Exploring and Exploiting Hubness Priors for High-Quality GAN Latent Sampling

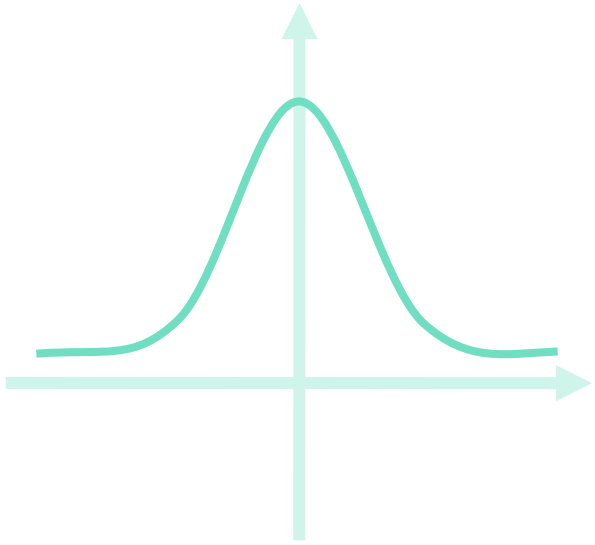
Yuanbang Liang, Jing Wu, Yu-Kun Lai, Yipeng Qin

