

Speeding up GANs

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Motivation and the main idea

- ▶ Training GANs is very slow
 - ▶ i.e. it takes 9 days to train StyleGAN2 on FFHQ
- ▶ People start applying GANs in real-world applications, i.e. there is a growing demand for fast generative models
- ▶ Research on fast GANs is very limited¹
- ▶ This creates opportunities for several work directions:
 - ▶ Bringing/creating methods to speed up GAN training and inference
 - ▶ Creating “YOLO”-like GAN models: models with a good tradeoff between speed and quality
 - ▶ mlperf for GANs: GAN quality/speed open benchmarking

¹For now, I only found a paper on quantization, model distillation and core-set construction

Speeding up training

- ▶ Additional losses for faster convergence
- ▶ Pretraining: how much knowledge is transferrable between different GAN models?
 - ▶ Can we use ImageNet-pretrained conv layers?
 - ▶ Can we train a single discriminator models on several datasets to be used in downstream tasks?
 - ▶ Pretraining is a big thing in deep learning, but in GANs it is very limited
- ▶ Faster convergence with tricks like ReZero, superconvergence, etc.
- ▶ Faster inference
- ▶ What else?

Speeding up inference

- ▶ Architectural tricks from classification:
 - ▶ groupwise/depthwise separable convolutions
 - ▶ batch norm fusion
 - ▶ what else?
- ▶ Quantization
- ▶ Distilling the model into a smaller one
- ▶ What else?