

# Combinational Nonuniform Timeslicing of Dynamic Networks

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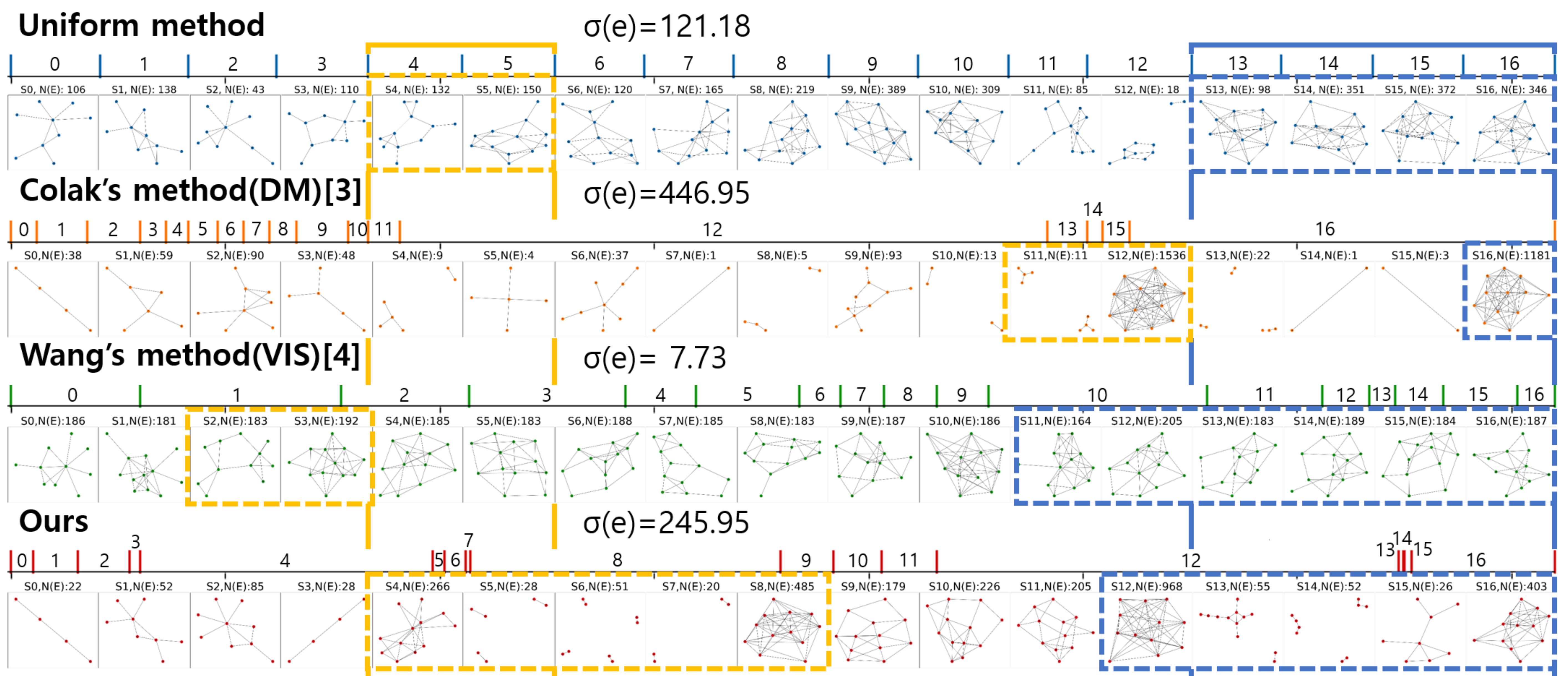
## Background

- Finding an optimal timeslicing interval is essential for meaningful analysis of dynamic networks[1].
- **Nonuniform timeslicing**, which adapts to density changes within the network, can be the solution.
- **Approaches in Data Mining[3]** concentrate in detecting changes in network, but sometimes create too dense and complex timeslices.
- **Approaches in Visualization[4]** focus on lessening human cognitive load in visual analysis, but lack consideration of highlighting network changes.

## Research Goals

- Propose a **nonuniform timeslicing method** that synthesizes **the strengths of both approaches**.
- Demonstrate efficacy of the proposed method with **a real-world data**.

