האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

On GANs and GMMs

Eitan Richardson and Yair Weiss

The Hebrew University of Jerusalem

GAN: Sharp and realistic generated samples, but…

Real

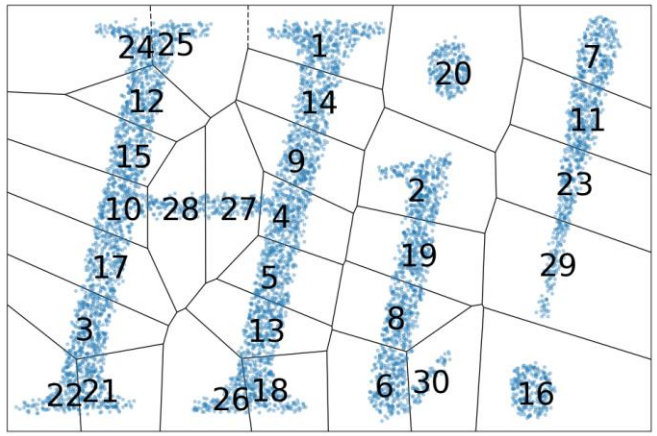
GAN

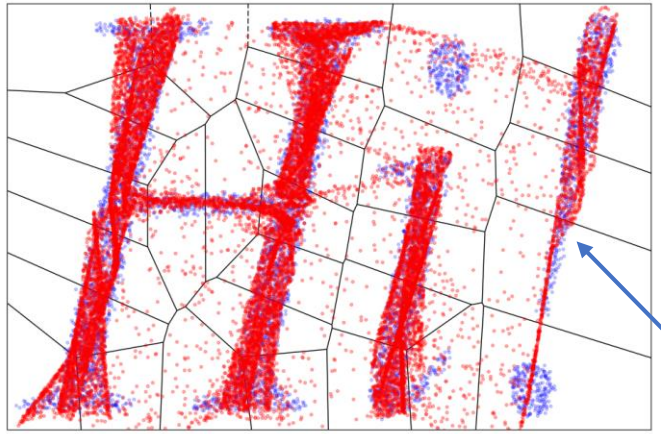
- Represents the entire data distribution?
- Utility (inference tasks)?
- Interpretability?

} Compared to GMM

NDB – A Binning-based Two-Sample Test

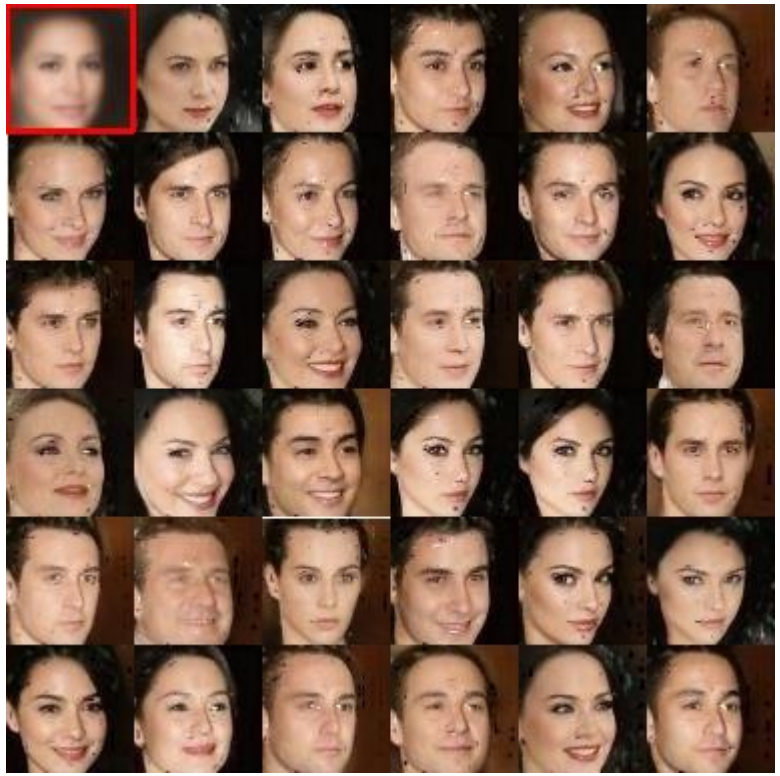
In $\mathbb{R}^2$





GAN Samples

In $\mathbb{R}^{64\times64\times3}$



Too Many

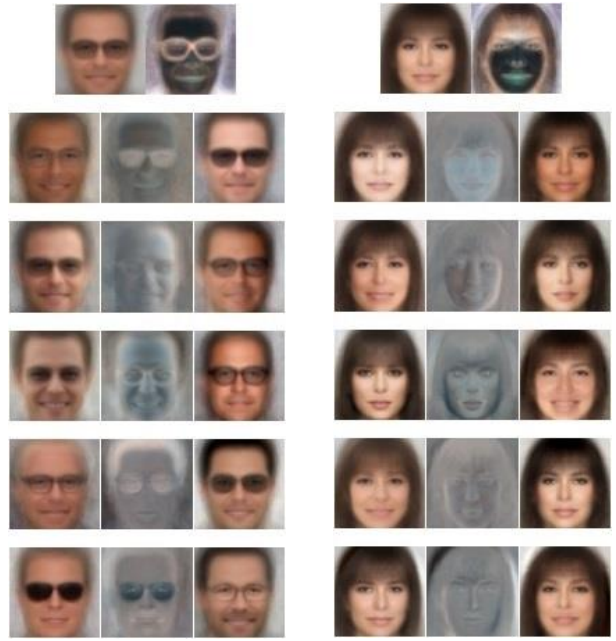
Too Few

A Full-image GMM (Mixture of Factor Analyzers)

Diverse

Linear-time Learning
(GPU-Optimized)

Interpretable



Simple Inference

But, Can GMMs Generate Sharp Images?

Training

GAN

GMM

“Adversarial GMM”

☞ 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)

https://arxiv.org/abs/1805.12462

https://github.com/eitanrich/gans-n-gmms