On GANs and GMMs

Eitan Richardson and Yair Weiss
The Hebrew University of Jerusalem
GAN: Sharp and realistic generated samples, but...

- Represents the entire data distribution?
- Utility (inference tasks)?
- Interpretability?

Compared to GMM
NDB – A Binning-based Two-Sample Test

In $\mathbb{R}^2$

Too Many

In $\mathbb{R}^{64 \times 64 \times 3}$

Too Few

GAN Samples
A Full-image GMM (Mixture of Factor Analyzers)

Diverse

Interpretable

Linear-time Learning (GPU-Optimized)

Simple Inference
But, Can GMMs Generate Sharp Images?

Adversarially-trained GMMs behave like GANs (sharp, but mode-collapsing)
Summary

• New evaluation method (NDB) reveals GAN mode collapse
• Full-image GMM: captures the distribution, interpretable, allows inference
• Adversarial GMM generates sharp images

Visit our poster – AB #59 (Wed 5-7pm @ Room 210 & 230)