Machine Learning Based Ressource Allocation for P2P Networks

Motivation

Common networking applications and peer-to-peer networks in particular use only one specific transport protocol like UDP or TCP. GNUnet is one of the few peer-to-peer frameworks supporting more than one transport protocol. With the possibility to choose between different options to communicate, the question arises which specific protocol to use to communicate with a specific peer. This question is even harder to answer if you have to consider limited ressources like available bandwidth and pay respect to quality constraints demanded from applications.

Your Task

To solve the problem of finding an best possible resource allocation GNUnet provides a simplistic and an linear programming based approach. These approaches do not consider past events or how the available resources were really used.

To improve this we want to use the technologies and ideas provided by machine learning to design and implement a new resource allocation mechanism which can provide an optimal or best possible resource allocation with respect to available resources and quality constraints learning from past events to improve the quality of its decision.

In your thesis you start with comparing different machine learning approaches and analyze how machine learning can be used to find a resource allocation. You will analyze the problem setting and specify the formalism for a resource allocation. To evaluate your approach you will implement your design in the GNUnet framework and compare it to already existing approaches.
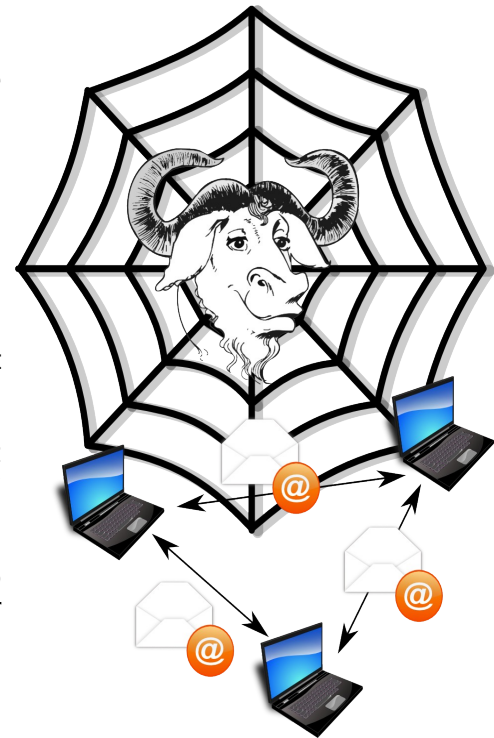
Your Benefits

We offer you the possibility to work in a creative environment with motivated supervision. You will learn a lot about development processes in a team, machine learning, performance, networking and the GNUnet peer-to-peer framework and significantly improve your software development skills.

And since we are an official GNU package you have the chance to participate actively in the development of free software!

Requirements

To succeed in this challenge you should have:
- Knowledge in Linux
- C/C++ programming skills and experience with related development tools
- Interest in network technologies

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