COSC 4368 – Task 3

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**Problem**

Compare the results and enhance the accuracy of the learnt models via selecting better parameters/preprocessing/kernels/background knowledge to summarize your findings in a report. We will use the UCI Machine Learning Repository and particularly the Higher Education Students Performance Evaluation dataset. As far as classification algorithms are concerned, we will use:

1. Neural Networks (Multi-Layer Perceptron – MLP)

2. Support Vector Machines.

You will use 2 “variations” of each approach:

● For the SVM, you should use 2 different kernels (any kernel is fine, you can use the linear kernel as one kernel)

● For the MLP, you should use two of the following activation functions: 1. Logistic/sigmoid 2. Tanh and 3. Relu

Accuracy of the four classification algorithms for training and testing should be measured using 10-fold cross validation. Moreover, compute the average MAE (mean absolute error) for the learnt models training and testing

**Results**

Data set given: Print**A screenshot of a computer

Description automatically generated with medium confidence**

Values given when describe:

**A screenshot of a computer

Description automatically generated**

Accuracy:

**Text

Description automatically generated**

**Questions:**

The question states after comparing the experimental results, write a paragraph which summarizes the experimental results and tries to explain/speculate why, in your opinion one classification algorithm outperformed the other?

* We would talk about the three categories: Training time, prediction performance and prediction accuracy. SVM known as Support Vector Machines are much slower than MLP. SVM requires the lagrangian dual problems compared the primal in MLP. Parallelizing in SVM in not trivial compared to MLP. SVM use direct decision functions and are multi-class classifications problems. Comparing prediction accuracy of the two models, the SVM will perform better than MLP. Lastly, for Prediction performance an SVM higher than MLP. With all the information given, I believe SVM outperformed the best.

What was the most important findings within this task?

* The importance of this task was to get knowledge on how SVM with kernels and ML work with the 10-fold. I believe this is great to know since most jobs require AI or comparing data. Even though, I couldn’t finish the assignment due to more homework and exams. I did had a great learning experience and researching SVM and MLP and how they work for in a company.