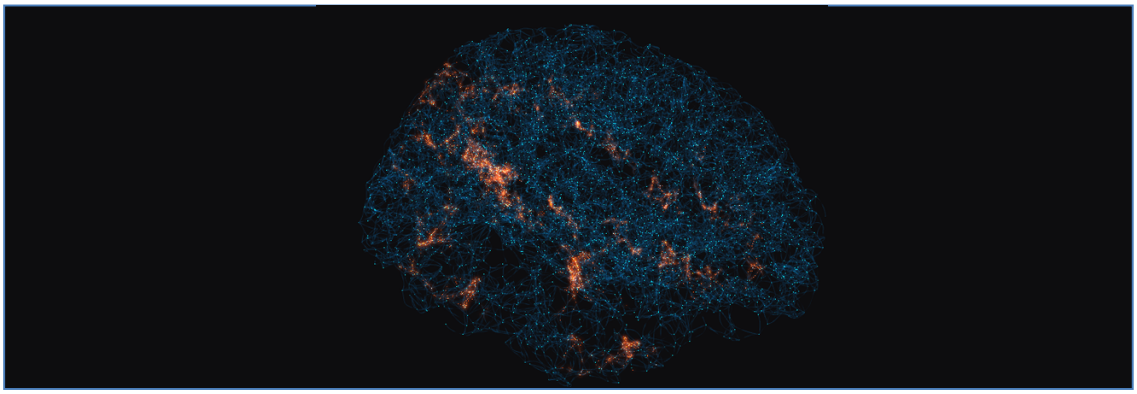
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

computer graphics laboratory

Bachelor Thesis

Deep Visual Analytics



Introduction

In recent years, Deep Learning has been successfully applied to solve many different machine learning tasks. The high number of parameters, together with the complex interactions between the network components, makes it difficult to inspect the flow of information and understand the behaviour of the models. On the other hand, being able to find this kind of insight has proved to be useful to improve existing models or develop new ones. For example, the development of a method to visualize the behaviour of convolutional neural network (CNN) turned out to be very powerful to understand this particular architecture. At the same time, tools like TensorBoard are continuously improved to provide more and more visual analytics tools for researches to better understand this topic.

Task Description

The goal of this thesis is to develop a tool for interactive and real-time visualization of the information flow within an artificial neural network, during training and inference. The tool should provide a back-end in Python and front-end in Javascript to visualize and interact with a network model. This tool should leverage the potentiality of modern web technologies for Computer Graphics to provide a 2D or 3D visualization of the network graph and allow to compute attributions maps (like those in https://github.com/marcoancona/DeepExplain) for any input and target activation.

Skills

- Some knowledge about Machine Learning (preferably including Deep Learning).
- Strong programming skills with Python and web technologies (Javascript, HTML, CSS)
- Familiarity with web technologies for visualisation (WebGL, Three.js) is a plus.

Remarks

A written report and an oral presentation conclude the thesis. The thesis is will be overseen by Prof. Markus Gross and supervised by Marco Ancona, Dr. Cengiz Öztireli and Dr. Tobias Günther.