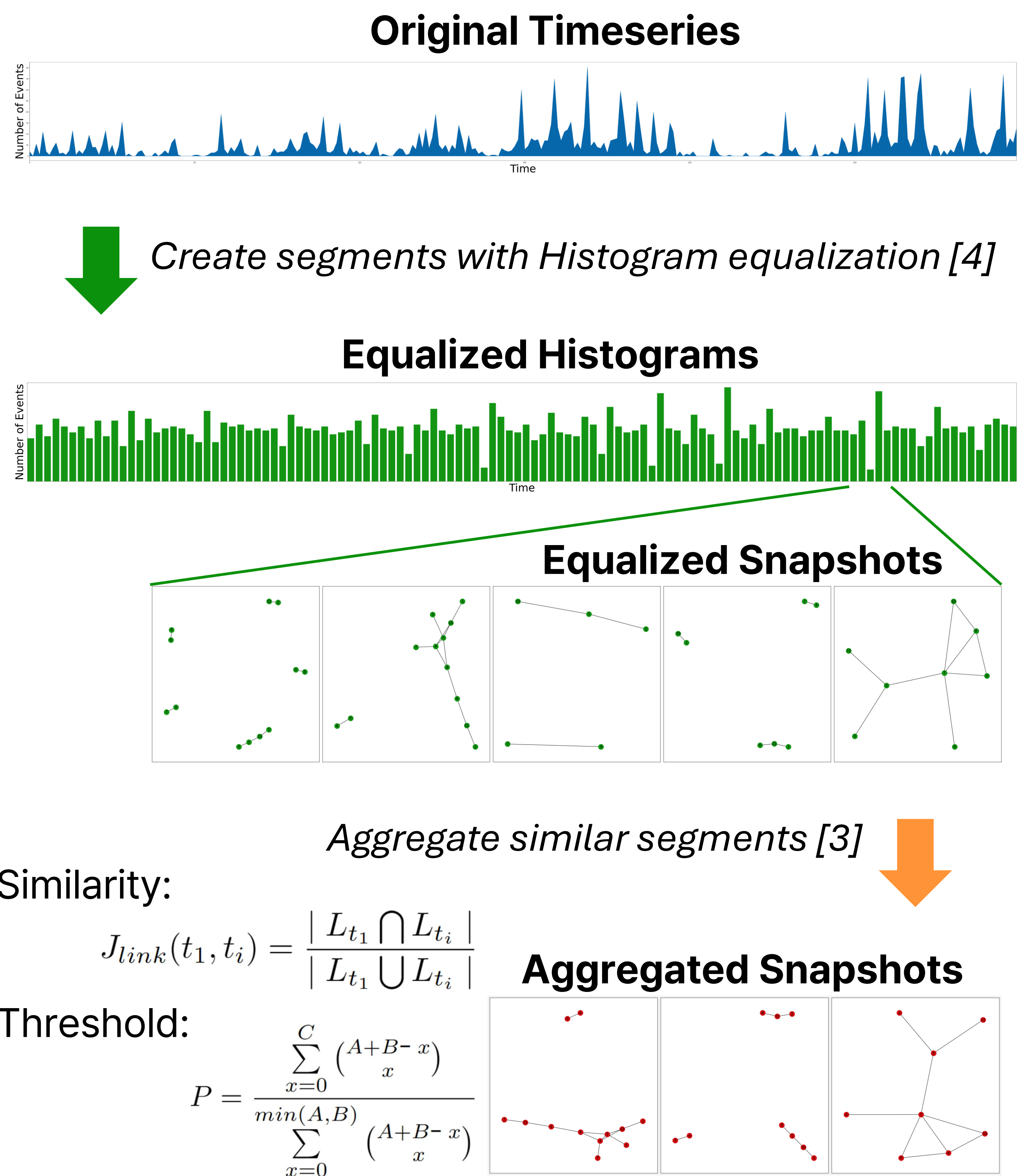
## Experiment with Rugby Dataset [2]



## Conclusion

- With the experiment, we discovered that **by combining the opposing approaches**, it is possible to **mitigate some of the issues** inherent to each individual method and **discover hidden patterns** from the dataset.
- In future work, we further aim to **develop an advanced nonuniform timeslicing technique** based on our findings.

## Method



[1] S. Jung, D. Shin, H. Jeon, K. Choe, and J. Seo, "MoNetExplorer: A Visual Analytics System for Analyzing Dynamic Networks with Temporal Network Motifs," *IEEE Trans. Vis. Comput. Graph.*, vol. PP, Nov. 2023

[2] Simonetto, Paolo, Daniel Archambault, and Stephen Kobourov. "Event-based dynamic graph visualisation." *IEEE Transactions on Visualization and Computer Graphics* 26.7 (2018): 2373-2386.

[3] Çolak, Serhat, and Güncü Keziban Orman. "Aggregating time windows for dynamic network extraction." *2021 International Conference on Innovations in Intelligent Systems and Applications (INISTA)*. IEEE, 2021.

[4] Wang, Yong, et al. "Nonuniform timeslicing of dynamic graphs based on visual complexity." *2019 IEEE Visualization Conference (VIS)*. IEEE, 2019.