Exploring the use of Machine Learning for Improved Shaping Configuration

Sandvine (ex Procera Networks) develops equipment used by major network operators to ensure high-quality connectivity for more than 1.7 billion users.

Inside many networks shaping is commonly used on the traffic in order to manage how different types of traffic can utilize the network resources. The configuration of this shaping and the resulting per flow outcomes in terms of actual obtained bandwidths, experienced delays etc. is not entirely understood for more complex scenarios. This thesis work aims to explore if this understanding can be improved by using Machine Learning (ML) based modelling. The idea is to use Decision trees or other ML modeling techniques that give models which have a reasonably high level of interpretability. By examining the obtained models the aim is to understand how the configuration of the shapers can potentially be improved based on various aspects of the environment such as type of traffic mix, degree of statistical multiplexing, etc. To create data to feed the modeling step, the thesis work will likely include setting up and performing controlled experiments in a network emulator such as NS3.

This thesis work is done with Sandvine, but much of the work will be done in Karlstad with a couple of visits to company premises in Varberg and Malmö. The work will be done using Python and associated libraries. Prior Python experience is not a requirement, but good general programming proficiency and willingness to learn Python is important. Previous Machine Learning experience in not required, but strong curiosity for the area is advantageous. This thesis work is the continuation of previous very successful thesis cooperation between Sandvine and KAU, where four previous KAU CivIng students already have successfully completed their thesis work using Python and Machine Learning techniques within this application area.

The technical work part of the thesis will be jointly supervised, with a Sandvine senior technical engineer and in close cooperation with KAU researchers active in the area. The writing part of the thesis will be supervised by the KAU supervisor (i.e one of the active researchers).

Monetary compensation will be provided from Sandvine for students participating in this thesis project.

For questions or more details, please contact Johan Garcia at johan.garcia@kau.se, or visit me at room 21F426