



Master thesis No. 1022

Traffic prediction on backbone Networks using a Probabilistic Programming Language



Methods

Probabilistic programming
Bayesian statistics

Topics

Traffic modeling
Traffic prediction

Background

Modern networking is starting to be highly demanding on covering QoS (Quality of Service) requirements. At the same time and due to cost reasons the network operator needs to find a way to efficiently operate the network, minimizing operational expenses (OpEx) from one side and maximizing equipment usability (so that no new equipment is needed) from the other. Usually, such a task is very difficult and strongly depends on the future scenario. Thus a better knowledge of the traffic demands and the ability to predict such future demands is of vital importance in order to find the optimal operation strategy.

Bayesian statistics are based on the Bayesian probability formula or Bayes' Theorem. They provide an efficient strategy to develop a model and update it based on some data. Modern tools have been built to automate such procedures called Probabilistic Programming Languages.



Problem Description

In the context of this thesis, you are called to construct a Bayesian model of the core network traffic demands, by using the Julia library Turing.jl. More specifically, the thesis consists of the following steps:

- getting familiar with the Turing.jl package and Bayesian statistics
- investigation of network traffic patterns
- building a Bayesian model of the backbone network traffic
- evaluation of the model based on existing data

Acquired Knowledge and Skills

In this thesis you will enrich your knowledge on Bayesian statistics and probabilistic inference, a methodology gaining growing focus. You will also experiment with the highly promising and already established scientific programming language Julia. Finally, you will get a great insight into core networking and network services.

Requirements

Communication Networks Architecture and Design
Programming Experience

Desirable knowledge

Kommunikationsnetze I

Contact

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