ICML
International Conference
On Machine Learning

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

UK Research and Innovation

Motivation

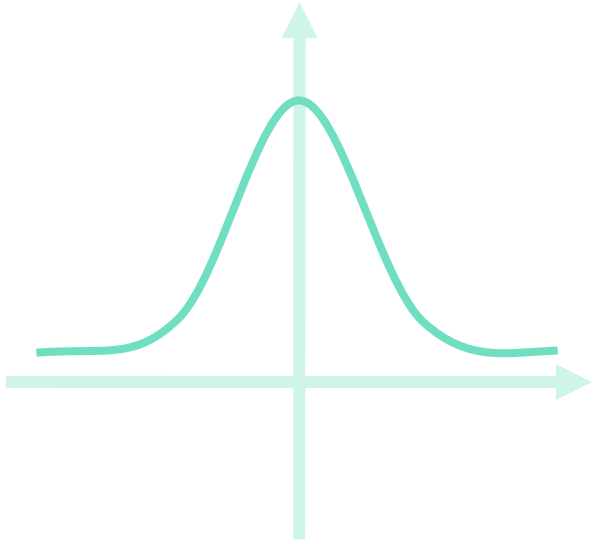


Latent Distribution

Generator

Motivation

Random Sampling

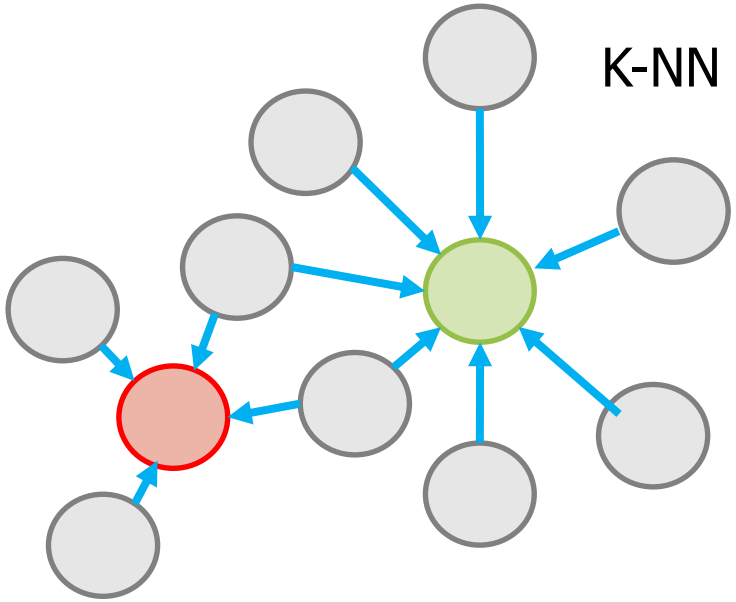


Latent Distribution

Generator

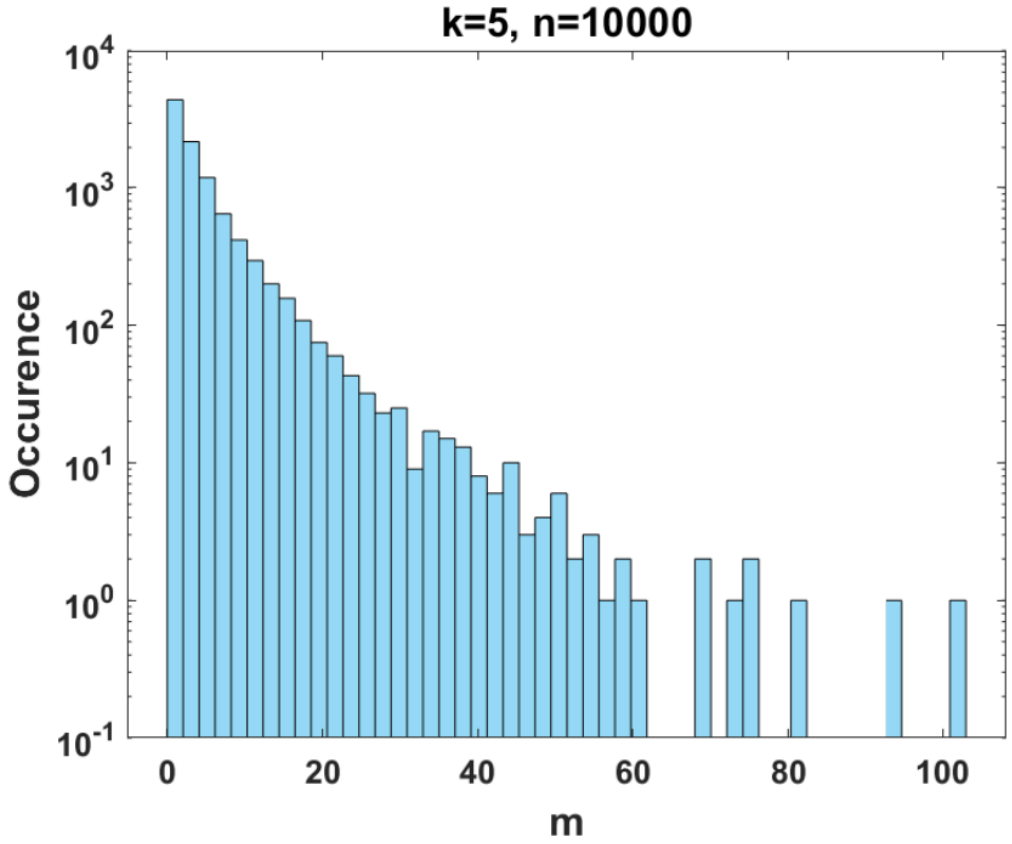
Hubness Priors

Hubness phenomenon[1]



