ECE532 - Final Project Update 2

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1 Update and Revised Timeline

Since the last project proposal, I have implemented the third classifier, a simple neural network, using a one hidden layer architecture in pytorch. I have also corrected issues in the 'one' vs 'all' testing and finished the shell cross-validation routine that interfaces with the 'one' vs 'all' routine. Following up from the last project proposal, I have also implemented a weighted least squares and weighted SVM routine that can be used in addition to the downsampling. Finally, I have started working on the final report based on the Neurips template.

I have now run some of the preliminary evaluations to be used for the final report and come up with a plan for some of the additional experiments and results I plan to include in the final report. These additional experiments include an analysis of regularization (l2 vs l1) for LSQ, a comparison between 'one' vs 'all' and direct multiclassification using the neural network, and different feature comparisons for the Mocap dataset. Table 1 shows some results for accuracy across the three classifiers with different basic evaluations.

	LSQ	SVM	NN
Training Data	0.684	0.423	0.933
Cross-Validation (n=5)	0.585	0.403	0.583

Table 1: Results for the classification using 'One' vs 'All' Across the Three Classifiers (No regularization). There are seven labels for the faults so the random guess percentage baseline would be 0.143. The neural network is successful as a function approximator, but does not perform well during generalization testing with a smaller training set which suggests the results might be overfit.

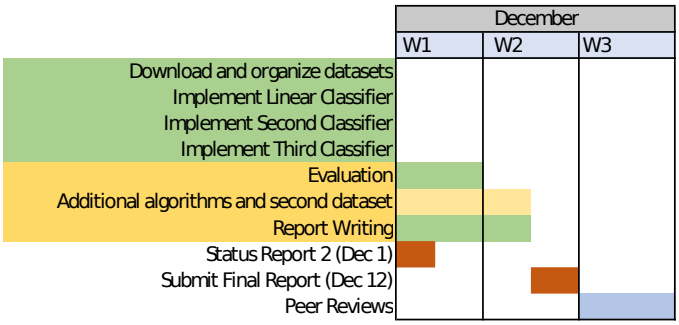

Figure 1: Gantt chart for remaining two weeks of the project

Similar to last time, the gantt chart has been updated to reflect the remaining project time. The gantt chart is shown in Figure 1. The only timeline changes that have occurred since the last update is that the neural network implementation took more time than anticipated and as a result, the category for additional algorithms and second dataset has been shifted backwards by a week. All of the relevant work related to this final project is being updated in the following github: Repository.