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Face to Cartoon using cycleGAN

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Advanced Topics of Machine Learning FS2019
by Prof. Dr. Paolo Favaro

Introduction to the Project

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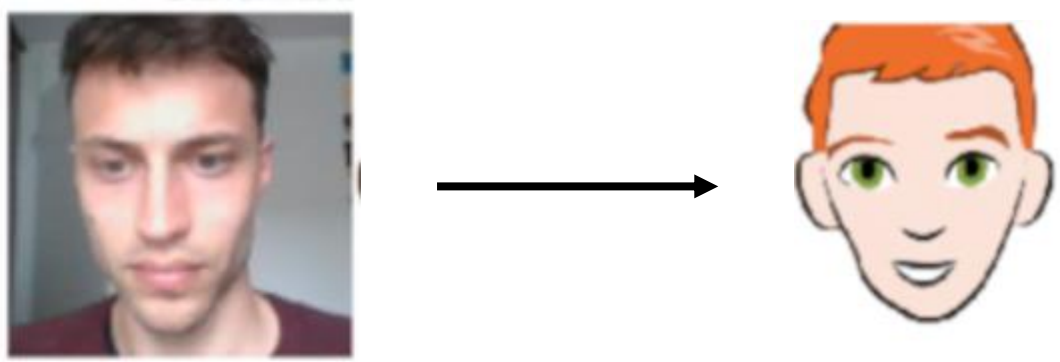
- **Goal**: Switch image styles from real faces to cartoon faces using unpaired data only.
- **Approach**: Use and modify CycleGAN (Jun-Yan Zhu et al.)

