# cGANs for Cartoons to Real-life Images

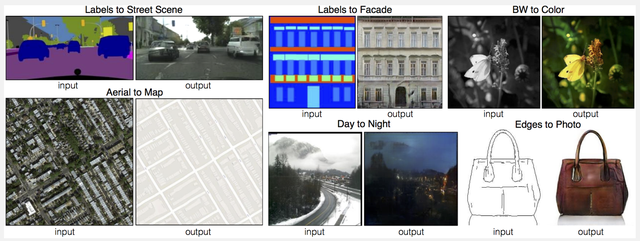
Kanya Satis, Pranjal Singh Rajput, Sonnya Dellarosa, Wenxuan Huang, and Obinna Agba

TU Delft

## 1 Background

Pix2Pix [1]: a conditional generative adversarial network (cGAN) designed for image-to-image translation, which features:

- **Discriminator** to discriminate fake and real
- **Generator** to minimize the loss function




## 2 Research Questions

1. Does the default set of hyper parameters of the original implementation work well on this cartoonized dataset?
2. Does the model properly recreate facial expressions and postures?

## 4 Data Collection

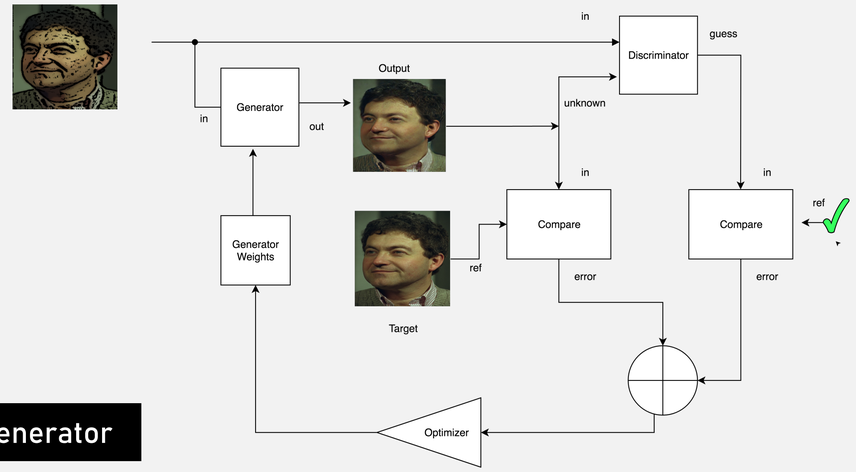
**color FERET Database**: 11,337 facial images

Preprocessing: cartoonization with OpenCV

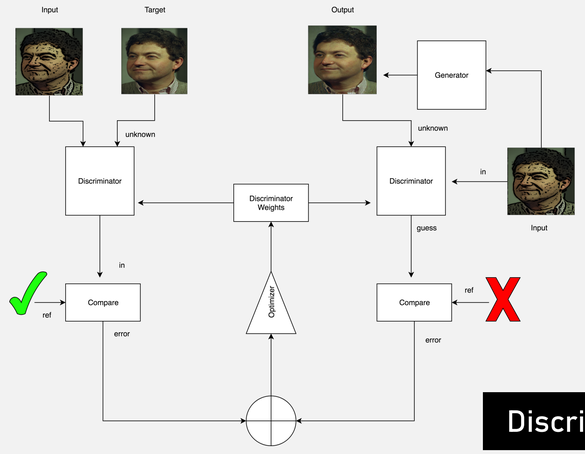
We changed the dataset to improve network:

1. **Original dataset**
2. **Filtered dataset**: only colored images where 50% of the image is a face (8,933 images)
3. **Augmented dataset**: combination of images with different cartoonization process (7,858 images)

## 3 Architecture




Generator



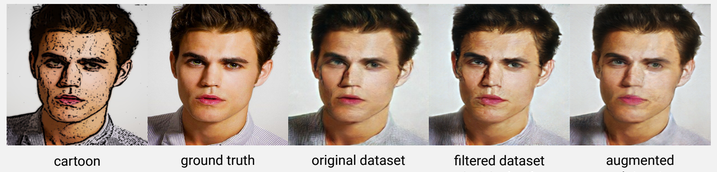

Discriminator

## 5 Experiments & Results

Original dataset


Filtered dataset

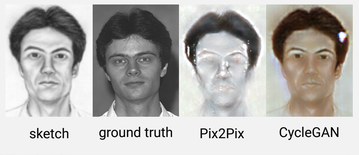
Augmented dataset

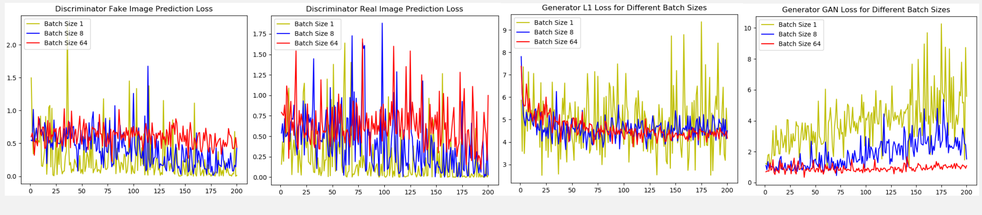



Network from training the original dataset outputs poor results on greyscale and images with a small face. After filtering the database, results improved. Augmenting the dataset further improved the results.

Effect of batch size


Pix2Pix vs CycleGAN




## 6 Discussions

- Higher batch size worsens performance
- CycleGAN which uses domain adaptation improved the results for hand-drawn sketches
- Data filter and augmentation greatly improves the results

## 7 Conclusion

The default hyper-parameters works well on the cartoonized dataset. The model is also able to regenerate the real image in the dataset with a slight variation from the ground truth.

## 8 References

[1] Isola, P., Zhu, J., Zhou, T., & Efros, A.A. (2017). Image-to-Image Translation with Conditional Adversarial Networks. 2017 IEEE CVPR, 5967-5976.
[2] color FERET database. https://www.nist.gov/itl/iad/image-group/color-feret-database