Master Thesis

Incorporating Attention Mechanism in Deep Neural Networks

Background

The capability of the human visual cortex in finding salient regions in complex scenes is regarded as an important part of the visual system. Methods for diverting attention to the most important regions of an image and disregarding irrelevant parts are called attention mechanisms which can simply be regarded as a dynamic weight adjustment process based on input feature maps in a neural network. Motivated by this, the attention mechanism was introduced into the computer vision era. An attention mechanism has now become an important concept in neural networks that has been researched within diverse application domains resulting in remarkable success in many visual tasks including image classification, semantic segmentation and object detection to name a few. In this research work, we aim to design an attention module that is capable of recalibrating the representation space based on more salient and informative features to generate generic and discriminative features. We will incorporate the attention mechanism inside the deep semantic segmentation networks to evaluate its effectiveness in terms of quantitative and qualitative results. We are also interested in visualizing the effect of the attention module for addressing inductive bias. The method will be evaluated on medical image datasets.

Tasks

- Literature review
- Implement and evaluate the baseline methods
- Investigate the solution for the literature limitations
- Evaluate the performance in different settings
- Write a paper (we will completely guide)

Your profile

- Student of RWTH Aachen with Faculty 6
- Strong programming skills (Python)
- Knowledge in computer vision and deep learning
- Experience in deep learning framework (Pytorch)
- Strong writing skill

Our Offer

Our institute features an ultra-modern computer infrastructure, including a remotely accessible cluster for training the deep learning networks with dozens of GPUs. Throughout the thesis period, you will be supervised with regular meetings and guidance.

References


If you are interested, please send a short email to azad@lfb.rwth-aachen.de with your resume and current transcript.