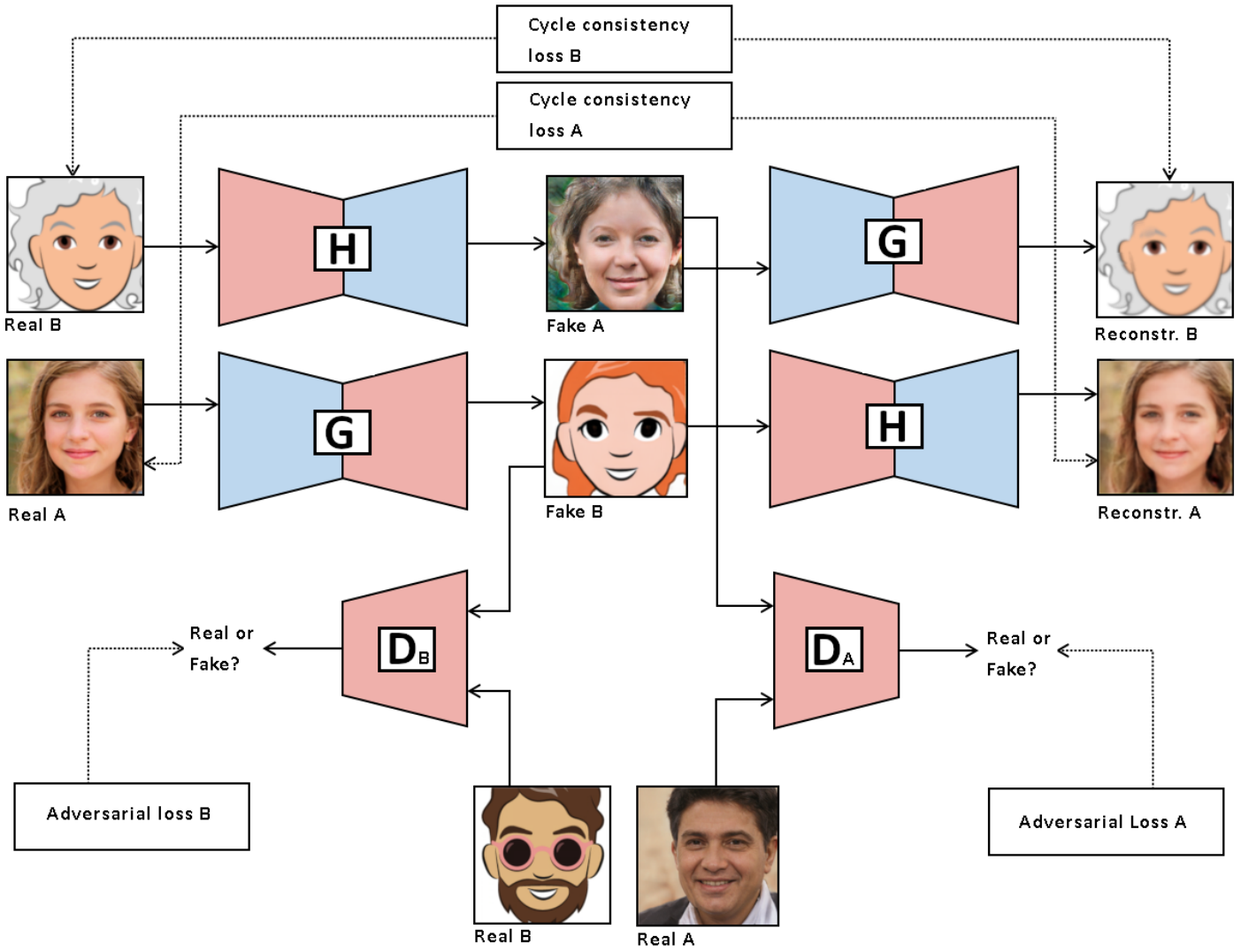


Datasets

- **Cartoon**: These cartoons helped develop the technology behind the personalized stickers in Google Allo. Around 10^13 possible combinations of styles and colors.
- **Real Faces**: 1000 real face images from the FFHQ dataset, which is from Style GAN

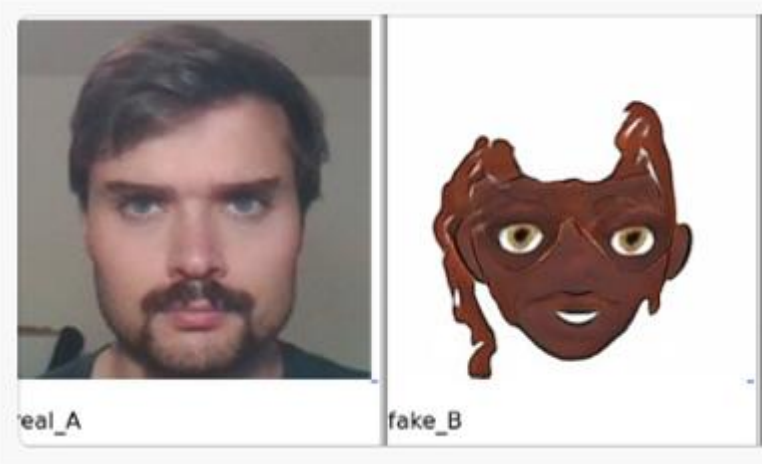
https://google.github.io/cartoonset/index.html

Approach: CycleGAN (Jun-Yan Zhu et al.)

