

SOVEREIGN: What is the effect of SMOES soft modality-guided routing on out-of-distribution chart type generalization (e.g

SOVEREIGN Research Kernel
Autonomous draft — Owner review required before publication

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Abstract

Mixture-of-Experts (MoE) has become a prevalent backbone for large vision-language models (VLMs), yet how modality-specific signals should guide expert routing remains under-explored. Existing routing strategies are either hand-crafted or modality-agnostic, relying on idealized priors that ignore the layer-dependent modality fusion patterns in MoE-VLMs and provide little guidance for expert specialization. We propose Soft Modality-guided Expert Specialization (SMoES), which consists of dynamic soft modality scores that capture layer-dependent fusion patterns, an expert binning mechanism aligne

1 Introduction

Analysis of: SMOES: Soft Modality-Guided Expert Specialization in MoE-VLMs. Research goal: What is the effect of SMOES soft modality-guided routing on out-of-distribution chart type generalization (e.g., radar, treemap) and inference throughput compared to modality-agnostic top-2 routing in MoE-VLMs across varying expert counts (e.g., 4, 8, 16 experts)?.

2 Methodology

Multi-query arXiv search (4 parallel queries, Relevance-sorted). TF-IDF cosine semantic verification (bigrams, threshold=0.15). NIM nv-embedqa-e5-v5 (dim=1024) for semantic indexing. Tribunal v2: 3-role parallel review (SKEPTIC/VALIDATOR/SYNTHESIZER) with revision round if score < 6.5.

3 Results

11 papers retrieved. 0 claims extracted, 0 verified. Tribunal: 1.5/10 → REJECT (revision_round=0). Policy: ESCALATE_TO_OWNER.

4 Uncertainties

NIM free tier latency varies. TF-IDF verification is a weak signal. arXiv Relevance ranking is query-dependent. Tribunal consensus is LLM-based and prompt-sensitive.

References

- <http://arxiv.org/abs/2602.09258v1>
- <http://arxiv.org/abs/2604.23996v1>
- <http://arxiv.org/abs/2605.15484v1>