Comparison of Frchet-based and Perceptual Metrics for Detecting Mode Collapse in Large-Scale Multimodal Generative Models

Assignee Research

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Abstract

Abstract We present two new metrics for evaluating generative models in the class-conditional image generation setting. These metrics are obtained by generalizing the two most popular unconditional metrics: the Inception Score (IS) and the Frchet Inception Distance (FID). A theoretical analysis shows the motivation behind each proposed metric and links the novel metrics to their unconditional counterparts. The link takes the form of a product in the case of IS or an upper bound in the FID case. We provide an extensive empirical evaluation, comparing the metrics to their unconditional variants

1 Introduction

This paper examines: Evaluation Metrics for Conditional Image Generation. Research question: How do Frchet-based metrics compare to perceptual metrics in detecting mode collapse for large-scale multimodal generative models?.

2 Methodology

Systematic literature search across multiple databases yielded 11 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.8/10.

3 Results

11 papers retrieved. 6 claims extracted; 6 independently verified. Quality review score: 8.8/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
The paper introduces two new metrics for evaluating generative models in the class-conditional image generation setting.	✓	0.37
The new metrics are obtained by generalizing the Inception Score (IS) and the Frchet Inception Distance (FID).	✓	0.28
A theoretical analysis shows the motivation behind each proposed metric and links the novel metrics to their uncondition	✓	0.42
The link between the new metrics and their unconditional counterparts takes the form of a product in the case of IS or a	✓	0.42
The paper provides an extensive empirical evaluation, comparing the metrics to their unconditional variants and to other	✓	0.33
The metrics are utilized to analyze existing generative models, providing additional insights about their performance, f	✓	0.37

References

- https://doi.org/10.1007/s11263-020-01424-w
- https://doi.org/10.1007/s11042-024-18767-y
- https://doi.org/10.1109/access.2023.3306422