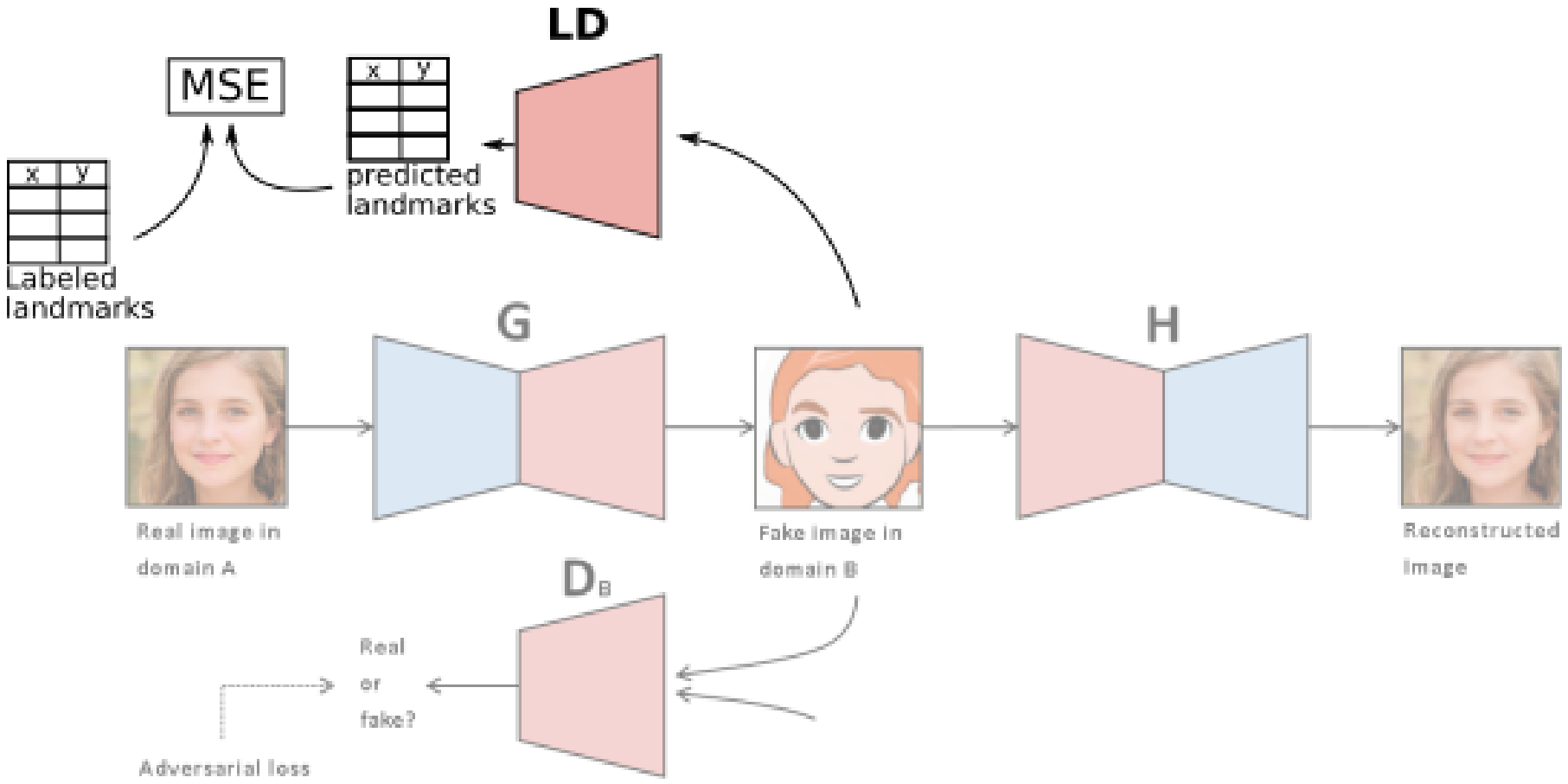


First results with cycleGAN

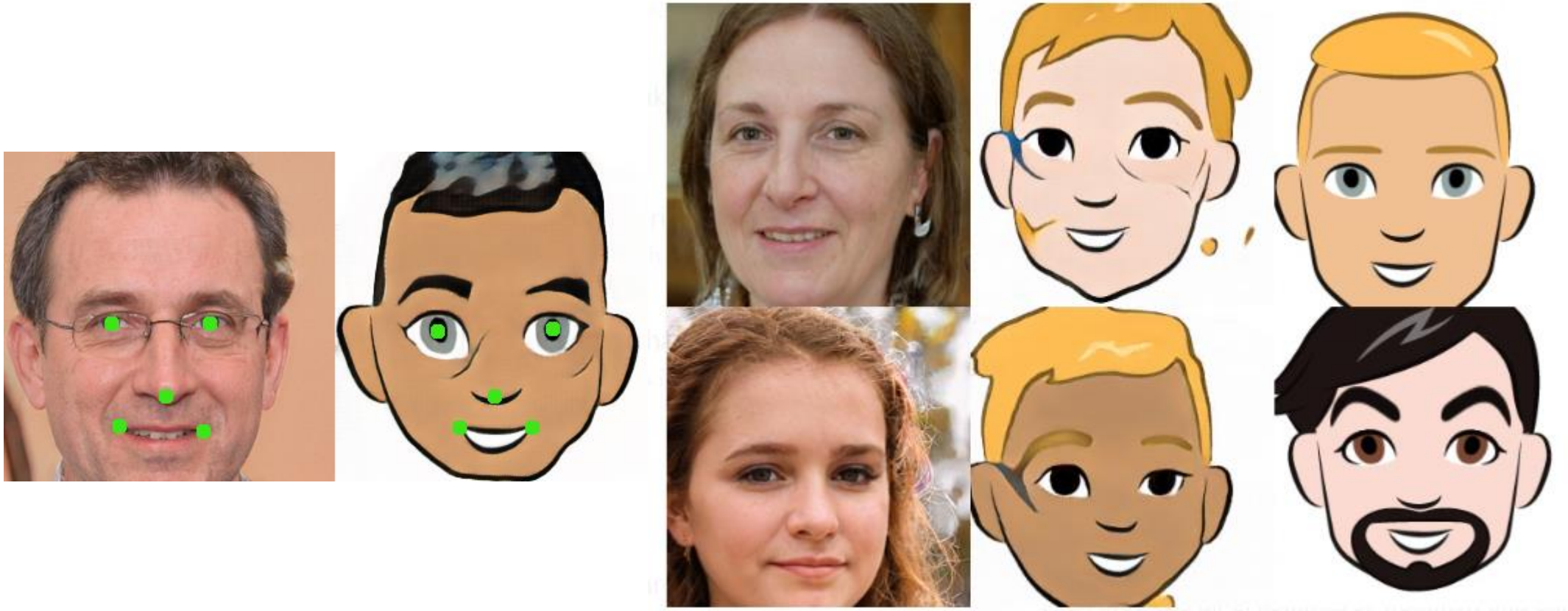
- There is no real correspondence between the faces
- We have no control over the generation of e.g. the color



