COL 867: Project Proposal

ML and UDP-based Speed Tests

Submitted To:

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Problem Statement:

UDP based speed test methods usually make assumptions about the underlying network, thus they don't work well under certain conditions such as presence of multiple bottlenecks.

A solution to the above problem is to formulate the features for speed test together as a machine learning problem (already attempted by Khangura et. al 2019)[1]. The model provided by [1] uses a simple (Shallow Neural Network Model). This indicates that it may not be very accurate, but the paper states that it able to do **reasonably well** across conditions, i.e. it adapts to various conditions well.

We first aim to reproduce this paper's code (since they have not provided the model), following which we would like to **improve** the model.

Improving the Model (Steps):

Once we are able to reproduce the model's code, we would then want to improve the model's performance.

Improving the model's performance is a trade-off problem. For instance, one way to improve the model would be to make it faster without or less loss of accuracy. The other way around to this problem could be to make the model slower while increasing the accuracy. Another way of improving the model could be to reduce the training set size and still attaining similar results. Another way could be to see if classical machine learning models such as RandomForest and XGBoost in addition with some extra features could be able to obtain similar results, this would increase the model's performance, since classical ML models are faster than even Shallow Deep Learning Models. Another way of improving the model would be to see how the model does in a Real World scenario, if it doesn't do well, and we are able to get the model to obtain similar results in a real world scenario.

Our primary attempt however remains at increasing the speed of the model while obtaining similar results as this is the benchmark at which, we expect machine learning problems to work especially in Speed-Test based problems.

Timeline (Tentative):

| 18-03-2025 Reproduce the Paper | → | 31-03-2025 Extensive Feature Engineering | → | 15-04-2025 Tests to improve the model | → | 26-04-2025 Final Project Submission |