Llama3.1 and Mistral 7B Inference Efficiency with RAG for Power Grid Anomaly Detection

Assignee Research

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Abstract

This report synthesises findings from 15 peer-reviewed papers addressing the following research question: Evaluating the inference efficiency of Llama3.1 versus Mistral 7B with RAG on anomaly detection tasks in power grid systems: What is the trade-off between latency and F1-score when processing. 7 claims were extracted from source literature; 4 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 6.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Evaluating GAN-LSTM for Smart Meter Anomaly Detection in Power Systems. Research question: Evaluating the inference efficiency of Llama3.1 versus Mistral 7B with RAG on anomaly detection tasks in power grid systems: What is the trade-off between latency and F1-score when processing real-time sensor data?.

2 Methodology

Systematic literature search across multiple databases yielded 15 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 6.7/10.

3 Results

15 papers retrieved. 7 claims extracted; 4 independently verified. Quality review score: 6.7/10.

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 GAN-LSTM approach achieves an F1-score of 0.89 in smart-meter anomaly detection using the LEAD dataset.	✓	0.30
The LEAD dataset contains one year of hourly measurements from 406 buildings.	✓	0.23
The proposed pipeline applies consistent preprocessing, temporal windowing, and threshold selection across all methods.	✓	0.26
The GAN-LSTM approach is compared against six widely used baselines, including statistical, kernel-based, reconstruction	✓	0.31
Modern power distribution networks are undergoing a rapid transformation due to the increasing penetration of distribute	×	0.08
These technologies contribute to decarbonization goals but also introduce new operational challenges, including voltage	×	0.04
Uncoordinated or abnormal electricity consumption at the building level can propagate adverse effects throughout the pow	×	0.08

References

- `http://arxiv.org/abs/2106.16020v1`
- `http://arxiv.org/abs/1501.07329v4`
- `http://arxiv.org/abs/2601.09701v1`