Landmarks Loss

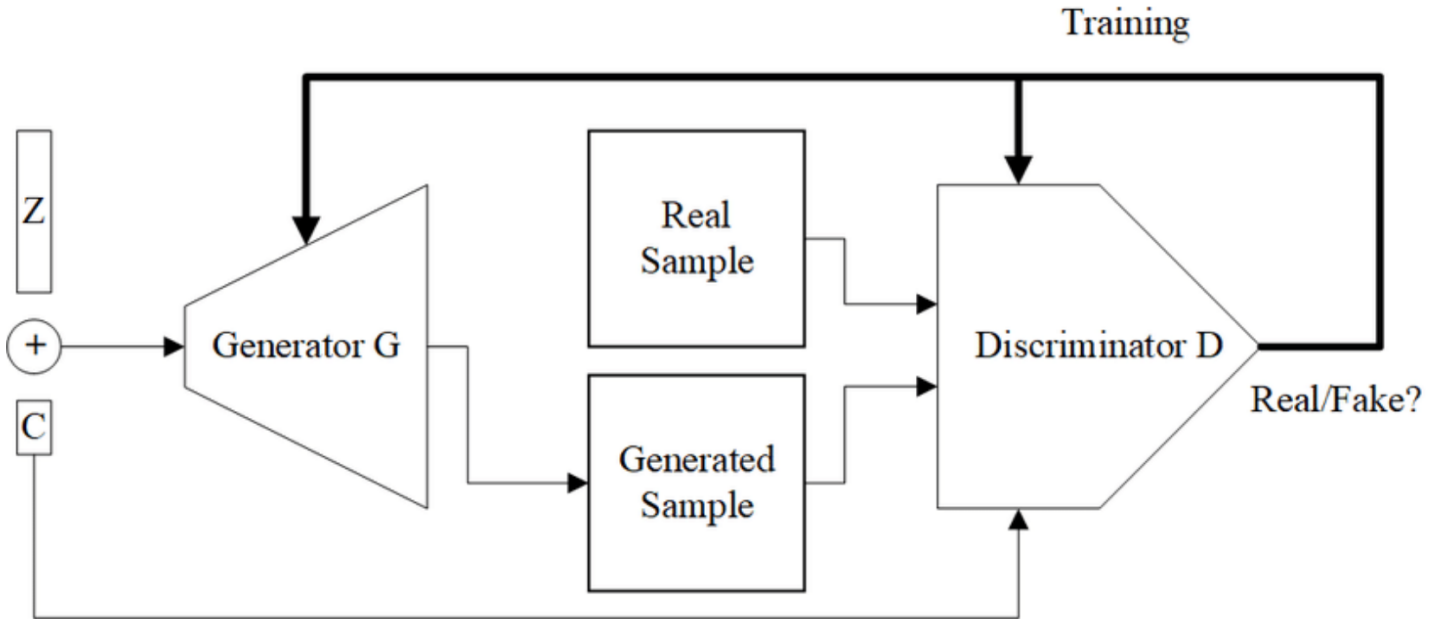


Landmarks Loss



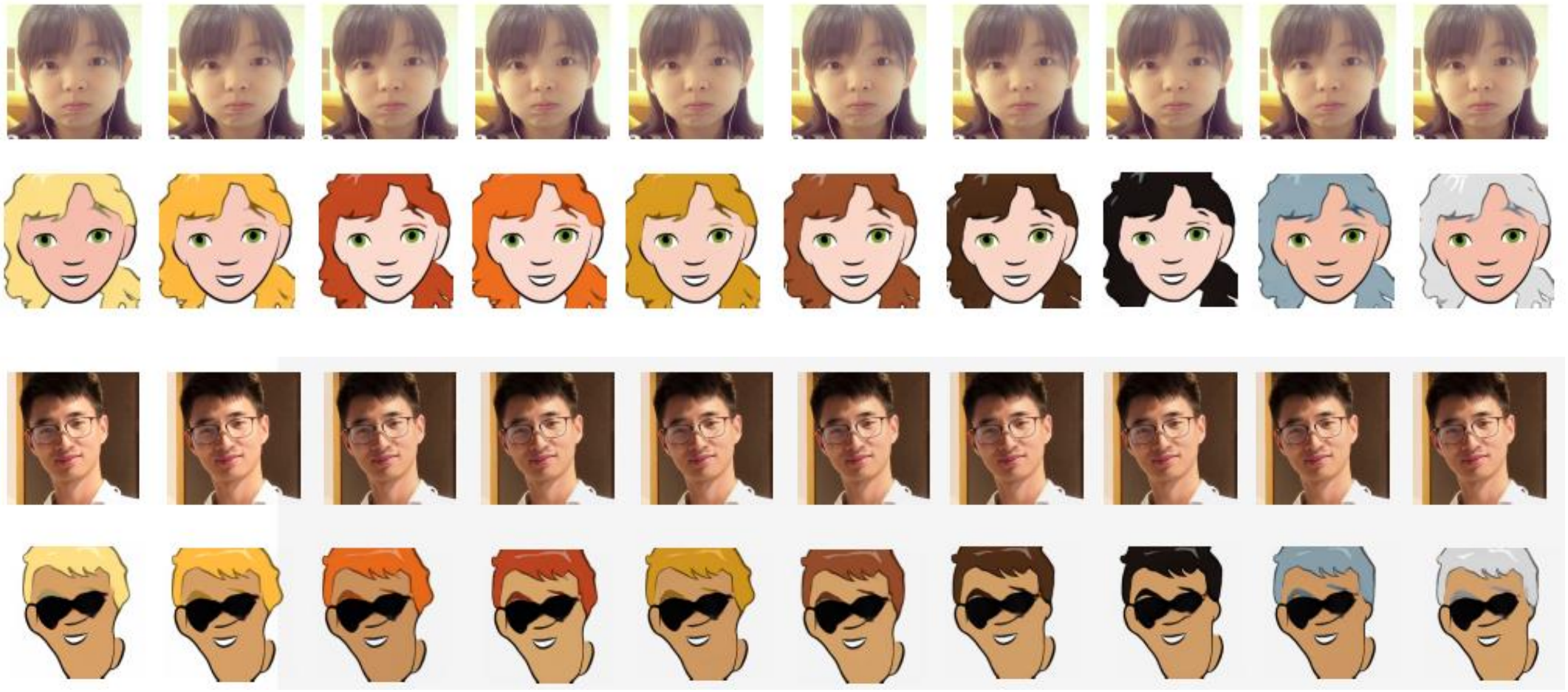
Conditional cycleGAN

- Conditional GAN uses a class label to condition on to both the generator and discriminator, which shows that the model can generate MNIST digits conditioned on class labels.



Mirza M, Osindero S. Conditional generative adversarial nets. arXiv preprint arXiv:1411.1784. 2014 Nov 6.

