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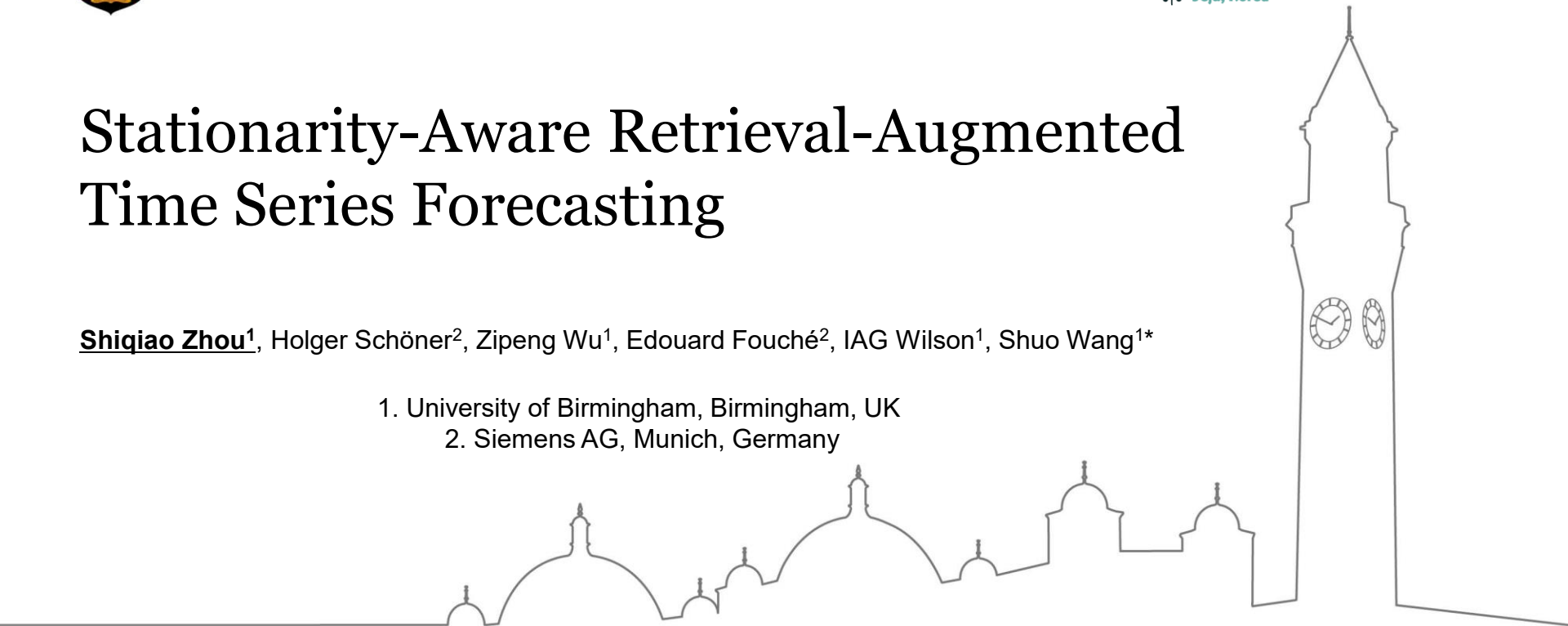
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Stationarity-Aware Retrieval-Augmented Time Series Forecasting

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1. University of Birmingham, Birmingham, UK

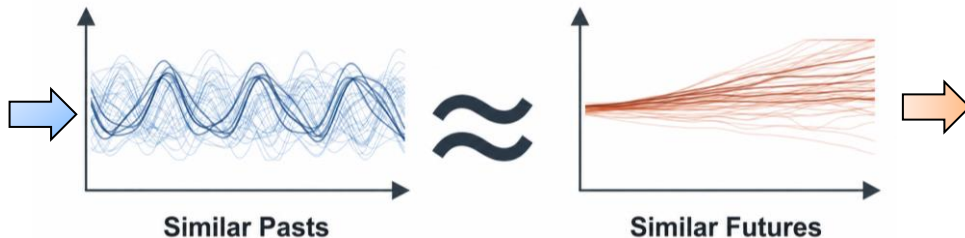
2. Siemens AG, Munich, Germany



The Rise and Core Hypothesis of Retrieval-Augmented Forecasting (RAF)

The Dilemma of ML Models

Difficult to capture rare patterns and long-tail distributions, triggering the need for external memory.

