

Paper 1: Visual Analytics in Deep Learning: An Interrogative Survey for the Next Frontiers

It's a 2018 paper published by PhD student at Gatech, Minsuk Kahng who is one of the developer of ActiVis used by Facebook. Authors here talk about how deep learning has seen rapid development these days. People using deep learning should know when the models work correctly, when it fails and how to improve its performance. Visual analytics system has now been developed to support model explanation, interpretation, debugging and improvement. Deep learning is a part of machine learning which used deep neural networks to learn the structured representation of data. Though lot of deep learning tools are available these days which are easy to use but it comes with some challenges. It becomes difficult for users to understand the reasons if some data is misclassified by a model if no explanations are given by model. While there is larger literature for visualization for machine learning, there is no comprehensive survey for visual analytics of deep learning. This paper provides a comprehensive, human-centered, and interrogative framework to describe deep learning visual analytics tools. Here authors summarize a large number of deep learning visualization works using five Ws and Hows (Why, Who, How, What, When and Where). The important reason to why people want to visualize deep learning is to know what representations the deep learning models have learned and how they make decisions based on it. Authors classifies the users of deep learning into 3 groups: 1) model developers whose job is focused on developing, experimenting with and deploying deep neural networks. Authors talk about tools like Tensorboard, DeepEyes, Blocks for visualization. 2) model users who have technical knowledge but are neural network novices. They use models for their domain specific applications. Authors here talk about ActiVis - a visual analytics system which is developed and used by Facebook developers to explore and interpret deep learning model results. 3) non-experts who have no prior knowledge about deep learning and some or no technical background. Here authors talk about tools like Teachable Machines, Deep visualization toolbox TensorFlow Playground and Shapeshop that helps to understand how neural networks learn.

In the what to visualize section of paper authors mention computational graph and data flow graph. In the how to visualize section of the graph authors mentions network architectures that are often represented as node-link diagrams; embeddings of many activations typically represented as scatter plots; and model metrics over epoch time that are represented as line charts. In the last section Where deep learning is visualized authors mention domains like

neural machine translation, reinforcement learning, social good, autonomous vehicles, medical imaging diagnostics, and urban planning. I personally liked this paper, the way it is structured and explained is pretty clear. It gave me some insights into the tools that are used by people at different levels of deep learning knowledge.

Paper 2: How to (seriously) read a scientific paper

Elizabeth Pain here mentions some approaches followed by certain people while reading a scientific paper. Most of them follow the procedure of firstly reading the abstract and then the conclusion to see if the goal mentioned in the abstract has been achieved. If the paper seems of interest to dive deeper, they start reading all the sections in the order to know the technical details of the paper. While going through the paper they focus on figures that are of importance that helps to get first impression of the paper. Also if references come up, some people try to read those and learn about the topic. Citation lists can help to decide why the paper may be most relevant by giving a first impression of how colleagues that do similar research as us have used the paper. Some people also like to print out the paper and highlight the most relevant information, so on a quick rescan they can be reminded of the major points. When someone doesn't understand the topic they are read in the paper, they either note it down or look online to understand more about it or go through the topic in some book to know the basics. This is important otherwise we wouldn't understand the rest of the paper. Sometimes the content of the paper may be too overwhelming. In such situations some people see if the paper is really relevant and if it so they break it down into chunks and try to go through it over course of few days. In this way author mentions ways discussed by people about how do they read scientific paper.