

# Ryan Mercer

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## Personal Profile

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A final year PhD student at the University of California Riverside, researching time series data mining. Expected graduation: June 2023. Looking for full-time software engineering, data science, machine learning, and data visualization positions.

## Education

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### University of California, Riverside

PhD in Computer Science. Advised by Dr. Eamonn Keogh.

Riverside, CA

Sept. 2018 - Current

### University of California, Los Angeles

BS in Electrical Engineering

Los Angeles, CA

Sept. 2009 - March 2014

## Experience

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### UCR Matrix Profile Research

Graduate Student Researcher, Data Mining Lab, UCR

Riverside, CA

Jan. 2019 - Current

- Proposed Novelets, a new primitive for time series data mining that identifies emerging behaviors in real-time data.
- Proposed Contrast Profile, a new primitive for time series data mining that answers the question regarding two time series **A** and **B**: "Which repeated behaviors exist in **A** but are absent from **B**?"
- Proposed the Pan Matrix Profile heatmap, a visualization technique for motif discovery of all lengths.

### Toyota InfoTech Labs

Research Co-Op

Remote/Mountain View, CA

Jan. 2021 - April 2021

- Worked on distracted driving detection using interpretable shape-based model.
- 1 Paper Published, 3 Patents Submitted

### Visa Research

Research Intern

Remote/Palo Alto, CA

June 2020 - Aug. 2020

- Worked on fraud detection, comparing shape based models to traditional ML models.
- 1 Paper Published.

## Selected Publications

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5 First Author, 7 Co-Author, 3 Patents Submitted

Patent: Seyhan Ucar and **Ryan Mercer**. Identifying an origin of abnormal driving behavior for improved vehicle operation. US Patent App. 17/235,607, 2022

**Ryan Mercer** and Eamonn Keogh. "Matrix Profile XXV: Introducing Novelets: A Primitive that Allows Online Detection of Emerging Behavior in Time Series." In 2022 IEEE International Conference on Data Mining (ICDM). IEEE, accepted for publication.

Maryam Shahcheraghi, **Ryan Mercer**, João Rodrigues, Audrey Der, Hugo Filipe Silveira Gamboa, Zachary Zimmerman, and Eamonn Keogh. "Matrix Profile XXVI: Mplots: Scaling Time Series Similarity Matrices to Massive Data." In 2022 IEEE International Conference on Data Mining (ICDM). IEEE, accepted for publication.

Takaaki Nakamura\*, **Ryan Mercer\***, Makoto Imamura, and Eamonn Keogh. "MERLIN++ Parameter-Free Discovery of Time Series Anomalies" Data Mining and Knowledge Discovery, accepted for publication. \*joint first authors

**Ryan Mercer**, Seyhan Ucar, and Eamonn Keogh. "Shape-Based Telemetry Approach for Distracted Driving Behavior Detection." In 2021 IEEE Conference on Standards for Communications and Networking (CSCN), pp. 118-123. IEEE, 2021.

**Ryan Mercer**, Sara Alaei, Alireza Abdoli, Shailendra Singh, Amy Murillo, and Eamonn Keogh. "Matrix Profile XXIII: Contrast Profile: A Novel Time Series Primitive that Allows Real World Classification." In 2021 IEEE International Conference on Data Mining (ICDM), pp. 1240-1245. IEEE, 2021.

Sara Alaei, **Ryan Mercer**, Kaveh Kamgar, and Eamonn Keogh. "Time series motifs discovery under DTW allows more robust discovery of conserved structure." Data Mining and Knowledge Discovery 35, no. 3 (2021): 863-910.

Frank Madrid, Shima Imani, **Ryan Mercer**, Zachary Zimmerman, Nader Shakibay, and Eamonn Keogh. "Matrix profile xx: Finding and visualizing time series motifs of all lengths using the matrix profile." In 2019 IEEE International Conference on Big Knowledge (ICBK), pp. 175-182. IEEE, 2019.

## Skills

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**Proficiency** Python (Pandas, PyTorch, NumPy, Scikit-learn. etc.), MATLAB, various ML algorithms, TensorFlow

**Familiarity** Linux shell,  $\TeX$ (Overleaf), Git, C/C++, JavaScript, SQL.