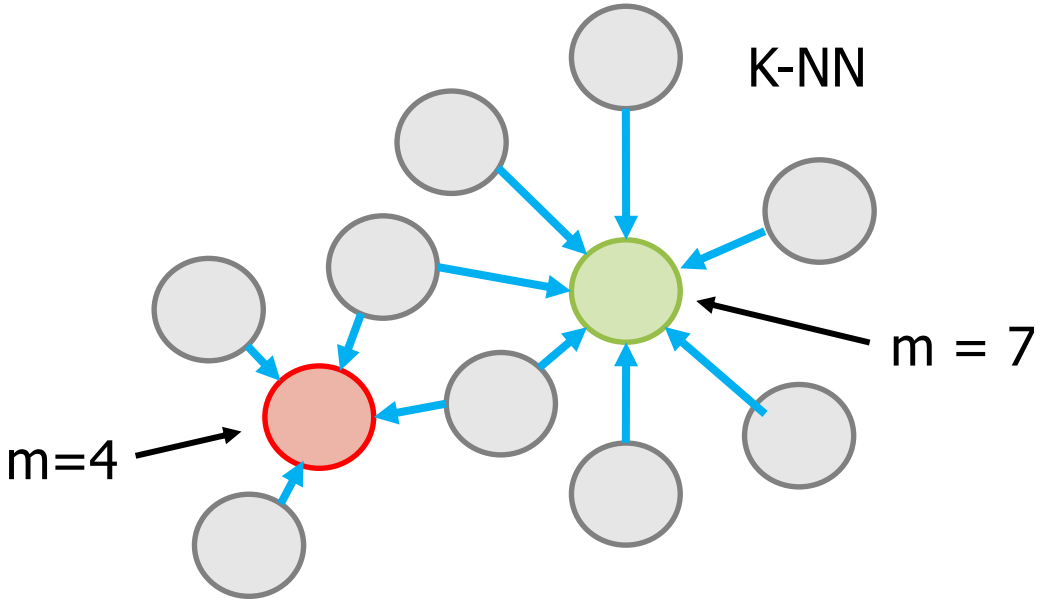
m: hubs value

The distribution of the hub values



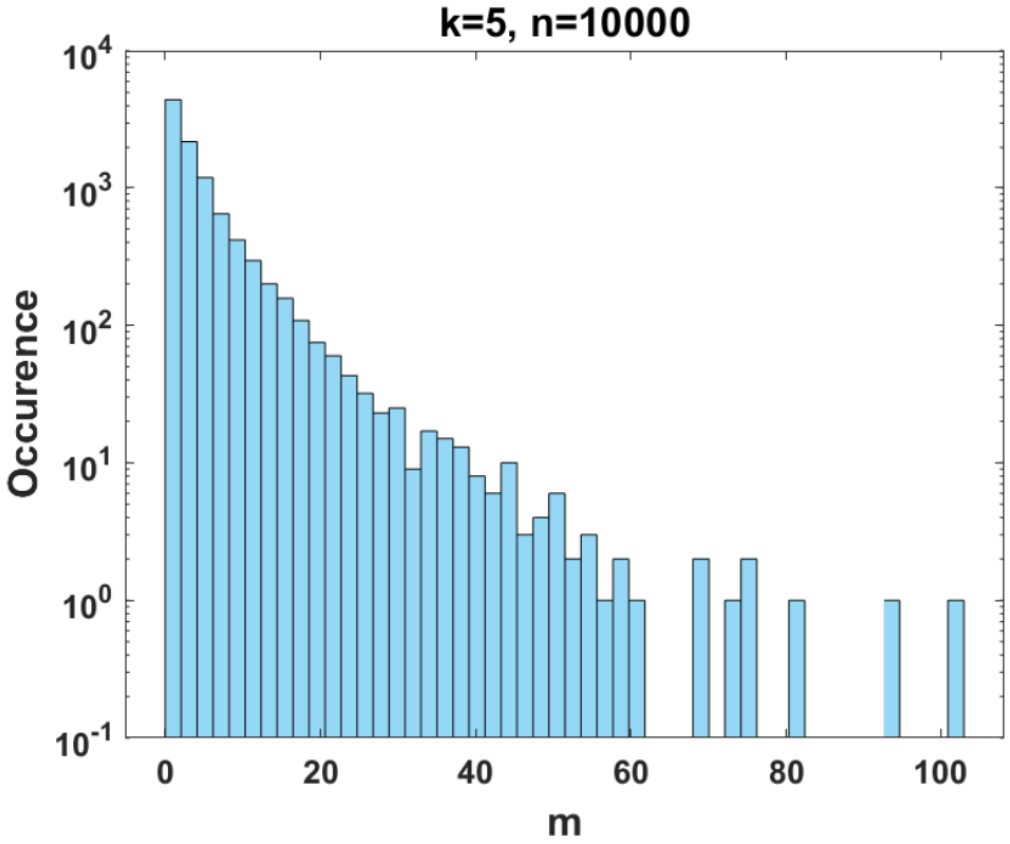
Hubness Priors

Hubness phenomenon[1]



