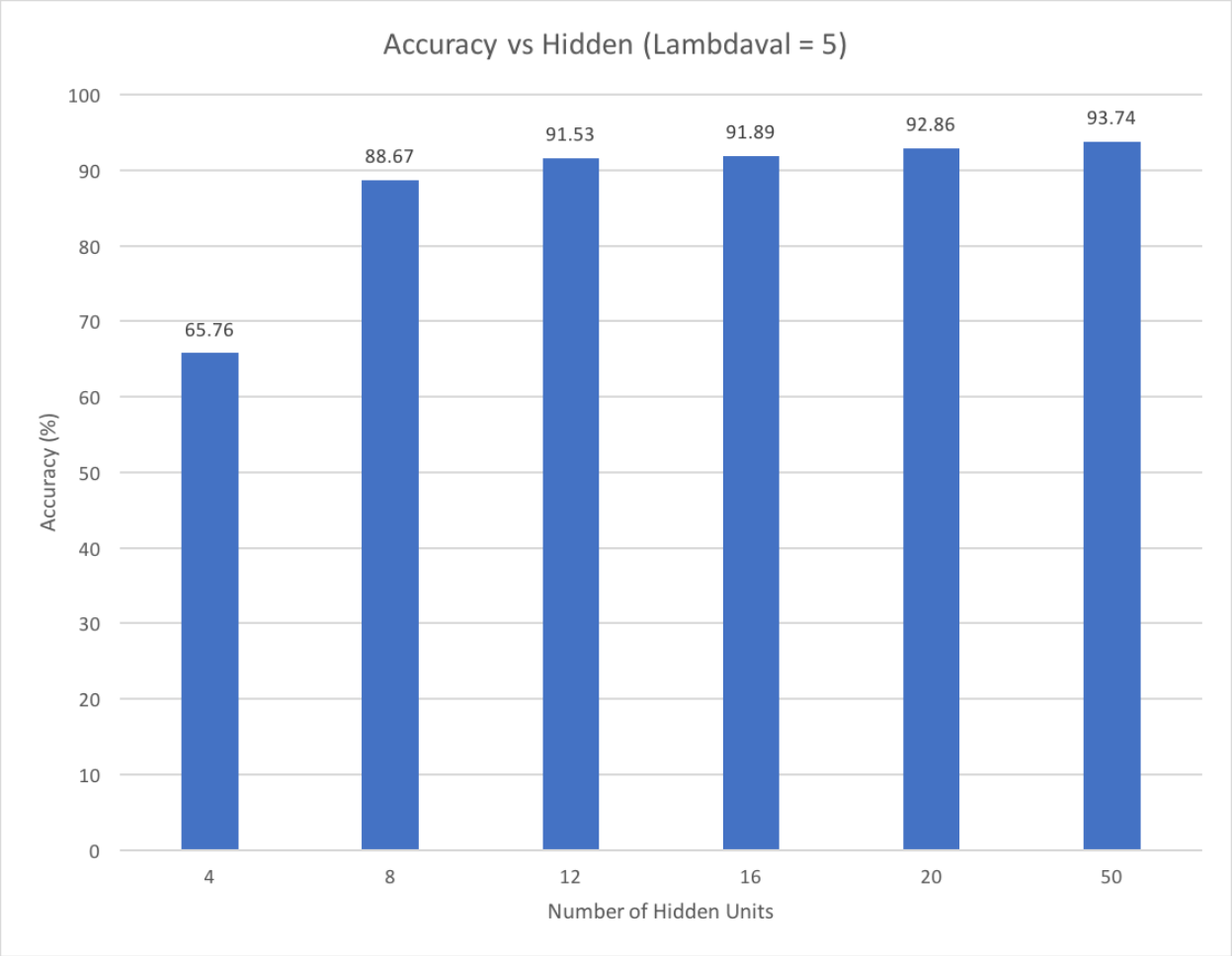
When looking at the results we can determine the best combination of Hidden Units and the regularization term (Lambda). First lets look at the follow graph of Accuracy while only changing the value of lambda. Here we can see that for the exception of zero the lower the value assigned to lambda is desired for the highest accuracy.

