Computational Creativity

Literature

Focus

Weidong Yin, Yanwei Fu, Yiqing Ma, Yu-Gang Jiang, Tao Xiang, and Xiangyang Xue. 2017. Learning to Generate and Edit Hairstyles. In Proceedings of the 25th ACM international conference on Multimedia (MM '17). ACM, New York, NY, USA, 1627-1635. PDF

Related dataset: Hairstyle30k

Context and related works

Simon Colton and Geraint A. Wiggins. 2012. Computational creativity: the final frontier?. In Proceedings of the 20th European Conference on Artificial Intelligence (ECAI'12), Luc De Raedt, Christian Bessiere, Didier Dubois, Patrick Doherty, and Paolo Frasconi (Eds.). IOS Press, Amsterdam, The Netherlands, The Netherlands, 21-26. PDF

Generative adversarial nets

I. J. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. Courville, and Y. Bengio. 2014. Generative adversarial nets. In Proceedings of the 27th International Conference on Neural Information Processing Systems - Volume 2 (NIPS'14), Cambridge, MA, USA, 2672-2680. PDF

Chen, Xi et al. “InfoGAN: Interpretable Representation Learning by Information Maximizing Generative Adversarial Nets.” *NIPS* (2016). PDF

Bao, Jianmin et al. “CVAE-GAN: Fine-Grained Image Generation through Asymmetric Training.” *2017 IEEE International Conference on Computer Vision (ICCV)* (2017): 2764-2773. PDF

Evaluating computational creativity

Carolyn Lamb, Daniel G. Brown, and Charles L. A. Clarke. 2018. Evaluating Computational Creativity: An Interdisciplinary Tutorial. ACM Comput. Surv. 51, 2, Article 28 (February 2018), 34 pages. PDF

Other style-related computational creativity applications

FaceApp, website
Face It – The Artificially Intelligent Hairstylist, article

Time allocation

- Literature, study (10 hours)
- Implementation (30 hours)
    - Dataset analysis
        - Noise, bias
        - Filtering and adding new examples
    - Setting up models (including selecting an appropriate architecture)
    - Training the models
    - Extra
        - Adding a different hairstyle
- Evaluating the results (7 hours)
    - Comparison with paper + other evaluation methods (e.g. Modified Turing Test)
    - How to improve the setup?
- Preparing the presentation (3 hours)
- Report (10 hours)

Proposal

Below we have identified three research questions and three related research objectives that summerize the content of our topic:

RQ1: can we verify and extend the experiments that have been conducted with (generative adversarial) neural networks to edit the hairstyle of people using images?

> **RO1**: recreate one such experiment and extend the used dataset to check if it can handle a supplementary hairstyles

RQ2: why are there few datasets and examples of hairstyle-editing applications to be found, compared to the number of applications that focus on changing facial expressions or features?

> **RO2**: identify the diffulties in designing such an application.

RQ3: how do we evaluate a computational creativity application focussed on hairstyle editing? Is it 'creative'?

> **RO3**: what do we nowadays consider as a creative application?
> Outcome vs. process paradigm

The start of our research is the paper by Yin Weidong (2017). They contributed a new dataset with hairstyles to the community (Hairstyle30k) and developed one of the first hairstyle-editing applications based on this dataset. We plan to set up our own GAN with the same dataset and want to compare our approach and result to the experiment from the paper. The challenge we face is learning to understand the loss functions sufficiently to obtain relevant results. If relevant results can be obtained, we plan to look at different ways to evaluate the application. What are the SOTA methods to evaluate applications in the computational creativity field? Weidong uses a Modified Turing Test, but other methods could also be considered. These methods don't have to restrict themselves to the outcome of the application, but might also evaluate the creativity of the design process.