Nuwan Gunasekara

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Summary

I'm an AI researcher specializing in data stream learning, with a focus on Neural Networks, Gradient Boosting, and Online Learning. My work tackles concept drift adaptation and catastrophic forgetting in streaming scenarios. I contribute to the MOA and CapyMOA frameworks, have published in top venues, delivered tutorials, and led multiple industry ML projects. Explore my GitHub for source code.

Recent Publications

1. H. M. Gomes, **N. Gunasekara**, and Y. Sun, " Machine Learning on the Fly: A Hands-On Tutorial for Streaming Data," in *ICDE*, IEEE, 2025. URL: https://doi.ieeecomputersociety.org/10.1109/ICDE65448.2025.00342.
2. H. M. Gomes, A. Lee, **N. Gunasekara**, *et al.*, *Capymoa: Efficient machine learning for data streams in python*, 2025. arXiv: 2502.07432 [cs.LG]. URL: https://doi.org/10.48550/arXiv.2502.07432.
3. **N. Gunasekara**, S. Nowaczyk, and S. Pashami, "Pragmatic paradigm for multi-stream regression," in *IDA*, Springer, 2025. URL: https://doi.org/10.1007/978-3-031-91398-3_27.
4. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, and A. Bifet, "Gradient boosted bagging for evolving data stream regression," in *Data Mining and Knowledge Discovery*, Springer, 2025. URL: https://doi.org/10.1007/s10618-025-01147-x.
5. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, and A. Bifet, "Gradient boosted trees for evolving data streams," in *Machine Learning*, Springer, 2024. URL: https://doi.org/10.1007/s10994-024-06517-y.
6. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, A. Bifet, and Y. S. Koh, "Recurrent concept drifts on data streams," in *IJCAI*, 2024. URL: https://doi.org/10.24963/ijcai.2024/888.
7. **N. Gunasekara**, "Advanced adaptive classifier methods for data streams," Ph.D. dissertation, University of Waikato, 2023. URL: https://hdl.handle.net/10289/16142.
8. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, and A. Bifet, "Survey on online streaming continual learning," in *IJCAI*, 2023. URL: https://doi.org/10.24963/ijcai.2023/743.
9. **N. Gunasekara**, H. Gomes, A. Bifet, and B. Pfahringer, "Adaptive neural networks for online domain incremental continual learning," in *DS*, Springer, 2022. URL: https://doi.org/10.1007/978-3-031-18840-4_7.
10. **N. Gunasekara**, H. Gomes, A. Bifet, and B. Pfahringer, "Adaptive online domain incremental continual learning," in *ICANN*, Springer, 2022. URL: https://doi.org/10.1007/978-3-031-15919-0_41.
11. **N. Gunasekara**, H. M. Gomes, B. Pfahringer, and A. Bifet, "Online hyperparameter optimization for streaming neural networks," in *IJCNN*, IEEE, 2022. URL: https://doi.org/10.1109/IJCNN55064.2022.9891953.
12. **N. Gunasekara**, "Meta learning on string kernel svms for string categorization," M.S. thesis, Auckland University of Technology, 2010. URL: https://hdl.handle.net/10292/1087.
13. **N. Gunasekara**, S. Pang, and N. Kasabov, "Tuning n-gram string kernel svms via meta learning," in *ICONIP*, Springer, 2010. URL: https://doi.org/10.1007/978-3-642-17534-3_12.

Projects

KEEPER	transforms industrial data into actionable insights using AI, to optimize assets like trucks, pumps, and network equipment, collaborating with Swedish industry partners and research institutes.
FREEWAY	is an asynchronous federated learning framework which enhances commercial EV fleet analytics via real-time ML, edge computing and MLOps.
AIM-TRUE	uses AI to optimize Volvo's aftermarket services, boosting efficiency and part availability via predictive logistics.
CapyMOA	Stream Learning Framework.
MOA	Massive Online Analysis Stream Learning Framework.
Project with Civil Engineers	to predict the Axial Capacity of Cold-Formed Steel.

Employment History

2024 – · · · ·
Postdoctoral Fellow, Halmstad University. Sweden.
Part of the research team at the broader KEEPER project.
AIM-TRUE project with Volvo Logistics.
FREEWAY project with Volvo Group Truck Technology.

2021 – 2024
Research Assistant, Artificial Intelligence Institute, University of Waikato. NZ.
Develop CapyMOA Stream Learning Framework.
Maintain MOA (Massive Online Analysis) Stream Learning Framework.
Project with Civil Engineers to predict the Axial Capacity of Cold-Formed Steel.

2021 – 2022
Teaching Assistant (Machine Learning COMPX310), University of Waikato.

2010 – 2020
Senior Software Engineer. Endace Tecnologies Ltd. New Zealand.
Develop and maintain high-speed network packet capturing and analysing tools.

Education

2020 – 2023
Ph.D., University of Waikato, Hamilton, NZ.
Thesis title: *Advanced Adaptive Classifier Methods for Data Streams.*

2008 – 2010
M.Sc. Information Sciences, Auckland University of Technology, NZ.
Thesis title: *Meta learning on string kernel SVMs for string categorization*.

2005 – 2007
B.Sc. Management Information Systems, University College Dublin, Ireland.

Skills

ML Frameworks
ML: Pytorch, Deep Java Library (DJL), Scikit-learn, Weka. Stream Learning: MOA, CapyMOA, Scikit-multiflow, Avalanche. AutoML: FLAML

ML Techniques
Neural Networks, Boosting, Bagging, Drift detection & adaptation

Programming Languages
Java, C, Python, bash, CUDA Programming

Tutorials, Workshops, Talks, Program Committees, Board Member

Tutorials
Machine Learning on the Fly: A Hands-On Tutorial for Streaming Data. ICDE, Hong Kong, 2025.
Machine Learning on Streaming Data. Volvo, Sweden, 2025.
Data stream learning with CapyMOA. IJCAI, Jeju, South Korea, 2024.

Workshops
Time-Evolving Data Science / Artificial Intelligence for Advanced Open Environmental Science (TAIAO)[2021, 2022]

Talks
"Online Hyperparameter Optimization for Streaming Neural Networks", Cardiff University - Machine Learning Seminar, 2022

Guest Lecture
Advanced Topics in Stream Learning, University of Waikato, - Data Stream Mining (COMPX523 Masters Course), 2023

Teaching
Jointly taught *Big Data Parallel Programming (2025)* course.
Jointly taught *Programming for Data Science (2024)* course.

Program Committee Member
IJCAI Survey Track, 2024/2025
IJCAI Human-centred AI Special Track 2025,
ECML-PKDD Research Track 2025

Conference Committee Member
New Zealand Artificial Intelligence Researchers Association 2024

Board Member
New Zealand Artificial Intelligence Researchers Association, 2024

Core maintainer
CapyMOA Stream Learning Platform

Honors & Awards

Awards and Achievements

2020-2024 **Research & Enterprise Study Award**, AI Institute, University of Waikato.
Three and half year scholarship is funded by the "*Entrepreneurial Universities - Real time analytics for Big Data*" project at AI Institute, University of Waikato.