The Variational Autoencoder for Motion Estimation

Master’s Thesis

The variational autoencoder (VAE) has become a hot topic in deep learning. Originally designed as a generative model, VAE’s have recently been used for structured prediction tasks in computer vision. Task specific VAE’s deliver not only a single output but a distribution over possible solutions and thus implicitly model uncertainty and handle multimodal output distributions.

Objective:

The goal of the thesis is to investigate the capabilities of the VAE for motion estimation. You will setup a framework to predict motion trajectories between two adjacent, but not directly successive frames of videos. Modeling the task with a VAE will deliver a better understanding of the capabilities of these models for structured prediction. Finally, you will investigate whether the resulting model can be used for temporal super-resolution or direct optical flow computation.

Qualifications:

- Student of Information and Computer Engineering, Computer Science
- Basic knowledge in computer vision and optimization
- Programming experience in Python and/or C++.
- Optional: Neural network package e.g. Theano, Tensorflow, etc

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