



Prof. R. Wattenhofer

## Advanced Topics in Deep Learning - Music Genre Transfer

In this thesis we want to further investigate how to do automatic music genre transfer. The task is to automatically transform a piece of music from a source to a target genre. We have already had some success using a CycleGAN-based model, and are planning on extending and improving it. We are working with so-called symbolic music in the form of MIDI files. Symbolic music does not contain sound waves, but instead corresponds more closely to sheet music.

If this sounds interesting to you, do not hesitate to contact us.

**Requirements:** Knowledge in Deep Learning, or solid background in Machine Learning. Implementation experience is an advantage. You should be able to read and understand the first 12 chapters of the "Deep Learning Book" by Goodfellow et al. (available for free online from MIT press). If you are interested in the topic but new to deep learning we expect you to complete an introductory deep learning course before applying for the thesis, such as Andrew Ng's coursera course (use the free trial!)<sup>1</sup> or this Udacity course<sup>2</sup>.



### Interesting Papers:

- CycleGAN [http://openaccess.thecvf.com/content\\_ICCV\\_2017/papers/Zhu\\_Unpaired\\_Image-To-Image\\_Translation\\_ICCV\\_2017\\_paper.pdf](http://openaccess.thecvf.com/content_ICCV_2017/papers/Zhu_Unpaired_Image-To-Image_Translation_ICCV_2017_paper.pdf)
- StarGAN [http://openaccess.thecvf.com/content\\_cvpr\\_2018/CameraReady/3662.pdf](http://openaccess.thecvf.com/content_cvpr_2018/CameraReady/3662.pdf)
- CoGAN <https://papers.nips.cc/paper/6672-unsupervised-image-to-image-translation-networks.pdf>
- Music Style Transfer: A position paper <https://arxiv.org/abs/1803.06841>
- Universal Music Translation Network <https://arxiv.org/abs/1805.07848>

<sup>1</sup><https://www.coursera.org/specializations/deep-learning>

<sup>2</sup><https://classroom.udacity.com/courses/ud730>

- MusicVAE <https://arxiv.org/abs/1803.05428>
- MIDI-VAE [https://www.tik.ee.ethz.ch/file/b17f34f911d0ecdb66bfc41af9cdf200/MIDI\\_VAE\\_ISMIR\\_CR.pdf](https://www.tik.ee.ethz.ch/file/b17f34f911d0ecdb66bfc41af9cdf200/MIDI_VAE_ISMIR_CR.pdf)
- Deep Learning for Music Survey <https://arxiv.org/abs/1709.01620>

**Interested? Please contact us for more details!**

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