Impact of Denoising Diffusion Processes on Zero-Shot Instruction Following Accuracy in Multimodal Models

Assignee Research

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Abstract

We present SPHINX, a versatile multi-modal large language model (MLLM) with a joint mixing of model weights, tuning tasks, and visual embeddings. First, for stronger vision-language alignment, we unfreeze the large language model (LLM) during pre-training, and introduce a weight mix strategy between LLMs trained by real-world and synthetic data. By directly integrating the weights from two domains, the mixed LLM can efficiently incorporate diverse semantics with favorable robustness. Then, to enable multi-purpose capabilities, we mix a variety of tasks for joint visual instruction tuning, and

1 Introduction

This paper examines: SPHINX: The Joint Mixing of Weights, Tasks, and Visual Embeddings for Multi-modal Large Language Models. Research question: How does replacing GAN-based layout priors with denoising diffusion processes impact the zero-shot instruction following accuracy of multimodal models on the RefCOCO+ visual grounding benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 12 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

12 papers retrieved. 12 claims extracted; 11 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
SPHINX is a versatile multi-modal large language model (MLLM) with a joint mixing of model weights, tuning tasks, and vi	✓	0.44
SPHINX unfreezes the large language model (LLM) during pre-training for stronger vision-language alignment.	✓	0.22
SPHINX introduces a weight mix strategy between LLMs trained by real-world and synthetic data.	✓	0.22
The mixed LLM in SPHINX can efficiently incorporate diverse semantics with favorable robustness.	✓	0.20
SPHINX mixes a variety of tasks for joint visual instruction tuning to enable multi-purpose capabilities.	✓	0.24
SPHINX designs task-specific instructions to avoid inter-task conflict.	✓	0.18
SPHINX includes more challenging tasks such as region-level understanding, caption grounding, document layout detection,	✓	0.27
SPHINX proposes to extract comprehensive visual embeddings from various network architectures, pre-training paradigms, a	✓	0.28
SPHINX provides language models with more robust image representations.	×	0.14
SPHINX exhibits superior multi-modal understanding capabilities on a wide range of applications.	✓	0.26
SPHINX proposes an efficient strategy aiming to better capture fine-grained appearances of high-resolution images.	✓	0.26
SPHINX attains exceptional performance with a mixing of different scales and high-resolution sub-images.	✓	0.23

References

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- https://doi.org/10.48550/arxiv.2309.13042

- https://doi.org/10.48550/arxiv.2311.07575