Norwegian Centre for Research-based Innovation

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RePAD3: Advanced Lightweight Adaptive Anomaly Detection for Univariate Time Series of Any Pattern

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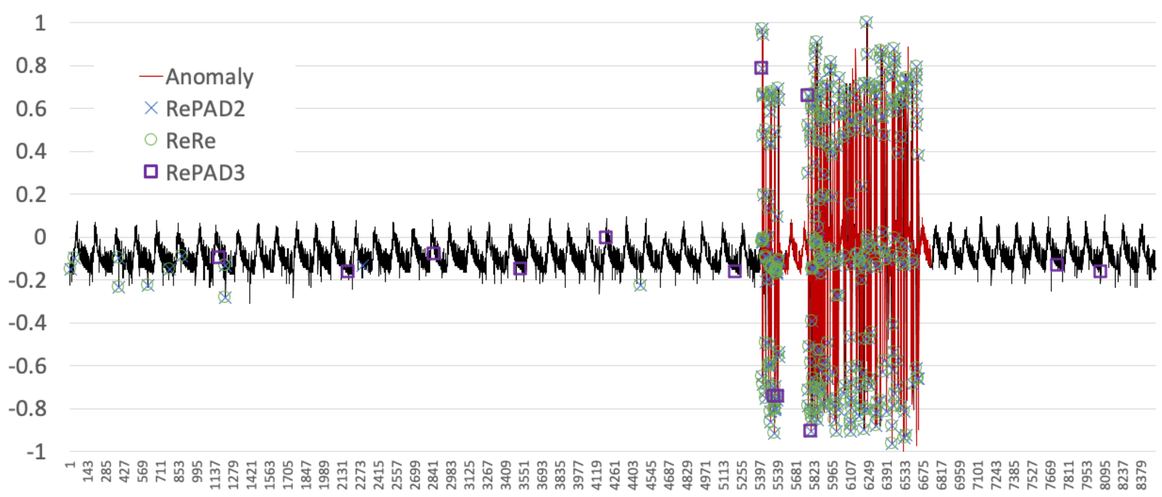
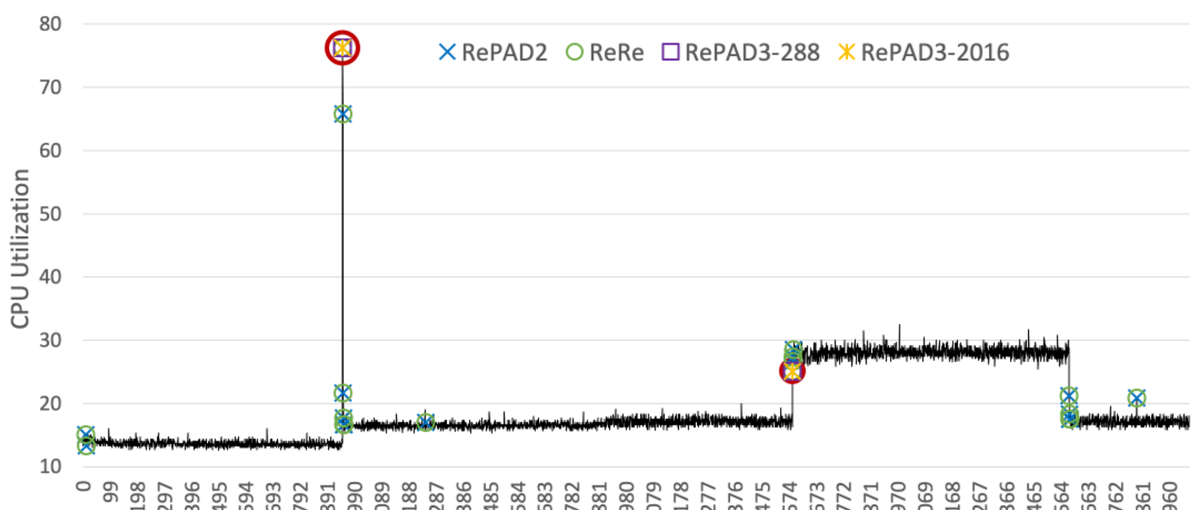
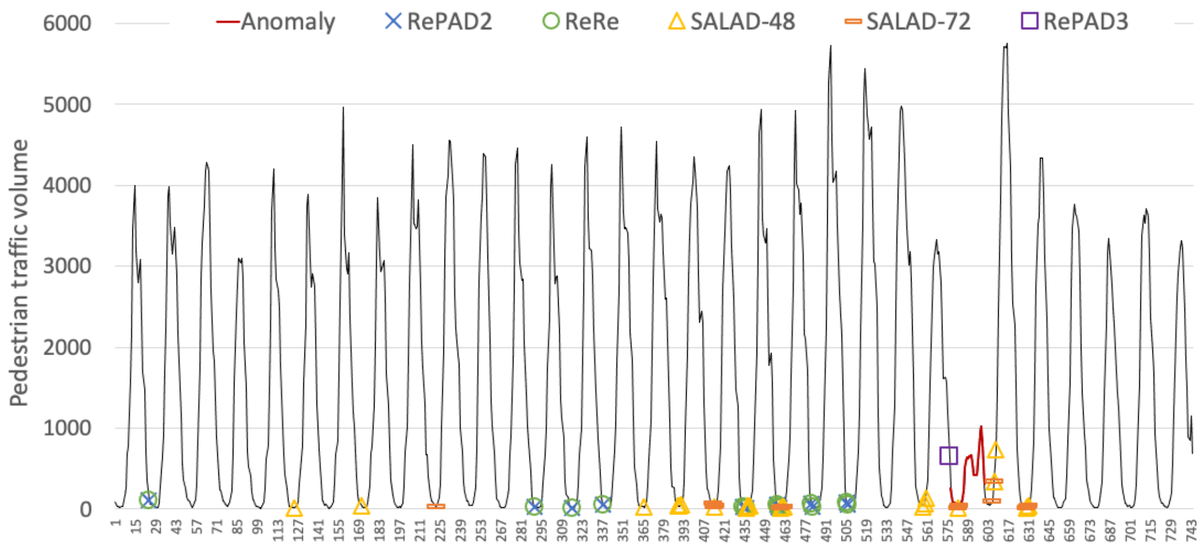
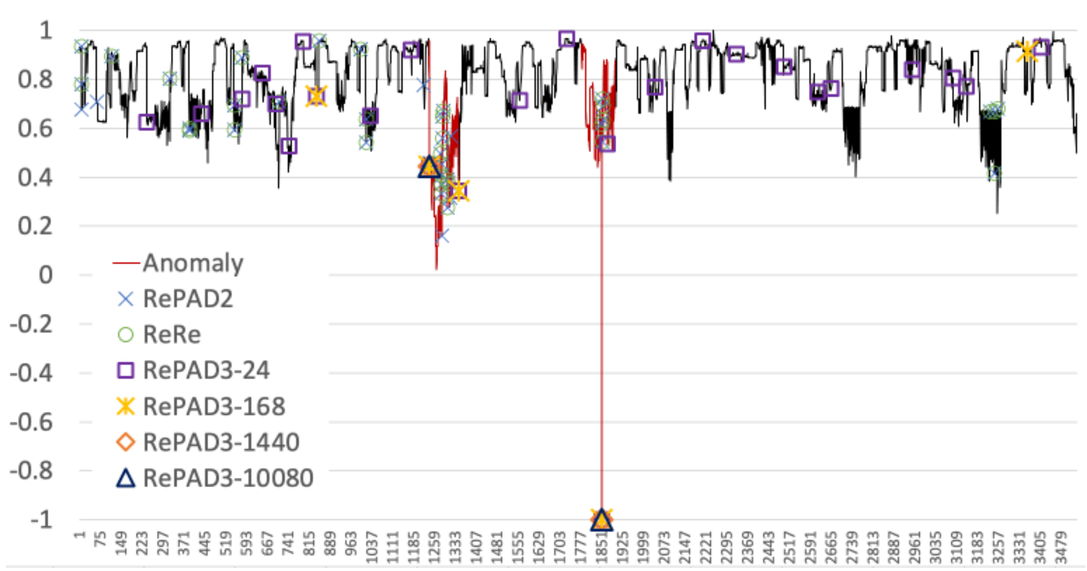
- Motivation
  - Detecting anomalies in univariate time series is essential for early risk identification in critical domains (e.g., energy, healthcare, manufacturing).
  - Challenges with existing approaches:
    - Poor adaptability to **real-time pattern changes**, dependence on **offline training, human intervention, and** hyperparameter **tuning**.
  - Develop a **real-time, unsupervised, interpretation, and adaptive** anomaly detection system that is both **accurate** and **lightweight**.
- Contributions
  - Real-time, unsupervised anomaly detection without offline training.
  - Hybrid design combining adaptive learning and symbolic analysis.
  - Robust against both recurrent and non-recurrent patterns.
- Future Directions
  - Extend **RePAD3** for **multivariate** time series anomaly detection.
  - Deploy in **cyber-physical systems** for intrusion and anomaly detection.









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