



CartoonGAN: Generative Adversarial Networks for Photo Cartoonization

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Introduction

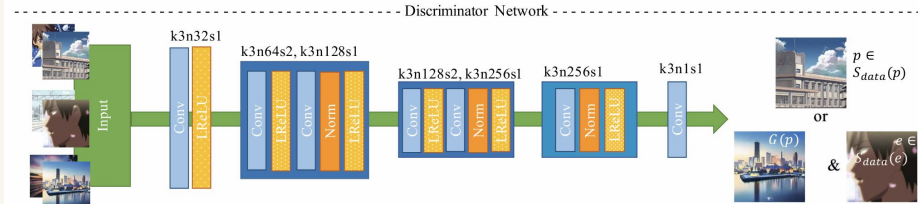
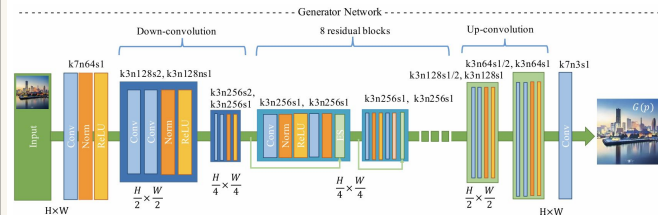
The goal of our project is to transform real-world photographs into stylized cartoon images using deep learning. Motivated by the growing popularity of cartoon-style outputs from models like ChatGPT, we aim to build our own cartoonization model based on Generative Adversarial Networks (GANs). Cartoonization requires abstracting complex visual patterns into simpler shapes, colors, and outlines, which is difficult to achieve manually but well-suited for deep learning. Our model, adapted from the CartoonGAN architecture, learns this transformation in an unsupervised manner without requiring paired datasets. This work not only advances creative image stylization but also highlights the challenges of balancing artistic abstraction with content preservation.

Dataset

Photo dataset: 4000 images from COCO dataset

Cartoon dataset: 4000 Anime Images called safebooru from Kaggle

Methods



Training involves both content loss (preserving photo features) and edge-promoting adversarial loss (encouraging cartoon characteristics).

Results



Sample from the model after 210 training epochs (left part is original photo while the right part is the cartoonized images)

Discussion

Throughout the project, we faced several technical challenges including GAN instability, vanishing gradients, and the difficulty of achieving clear yet smooth edges in generated images. Careful tuning of loss weights and hyperparameters, especially balancing content and adversarial losses, was critical to achieving convergence. Limited computational resources also constrained the extent of our experimentation. Despite these challenges, our model successfully produces cartoonized images with prominent stylistic features, validating our training strategies. In the future, we aim to enhance the diversity of our training datasets, experiment with additional style control losses, and explore real-time deployment possibilities.

References

Chen, Yang, Yu-Kun Lai, and Yong-Jin Liu. "CartoonGAN: Generative Adversarial Networks for Photo Cartoonization." CVPR 2018. <https://www.kaggle.com/alamson/safebooru>

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