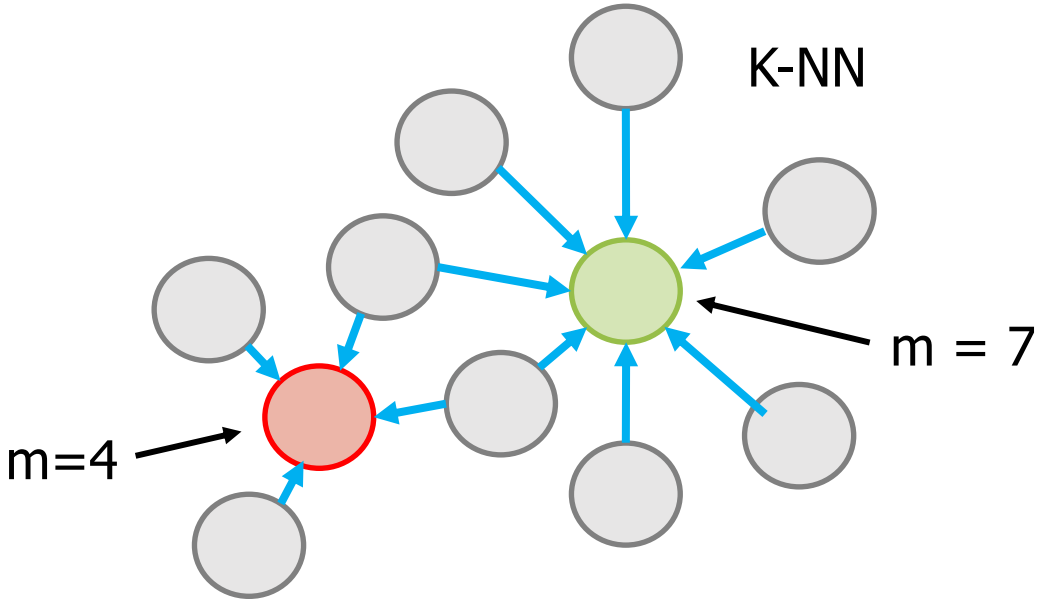
m: hubs value

The distribution of the hub values



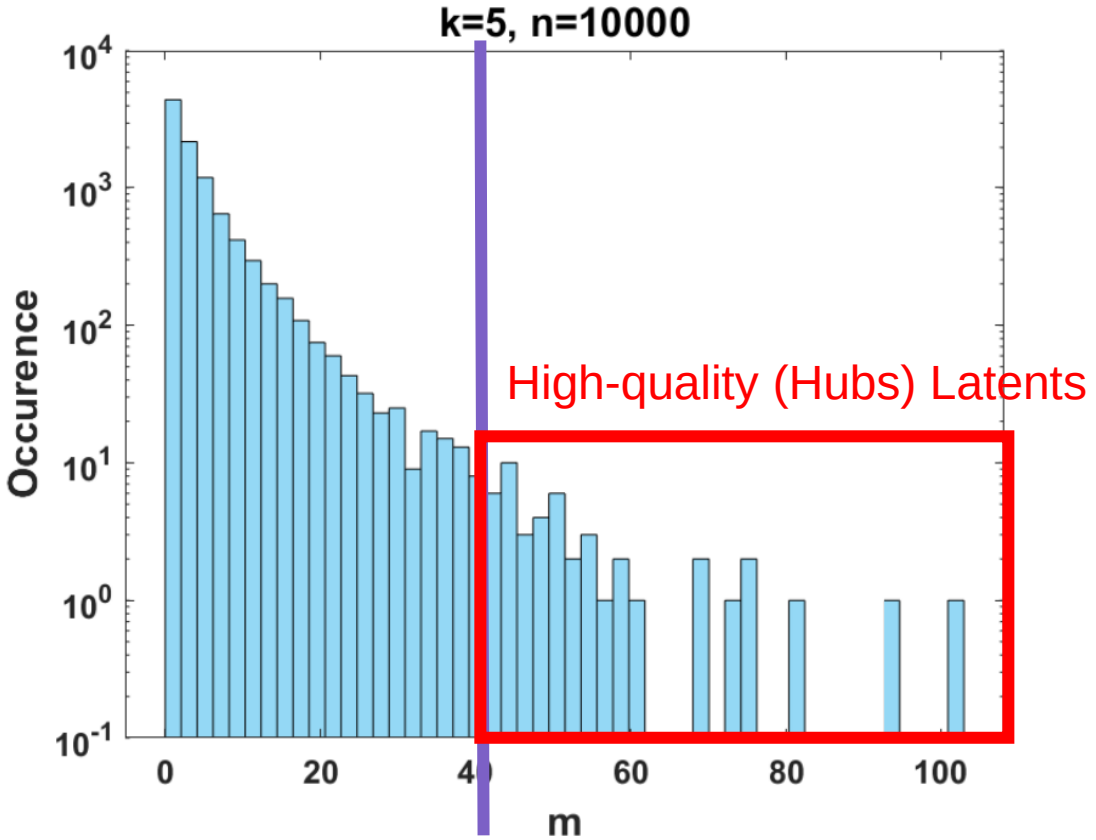
Hubness Priors

Hubness phenomenon[1]



