Projected GANs Converge Faster

Axel Sauer, Kashyap Chitta, Jens Müller, Andreas Geiger

TL;DR: Training GANs in pretrained feature spaces improves image quality, training speed, and sample efficiency.

The Discriminator’s Task is two-fold

In GAN training, the discriminator aims to distinguish real from fake samples. On closer inspection, the discriminator’s task is two-fold

1. Learn a representation of the input space (projects the real and fake samples into a meaningful space)
2. Discriminate based on this representation

We explore the utility of pretrained representations to facilitate the discriminator’s task and improve and stabilize GAN training.

Exploiting the Full Potential of Pretrained Features

Key components:
- Pretrained Feature Network F
- Feature Pyramids via random projections:
  - Cross-channel mixing (CCM)
  - Cross-scale mixing (CSM)
- Multi-scale discriminators

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Training Properties

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Results

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