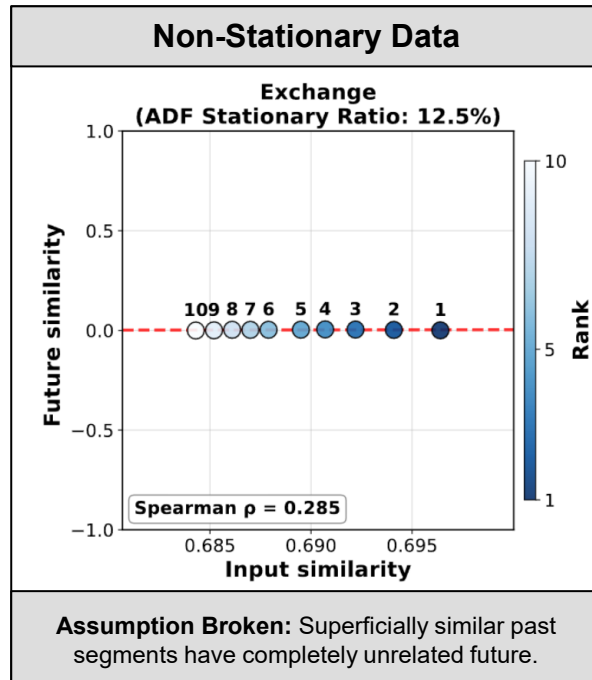
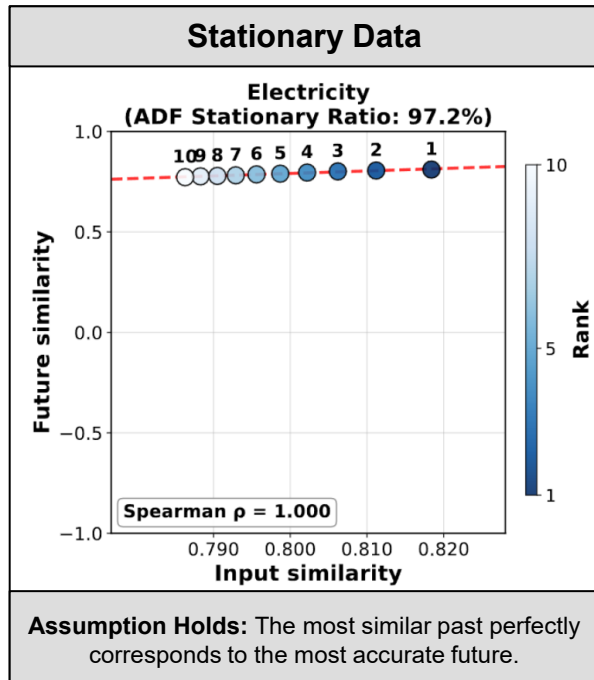


RAF's Solution

Based on Top-K similarity matching, inject historical slices as external evidence into the forecasting pipeline.