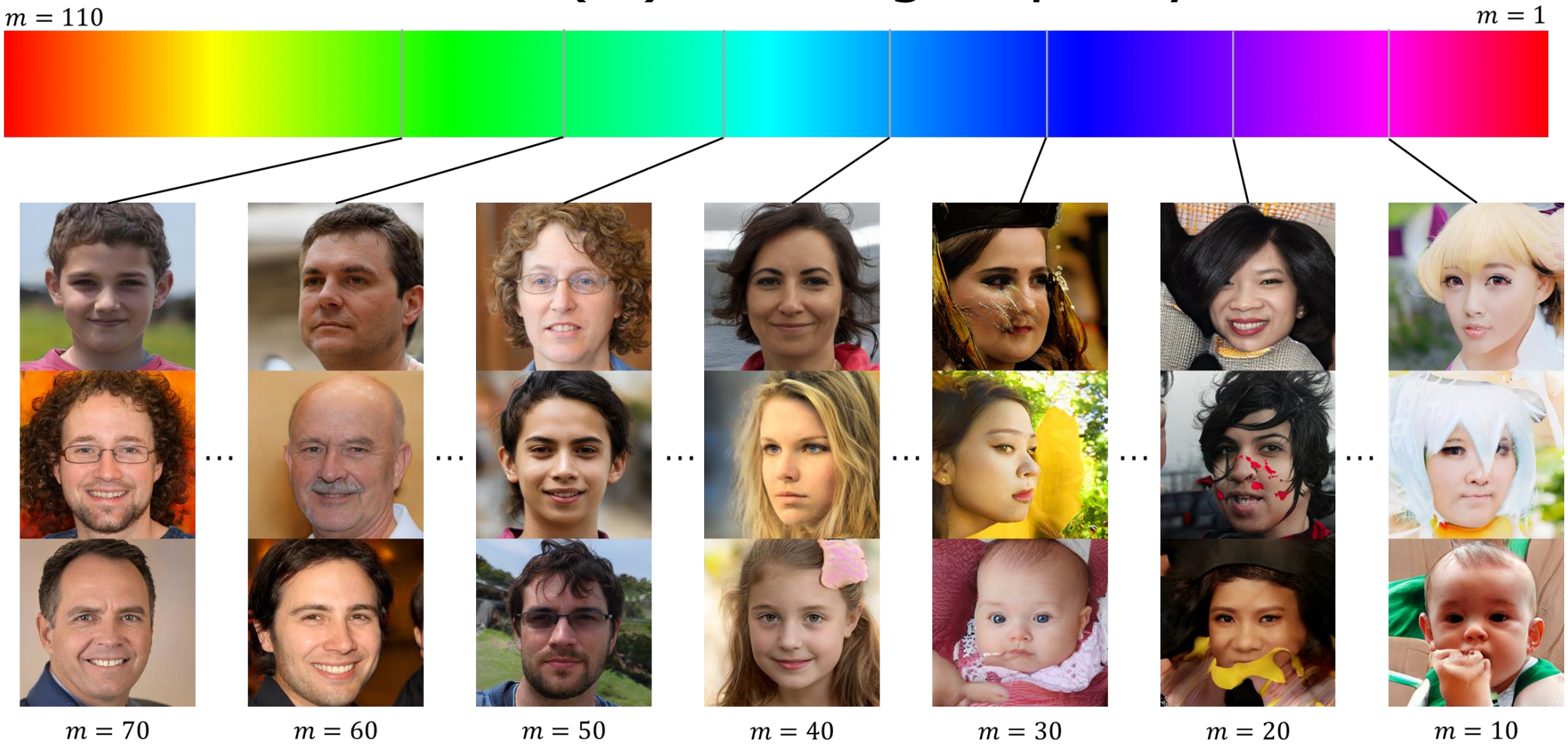
m: hubs value

The distribution of the hub values



Experimental Results

Hub values (m) *vs.* images quality



Experimental Results

HQ

LQ

(a) BigGAN

(b) ProGAN