Conditional cycleGAN Results



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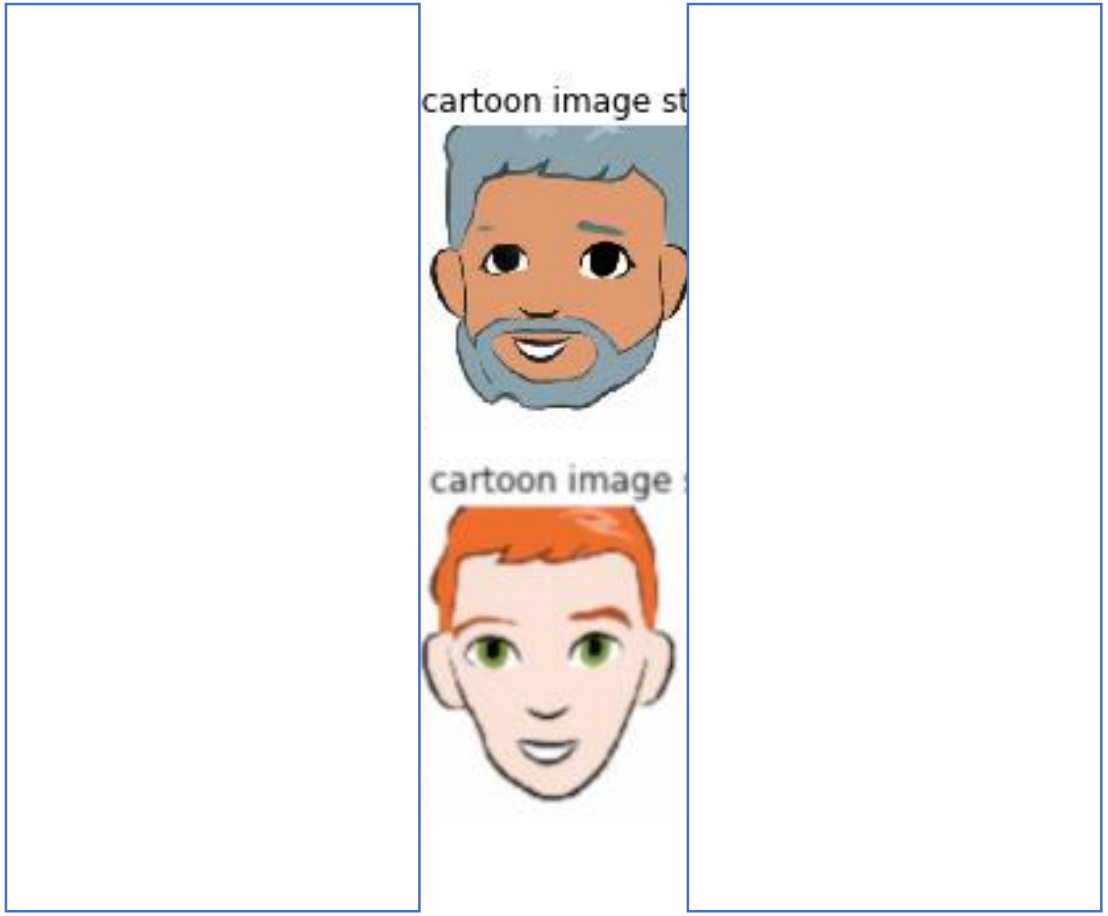
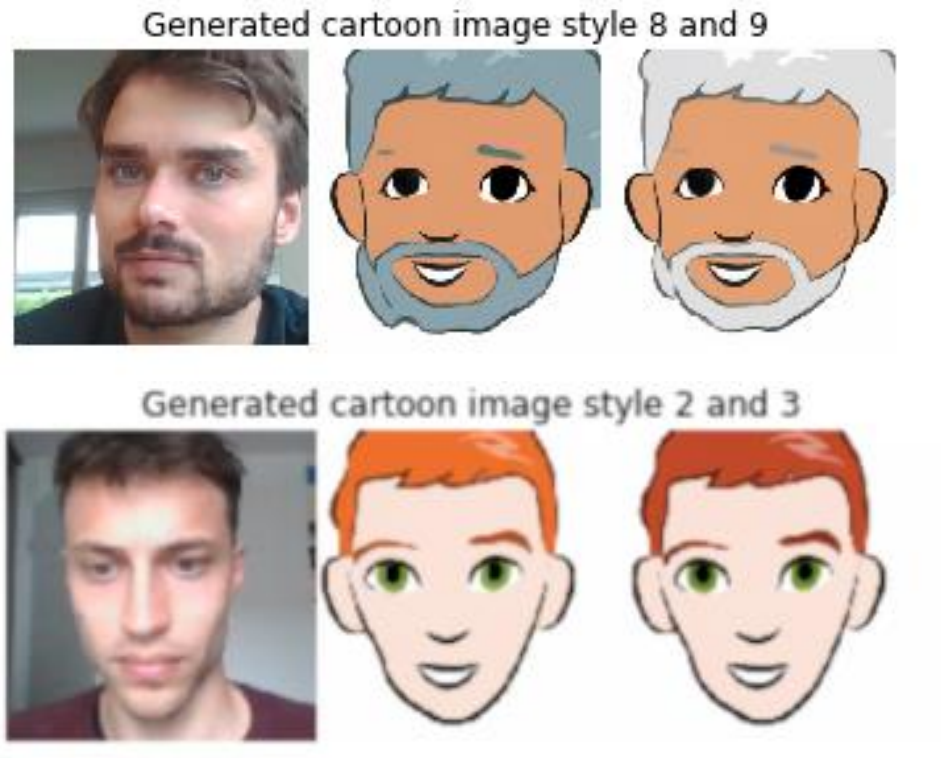
Results: Ben or Jan?



Results: Ben or Jan?



Conclusion and Outlook

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- Preserved some important features
- CycleGAN can be extended in a natural way
- Problems with:
  - Background (identify and neglect background)
  - Illumination
  - Viewpoint (augmentation on cartoonset)

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Questions?