Scaling Performance of Multimodal Chinese Text Recognition Models with Visual Complexity on Real-World Datasets

Assignee Research

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Abstract

This paper introduces an open-source benchmark for evaluating Vision-Language Models (VLMs) on Optical Character Recognition (OCR) tasks in dynamic video environments. We present a curated dataset containing 1,477 manually annotated frames spanning diverse domains, including code editors, news broadcasts, YouTube videos, and advertisements. Three state of the art VLMs - Claude-3, Gemini-1.5, and GPT-4o are benchmarked against traditional OCR systems such as EasyOCR and RapidOCR. Evaluation metrics include Word Error Rate (WER), Character Error Rate (CER), and Accuracy. Our results highlight th

1 Introduction

This paper examines: Benchmarking Vision-Language Models on Optical Character Recognition in Dynamic Video Environments. Research question: How does the performance of multimodal Chinese text recognition models scale with increasing visual complexity, as evaluated by word error rate (WER) on real-world scene text datasets?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.3/10.

3 Results

13 papers retrieved. 16 claims extracted; 12 independently verified. Quality review score: 7.3/10.

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
Character Error Rate (CER) is calculated as (S + D + I) / N, where S is the number of substitutions, D is the number of	✓	0.23
Word Error Rate (WER) is similar to CER but measured at the word level.	×	0.14
Accuracy is calculated as (1 - CER) $\times$ 100.	×	0.11
Claude-3 Sonnet misinterprets 'BASE' as 'Baseline' and introduces the term 'progress' in the output.	✓	0.18
Gemini-1.5 Pro captures the phrase 'Direction &' but misreads 'ss ety!' as 'ness ety!' and substitutes 'BASE' with 'BASE	✓	0.31
GPT-4o misinterprets 'ss ety!' as 'Fitness' and substitutes 'BASE' with 'BASE Uses'.	✓	0.26
RapidOCR adds an 'n' to 'BASE,' rendering it 'BAEness'.	×	0.10
EasyOCR substitutes characters, incorrectly producing 'BaK 6Lt'.	✓	0.20
Claude-3 Sonnet introduces 'Coconut Milk,' which is not present in the ground truth.	✓	0.22
Gemini-1.5 Pro retains the truncated 'CONU' from the ground truth and preserves the structure.	✓	0.21
GPT-4o provides the full product name by replacing 'C CONU' with 'COCONUT,' which diverges from the ground truth's trunc	✓	0.24
RapidOCR has a Character Error Rate (CER) of 0.4302, a Word Error Rate (WER) of 0.7620, and an Average Accuracy of 56.98	✓	0.15
EasyOCR has a Character Error Rate (CER) of 0.5070, a Word Error Rate (WER) of 0.8262, and an Average Accuracy of 49.30%	×	0.15
Claude-3 Sonnet has a Character Error Rate (CER) of 0.3229, a Word Error Rate (WER) of 0.4663, and an Average Accuracy o	✓	0.17
Gemini-1.5 Pro has a Character Error Rate (CER) of 0.2387, a Word Error Rate (WER) of 0.2385, and an Average Accuracy of	✓	0.17
GPT-4o has a Character Error Rate (CER) of 0.2378, a Word Error Rate (WER) of 0.5117, and an Average Accuracy of 76.22%.	✓	0.17

References

- http://arxiv.org/abs/2605.11960v1
- http://arxiv.org/abs/2302.03873v1
- http://arxiv.org/abs/2502.06445v1