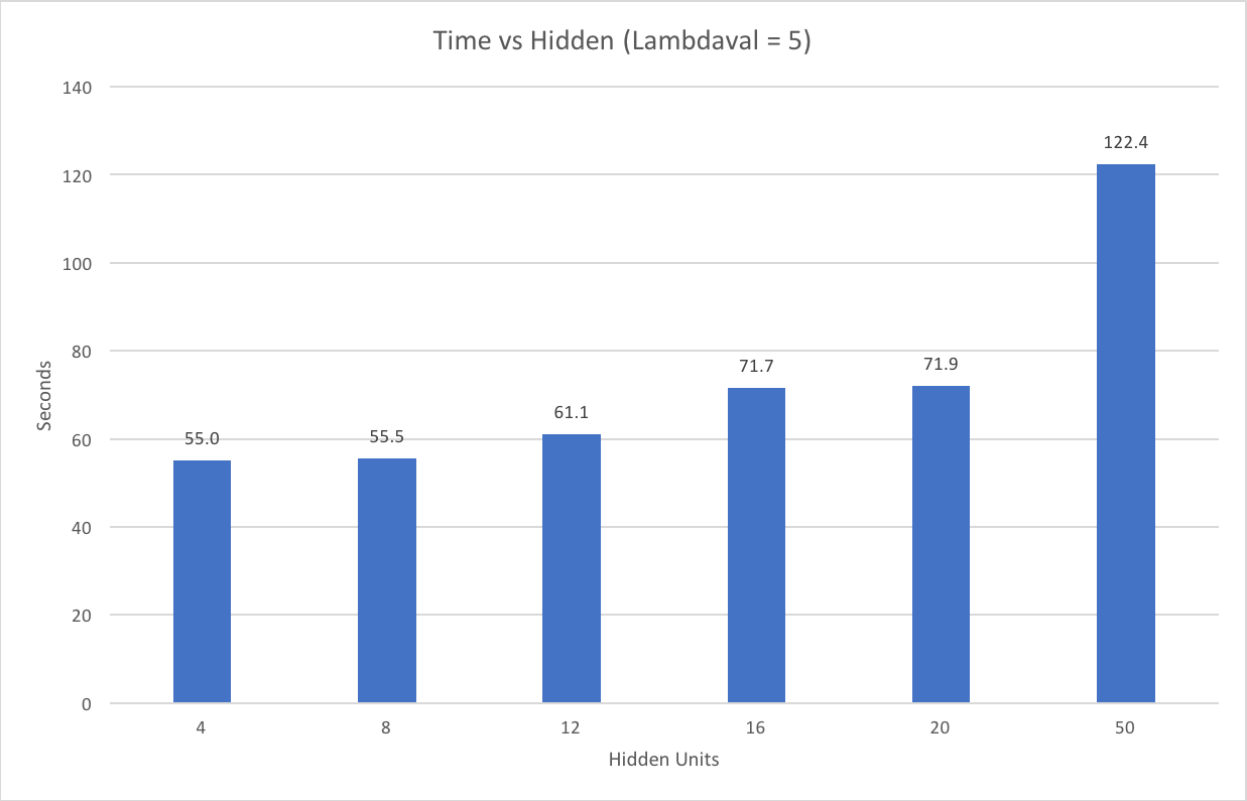


Now that we know that a prefered lambda value is five we will leave that value static in our analysis. We will now look at how our accuracy changes when we increment the number of hidden units in our network.

