Nuwan Gunasekara

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Summary

I am an AI researcher specializing in evolving data stream learning, focusing on advanced techniques like Neural Networks and Gradient Boosting. My work addresses critical challenges in Online Learning, including detecting and adapting to concept drifts in data streams and mitigating catastrophic forgetting in Neural Networks for online learning. I actively contribute to the open-source MOA and CapyMOA stream learning frameworks. I have also published multiple publications in reputed venues and have delivered tutorials on online learning. I bring a wealth of industry experience in participating in multiple machine learning projects and developing network capture tools. Explore my GitHub for accessible source codes.

Research Publications

1. 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://arxiv.org/abs/2502.07432.
2. **N. Gunasekara**, S. Nowaczyk, and S. Pashami, "Pragmatic paradigm for multi-stream regression," in *Advances in Intelligent Data Analysis XXIII*, Cham: Springer Nature Switzerland, 2025, pp. 358–372, ISBN: 978-3-031-91398-3. URL: https://doi.org/10.1007/978-3-031-91398-3_27.
3. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, and A. Bifet, "Gradient boosted trees for evolving data streams," in *Machine Learning*, Springer, 2024.
4. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, A. Bifet, and Y. S. Koh, "Recurrent concept drifts on data streams," in *Thirty-Third International Joint Conferences on Artificial Intelligence (IJCAI)*, 2024.
5. **N. Gunasekara**, B. Pfahringer, H. M. Gomes, and A. Bifet, "Survey on online streaming continual learning," in *Thirty-Second International Joint Conferences on Artificial Intelligence (IJCAI)*, 2023.
6. **N. A. Gunasekara**, "Advanced adaptive classifier methods for data streams," Ph.D. dissertation, University of Waikato, 2023.
7. **N. Gunasekara**, H. Gomes, A. Bifet, and B. Pfahringer, "Adaptive neural networks for online domain incremental continual learning," in *Discovery Science (DS): 25th International Conference, Montpellier, France, October 10–12, 2022, Proceedings*, Springer, 2022, pp. 89–103.
8. **N. Gunasekara**, H. Gomes, A. Bifet, and B. Pfahringer, "Adaptive online domain incremental continual learning," in *31st International Conference on Artificial Neural Networks (ICANN), Bristol, UK, September 6–9, 2022, Proceedings, Part I*, Springer, 2022, pp. 491–502.
9. **N. Gunasekara**, H. M. Gomes, B. Pfahringer, and A. Bifet, "Online hyperparameter optimization for streaming neural networks," in *2022 International Joint Conference on Neural Networks (IJCNN)*, IEEE, 2022, pp. 1–9.
10. **N. Gunasekara**, S. Pang, and N. Kasabov, "Tuning n-gram string kernel svms via meta learning," in *Neural Information Processing. Models and Applications: 17th International Conference, ICONIP 2010, Sydney, Australia, November 22-25, 2010, Proceedings, Part II 17*, Springer, 2010, pp. 91–98.
11. **N. A. Gunasekara**, "Meta learning on string kernel svms for string categorization," M.S. thesis, Auckland University Of Technology, 2010.

Projects

AIM-TRUE — With Volvo Logistics for demand prediction and inventory control.

Projects (continued)

CapyMOA	Stream Learning Framework.
MOA	Massive Online Analysis Stream Learning Framework.
Project with Civil Engineers	to predict the Axial Capacity of Cold-Formed Steel.

Memberships

- Tertiary Student Representative, New Zealand Artificial Intelligence Researchers Association.

Employment History

2024 – · · · · **Postdoctoral Fellow,** Halmstad University. Sweden.
AIM-TRUE Project with Volvo Logistics.

2021 – 2024 **Research Assistant,** Artificial Intelligence Institute, University of Waikato. New Zealand.
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),** Faculty of Computer Science, University of Waikato.
Tutor Machine Learning Course (COMPX310) .

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

2007 – 2008 **Support Engineer.** Virtusa.
Support internal applications for internal customers around the globe.

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	Pytorch, TensorFlow, Deep Java Library (DJL) by Amazon, Scikit-learn, Scikit-multiflow, MOA (Massive Online Analysis), Weka, Avalanche (Continual Learning), FLAML (AutoML) by Microsoft.
General Online ML Techniques	Neural Networks, Bagging and Boosting
Drift Detection Techniques	ADWIN, DDM
Online Replay Buffer Techniques	Experience Replay with reservoir sampling.

Skills (continued)

Networking	TCP/IP, libpacp, Wireshark.
OS	Linux, FreeBSD, MacOS.
Coding	Java, C, Python, Shell scripting, CUDA Programing
Languages	English and Sinhalese.
Misc.	Academic research, Academic writing, Tutoring.

Tutorials, Workshops, Talks, Program Committees

Tutorials	Machine Learning Streaming Data. Volvo, Sweden, 2025. Machine Learning on the Fly: A Hands-On Tutorial for Streaming Data. ICDE, Hong Kong, 2025. Data stream learning with CapyMOA. IJCAI, Jeju, South Korea, 2024.
Workshops	Time-Evolving Data Science / Artificial Intelligence for Advanced Open Environmental Science (TAIAO), Hosted by AI Institute, University of Waikato, [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
Program Committee Member	Invited as a PC Member for the IJCAI Survey Track, 2024/2025

Honors & Awards

Awards and Achievements

2020 **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.

References

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Dr. Sepideh Pashami
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Senior Researcher, RISE Swedish Research Institute.
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