Vision, Optimization and Learning Group
Institute of Computer Graphics and Vision (ICG)
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Van-Goghify* your Images / Video

Master's Project / Master's Thesis

In recent years, Convolutional Neural Networks (CNNs) have shown very impressive performance on numerous Computer Vision tasks. CNNs trained on the ImageNet database have a very expressive feature space which can also be used for transferring the style of one image to another [1] or from an image to a video [2]. This development led also to the commercialization of the approach via deepart.io.

Objective:

Get familiar with the literature on transferring style using CNN features, and play around with different optimization algorithms and image regularizers. Depending on the scope of the project it will be limited to still image style transfer, but could also be extended to style transfer for videos. For video style transfer, also temporal consistency via optical flow will be important. The problem will be formulated in a variational energy minimization framework. As a final goal, you will create a "Van Gogh"(*) regularizer that can be applied to any image or video sequence.
* (replace with your favourite artist)

Qualifications:

- Student of Biomedical Engineering, Information and Computer Engineering, Computer Science or Software Engineering and Management
- Knowledge in the field of Computer Vision, Optimization, Machine Learning
- Programming skills in Matlab/Python, C++/Cuda optional

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References

[1] Leon A. Gatys, Alexander S. Ecker, and Matthias Bethge. "Image style transfer using convolutional neural networks". In: *CVPR* (2016).

[2] Manuel Ruder, Alexey Dosovitskiy, and Thomas Brox. "Artistic style transfer for videos". In: *arXiv* (2016). arXiv: 1604.08610.