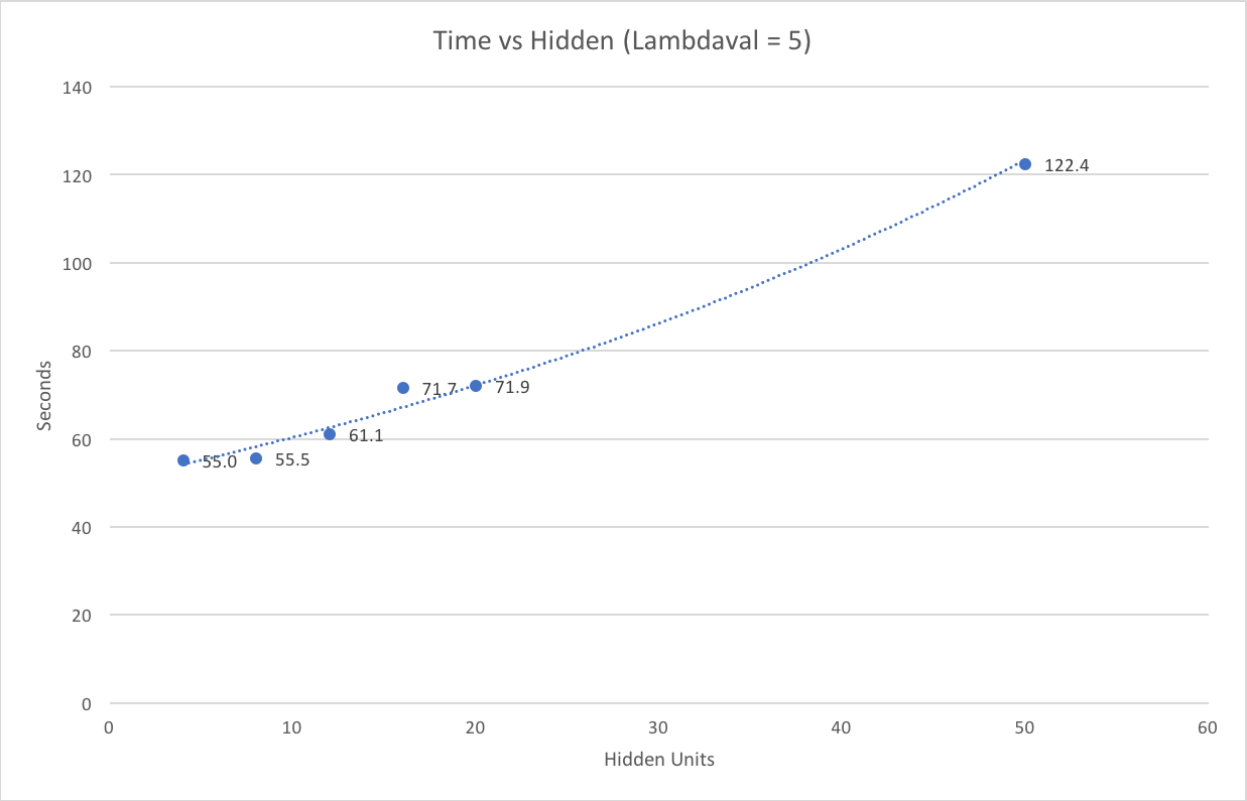


We can see there is a only a delta of 5% from where we only have eight hidden units all the way to fifty. From both graphs we can determine the highest accuracy will come from a L = 5 and H = 50.

Let us take a look now at the time interval across this data set.



Here we can see the rise in time requirements to obtain our accuracies. If you have a lot of time available then we can set the hidden units to 50. However, the line of best fit across this data shows a slight exponential characteristic. The slope of our line reveals that for each hidden unit above 4 you will add approximately 1.5 seconds per hidden unit.



Hidden	Time	Accuracy	Time per hidden	Cost (time) per Accuracy (%)	Cost per Hidden
4	55	65.76	13.8	0.84	0.21
8	55.5	88.67	6.9	0.63	0.08
12	61.1	91.53	5.1	0.67	0.06
16	71.7	91.89	4.5	0.78	0.05
20	71.9	92.86	3.6	0.77	0.04
50	122.4	93.74	2.4	1.31	0.03

Here we can determine the most “worth it” combination. We have already deduced that the best accuracy is with selected a lambda value of five. But now we can compare the cost of accuracy with time. The best combination will be with selecting twelve as your hidden value. After 12 the delta of Cost per Hidden changes in a way that makes it more costly per second. However, if you’re looking for the most accurate result then we can go with Lambda = 5, Hidden Unit = 50.