Unconditional Training in TSDiff Enhances Robustness Against Domain Shifts in Time Series Forecasting via KL Divergence on ETTm2

Assignee Research

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Abstract

A time series is a sequence of time-ordered data, and it is generally used to describe how a phenomenon evolves over time. Time series forecasting, estimating future values of time series, allows the implementation of decision-making strategies. Deep learning, the currently leading field of machine learning, applied to time series forecasting can cope with complex and high-dimensional time series that cannot be usually handled by other machine learning techniques. The aim of the work is to provide a review of state-of-the-art deep learning architectures for time series forecasting, underline r

1 Introduction

This paper examines: Deep Learning for Time Series Forecasting: Advances and Open Problems. Research question: To what extent does the unconditional training approach in TSDiff improve robustness against domain shifts in time series forecasting compared to conditional diffusion models, evaluated using KL divergence between predicted and ground truth distributions on the ETTm2 benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 5 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.0/10.

3 Results

5 papers retrieved. 4 claims extracted; 4 independently verified. Quality review score: 8.0/10.

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
Deep learning applied to time series forecasting can handle complex and high-dimensional time series that other machine	✓	0.30
The work provides a review of state-of-the-art deep learning architectures for time series forecasting.	✓	0.28
The work distinguishes between deep learning architectures suitable for short-term and long-term forecasting.	✓	0.26
The work describes recent architectures for time series forecasting, including Graph Neural Networks, Deep Gaussian Proc	✓	0.36

References

- https://doi.org/10.3390/info14110598
- https://doi.org/10.36227/techrxiv.176978429.90235801/v2
- https://doi.org/10.48550/arxiv.2409.02322