SMARTR

Thesis proposal: residual neural networks and continuous dynamical systems

About Smartr

Smartr is an expert bureau within data and AI. We work with the entire value chain from data strategy, research, algorithm development, prototyping, validation, software development and data engineering. We have a high level of seniority and we work close to academia. Supervising students at different levels gives us a great opportunity to develop unique skills but also serves as a base for recruitment. We intend to supervise two projects in 2020.

Thesis project

Residual neural networks have become very popular in deep learning. They can be viewed as Euler discretizations of controlled ordinary differential equations and training can be viewed as an optimal control problem. In this thesis we want to evaluate different ways to train residual neural networks with or without algorithms from optimal control. The methods shall be evaluated on some dataset of choice and the methods shall also be compared to multilayer perceptron (MLP) networks to understand the pros and cons of using residual neural networks on data in comparison to using the more common MLP networks.

We seek 1-2 students for this project. The students are expected to have a strong mathematical background. Some experience with TensorFlow or PyTorch is meriting. This is a rather challenging thesis topic and the students should be dedicated and looking forward with excitement to six months of investigations, learning, and interaction. The project can be shaped to be meriting for future PhD studies if the student wishes.

Supervisors

Supervisor at Smartr is Adam Andersson and at Chalmers Stig Larsson. The student(s) can expect an active and interactive supervision.

Contact and application

A complete application contains CV, personal letter and transcripts from university. Please send it to adam.andersson@smartr.se and feel free to ask any questions.

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