(c) StyleGAN3

Experimental Results

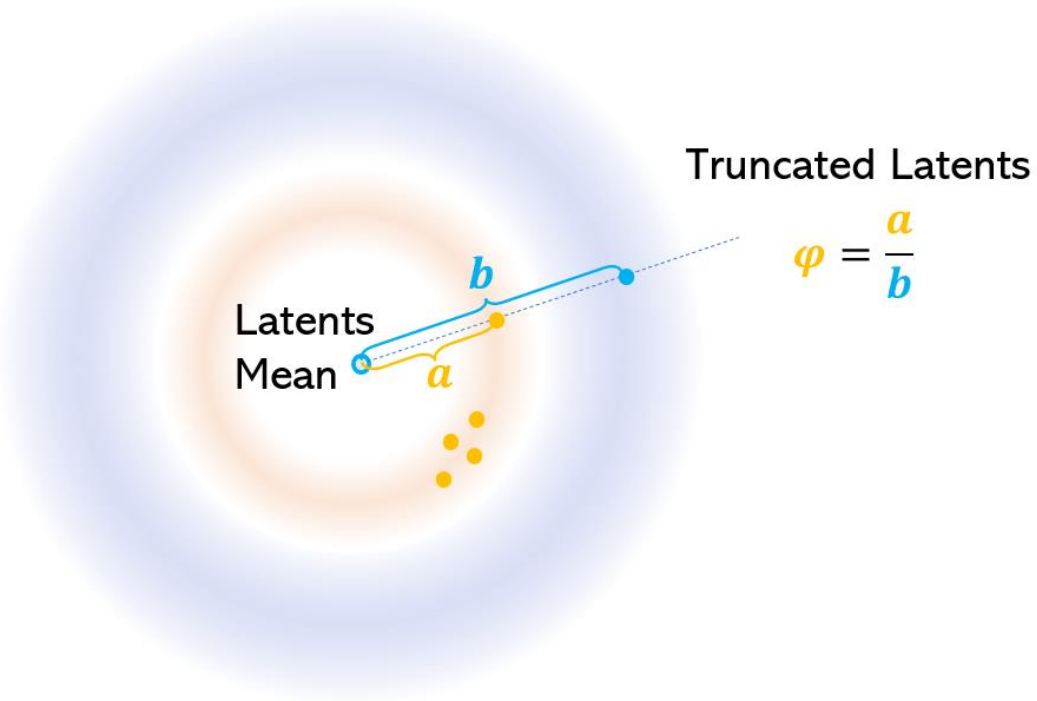
Methods	FID↓	
	FFHQ-1	FFHQ-2
FFHQ-2	16.505	—-
Hubs (50)	21.955	23.609
Truncated (0.7)	25.097	25.127
Random	35.455	35.598

