

Ryan Mercer

Department of Computer Science and Engineering, University of California Riverside

(909) 255-1023 | Research@RyanMercer.ai | [RyanMercer.ai](https://www.linkedin.com/in/ryanmercera) | github.com/rmerc002 | [linkedin.com/in/ryanmercera](https://www.linkedin.com/in/ryanmercera)

Personal Profile

A PhD student at the University of California Riverside, researching time series data mining. Expected graduation: June 2023.

Looking for full-time data science, machine learning, and data visualization positions.

Selected Research Projects

UCR Matrix Profile Research

Riverside, CA

Graduate Student Researcher, Data Mining Lab, UCR

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.

Work Experience

Toyota InfoTech Labs

Remote/Mountain View, CA

Research Co-Op

Jan. 2021 - April 2021

- Worked on distracted driving detection using interpretable shape-based model.
- 1 Paper Published, 3 Patents Submitted
- Technical Skills:** Python with PyTorch, NumPy, Matplotlib, Pandas, Scikit-learn, MatrixProfile, Linux, Git, and Data Cleaning/Transformation.
- Soft Skills:** Insight through data visualization.

Visa Research

Remote/Palo Alto, CA

Research Intern

June 2020 - Aug. 2020

- Worked on fraud detection, comparing shape based models to traditional ML models.
- 1 Paper Published.
- Technical Skills:** Python with NumPy, Matplotlib, Scikit-learn, and Matrix Profile.
- Soft Skills:** Visualizing results.

SanDisk

Milpitas, CA

Product Design Engineer I

April 2014 - April 2015

- Worked on developing testing system for a new enterprise flash appliance, InfiniFlash
- Setup contract manufacturer with my test system.
- Technical Skills:** PCB analysis, PCB rework, MySQL, SolidWorks, 3D Printing.
- Soft Skills:** Communication across teams and contingency planning.

Publications

5 First Author, 7 Co-Author

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

Seyhan Ucar, **Ryan Mercer**, and Eamonn Keogh. "Nearby Distracted Driving Detection." IEEE SECON, accepted for publication.

Ryan Mercer, Sara Alaee, Alireza Abdoli, Nader Shakibay Senobari, Shailendra Singh, Amy Murillo, and Eamonn Keogh. "Introducing the Contrast Profile: A Novel Time Series Primitive That Allows Real World Classification." Data Mining and Knowledge Discovery 36, no. 2 (2022): 877-915.

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.

Yeh, Chin-Chia Michael, Zhongfang Zhuang, Junpeng Wang, Yan Zheng, Javid Ebrahimi, **Ryan Mercer**, Liang Wang, and Wei Zhang. "Online Multi-horizon Transaction Metric Estimation with Multi-modal Learning in Payment Networks." In Proceedings of the 30th ACM International Conference on Information Knowledge Management, pp. 4331-4340. 2021.

Ryan Mercer, Sara Alae, 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.

Alae, Sara, **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.

Nakamura, Takaaki, Makoto Imamura, **Ryan Mercer**, and Eamonn Keogh. "Merlin: Parameter-free discovery of arbitrary length anomalies in massive time series archives." In 2020 IEEE International Conference on Data Mining (ICDM), pp. 1190-1195. IEEE, 2020.

Madrid, Frank, 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.

Fabien Scalzo, **Ryan Mercer**, Seth Wilk, and Robert Hamilton. "Intracranial Hypertension Detection using Machine Learning Classification of Non-invasive TCD Waveforms." Military Health System Research Symposium, 2018.

Education

University of California, Riverside

Riverside, CA

PhD in Computer Science

Sept. 2018 - Current

- **Time Series Data Mining Lab:** Advised by Dr. Eamonn Keogh.
- **Courses:** Artificial Intelligence, Machine Learning, Probabilistic Models, GPU Architecture and Parallel Programming, Distributed Systems, Computer Graphics, Computer Animation, Operating Systems, Theory of Computation, Algorithms

University of California, Los Angeles

Los Angeles, CA

BS in Electrical Engineering

Sept. 2009 - March 2014

Skills

Proficiency Python (Pandas, PyTorch, NumPy, Scikit-learn. etc.), Matlab, Microsoft Office.

Familiarity Linux shell, \LaTeX (Overleaf), Git, C/C++, JavaScript, SQL.

Various machine learning algorithms.

Keras, TensorFlow.

Awards

2021 **Student Attendance Award**, International Conference on Data Mining award covering the registration cost *Remote*

2021 **3 Patents Submitted**, Submitted during Toyota InfoTech co-op *Remote*

2020 **NICE Fellowship**, NRT Integrated Computation Entomology, 2 years of PhD funding *Riverside, CA*

2018 **Dean's Distinguished Fellowship**, Awarded at UCR for PhD program *Riverside, CA*

Interests

Questions Coming up with "How many days in a year if the Sun rose in the west instead of the east?"

Glamping I enjoy the group intimacy developed at a campsite with the comfort of sleeping on a padded cot.

Visual Art I have been developing my visual intuitions in various mediums such as drawing, sewing, and screen printing.

3D Prints Models ranging from a camera mount for my monitor to custom golden Easter eggs.

Zelda I became a fan of the Nintendo franchise in 2014 and have been captivated by the dungeon design ever since.

Earth would experience exactly 2 extra day/night cycles, resulting in 367.25 days in a year. In a 2D projection with the Earth rotating

Answers CW around the Sun, the Earth will have 0 day/night cycles with 1 CW axis rotation, +1 day/night cycle with 0 axis rotation, and +2 day/night cycles with 1 CCW axis rotation.

References available upon request.