

ABSTRACT

- Consistency models can produce high quality samples in one step. They are typically trained with discrete timesteps, which requires additional time schedules and is susceptible to discretization errors. Though continuous-time formulations can mitigate these issues, current training methods are oftentimes unstable.
- We propose a simplified theoretical framework that unifies previous parameterizations of diffusion models and consistency models, identifying the root causes of instability. We also introduce key improvements in diffusion process parameterization, network architecture, and training objectives.
- These techniques enable us to train continuous-time consistency models at an unprecedented scale, reaching 1.5B parameters on ImageNet 512x512 with FID scores of 1.88 for 2-step sampling.





Definition:

Training:

Simplifying, Stabilizing & Scaling Continuous-Time Consistency Models



Cheng Lu & Yang Song OpenAI