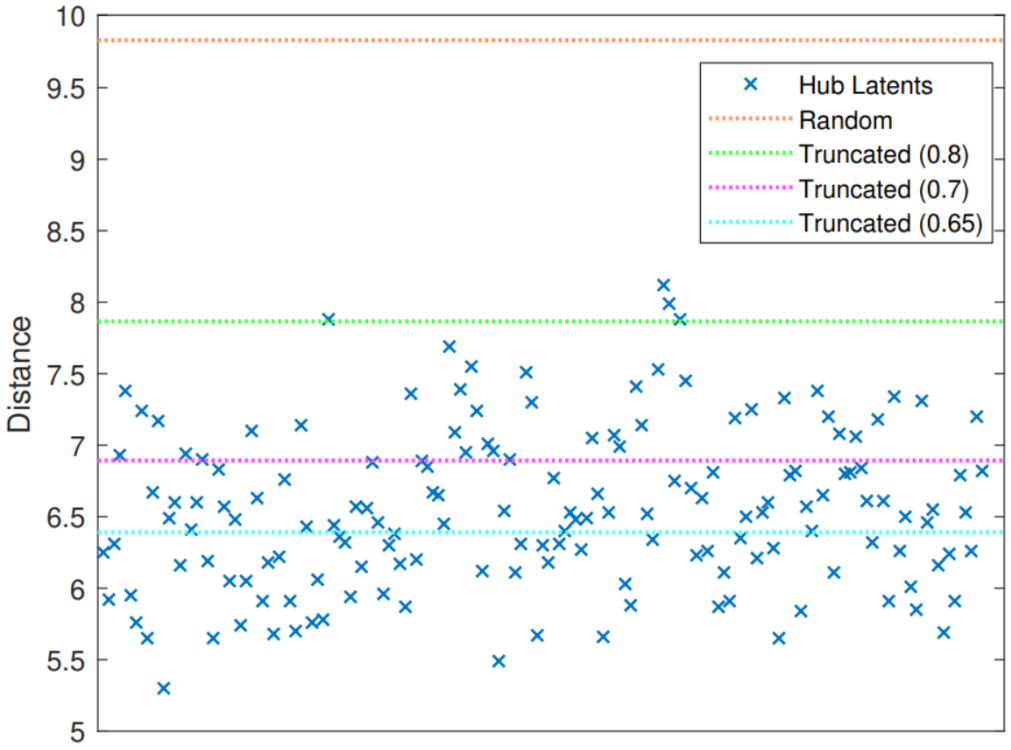
FID

Method	Precision↑	Recall↑
Hubs (50)	<u>0.890</u>	<u>0.324</u>
Truncated (0.3)	**0.892**	0.015
Truncated (0.7)	0.811	0.223
Random	0.720	**0.393**

Precision and Recall

Relationship with Truncation Trick





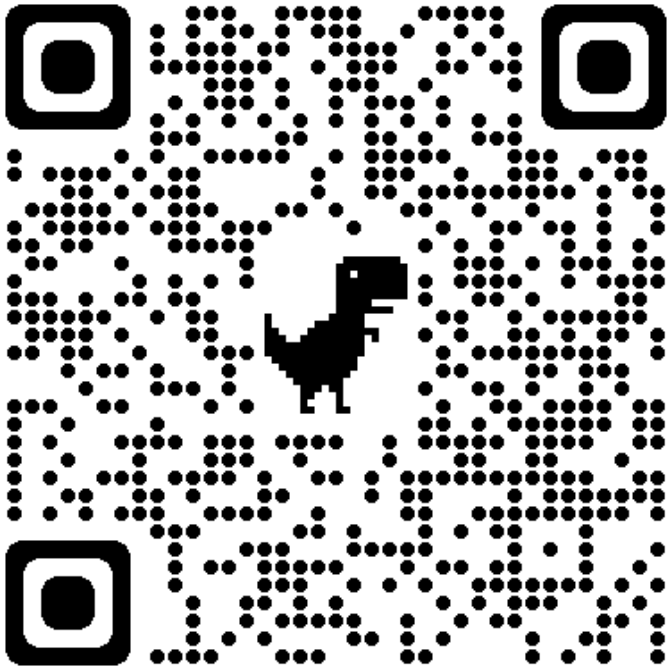
Distance to the mean of all sampled latents

Reference

[1] Radovanovic, Milos, Alexandros Nanopoulos, and Mirjana Ivanovic. "Hubs in space: Popular nearest neighbors in high-dimensional data." *Journal of Machine Learning Research* 11.sept (2010): 2487-2531.

See our paper and GitHub Repo for more details!

https://github.com/Byronliang8/HubnessGANSampling



Thank You for Watching!