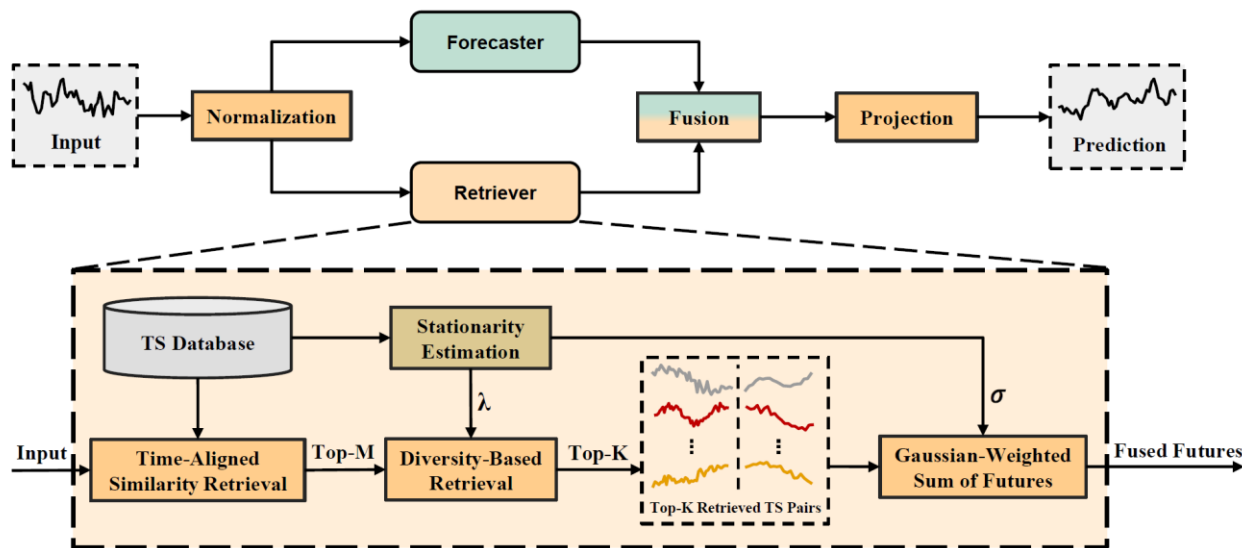
But, how about RAF in real world which is often with distribution shift?

Core Paradox: “Similar Pasts” Do Not Always Predict “Similar Futures”



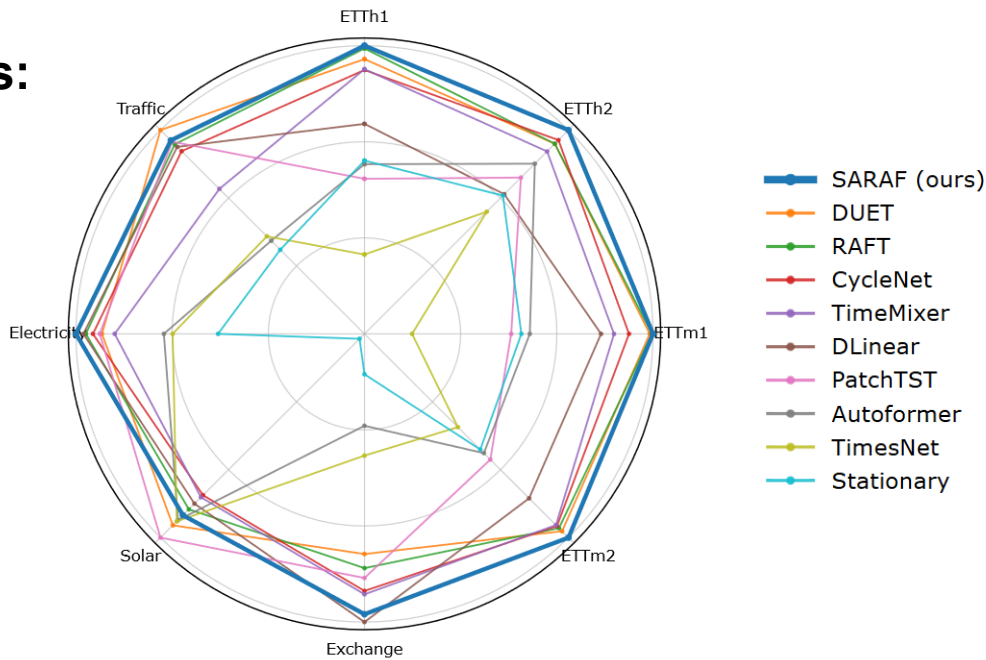
Proposed Methodology: SARAF

By utilizing dataset stationarity as a dynamic control signal, SARAF moves beyond rigid similarity search to fetch and adaptively fuse diverse, time-aligned historical patterns



Performance

- **Lightweight yet powerful:** Achieves competitive performance across 8 real-world datasets
- **MSE Radar Results:**



Summary

- SARAF diagnose the issue in RAF: similar pasts not always predict similar future
- SARAF mitigate this issue by temporal alignment, diversity retrieval and adaptive fusion with stationarity estimation

Paper



Code

