

Dilina Rajapakse

MACHINE LEARNING | REINFORCEMENT LEARNING | RECOMMENDER SYSTEMS | EXPLAINABLE AI

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Education

Trinity College Dublin, The University of Dublin

Ireland

PHD IN COMPUTER SCIENCE

April 2021 - Mar 2025

- Thesis: Recommender Systems: A study of User-Cold start and Reinforcement Learning
- Supervisor: Prof. Douglas Leith

Sri Lanka Institute of Information Technology (SLIIT)

Sri Lanka

BSC. (HONS) ELECTRICAL AND ELECTRONICS ENGINEERING

2014 - 2018

- First Class Honours
- GPA: 3.82/4.00 (Ranked 2nd)

Experience

CONNECT Research Centre - Trinity College Dublin

Dublin, Ireland

POST-DOCTORAL RESEARCHER - DISTRIBUTED SYSTEMS GROUP

April 2025 - June 2026

- Research on Reinforcement Learning (RL) and Explainable AI (XAI), with Principal Investigator, Prof. Ivana Dusparic.
- Proposed a novel trajectory-based framework **TREX**, as a foundation to explain the decisions made by Multi-Objective RL agents. TREX generates interpretable decision trajectories, improving agent policy transparency with minimal computational overhead.

Trinity College Dublin

Dublin, Ireland

DOCTORAL RESEARCHER - PHD IN COMPUTER SCIENCE

April 2021 - Mar 2025

- Research on Recommender Systems and Personalization, using online learning and reinforcement learning (RL) techniques.
- Proposed a novel Monte-Carlo Tree Search (**MCTS**) based approach for user cold-start recommendations, quickly learning a new user's preferences while preserving high recommendation accuracy. Optimized and implemented the MCTS in C++, with algorithmic and memory optimizations to achieve real-time recommendations.
- Proposed **RLT4Rec**, a Transformer-based RL architecture that recommend items for both cold-start and established users. Utilizing explainability techniques, the work demonstrates that the RLT4Rec internally learns a latent user state, reflecting evolving preferences from historical interactions.
- Built a simulation-based evaluation framework to rigorously test interactive recommender algorithms, bridging the gap between offline evaluation and online environments.
- Conducted a large-scale reproducibility and benchmarking study across standard recommendation datasets, systematically assessing relative performance and practical trade-offs between RL algorithms and strong supervised baselines.

Zone24x7 Pvt Ltd

Nawala, Sri Lanka

SENIOR MACHINE LEARNING ENGINEER - COMPUTER VISION AND VIDEO ANALYTICS

Dec 2017 - April 2021

- Designed and scaled core computer vision modules for the flagship **Cognitive Vision Analytics Platform**, processing real-time, multi-camera feeds for retail behavior analytics and security, deployed in production across multiple enterprise clients, including Fortune 500 retail companies.
- Served as Lead engineer and technical lead across multiple in-house R&D projects and product-oriented Machine Vision solutions for smart retail and security. Contributed to end-to-end architecture design, client engagements, mentoring junior engineers, and establishing best practices across the team.
- Trained and evaluated state-of-the-art deep architectures for multi-object detection and tracking, person re-identification and face recognition using PyTorch and TensorFlow, boosting tracking consistency across occluded retail camera views - using real-world noisy data.
- Optimized and deployed machine learning models across diverse hardware environments, including cloud infrastructures (GCP), on-premise CPU/GPU servers, and edge platforms such as NVIDIA Jetson and Android.

Zone24x7 Pvt Ltd

Nawala, Sri Lanka

TRAINEE ASSOCIATE ELECTRONICS ENGINEER - MACHINE LEARNING

Nov 2016 - Feb 2017

- Conducted research on person re-identification using image processing and machine learning, leading to the formation of the Machine Learning and Video Analytics team at Zone24x7.

Patents

April 2020 **An inventor of 'APPLIANCE TO SUPPORT COMPUTER VISION BASED MACHINE LEARNING USE CASES'**, US Provisional Patent, US63/101,509 - Applied on 05-April-2020

Publications

[Accepted] Dilina Rajapakse, Juan C. Rosero and Ivana Dusparic. 2026. TREX: Trajectory Explanations for Multi-Objective Reinforcement Learning. **XAI-2026 - 4th World Conference on Explainable Artificial Intelligence**.

Dilina Chandika Rajapakse and Jannach Dietmar. 2025. Reassessing the Effectiveness of Reinforcement Learning based Recommender Systems for Sequential Recommendation. **48th International ACM SIGIR Conference**.

Dilina Chandika Rajapakse and Douglas Leith. 2024. RLT4Rec: Reinforcement Learning Transformer for User Cold Start and Item Recommendation. **arXiv preprint arXiv:2412.07403**.

Dilina Chandika Rajapakse and Douglas Leith. 2024. A Good State Estimator Can Yield A Simple Recommender: A Reinforcement Learning Perspective. **4rd International Workshop on Online and Adaptive Recommender Systems (OARS)**.

Dilina Chandika Rajapakse and Douglas Leith. 2023. User Cold-Start Learning In Recommender Systems Using Monte Carlo Tree Search. **ACM Trans. Recomm. Syst. (August 2023)**. <https://doi.org/10.1145/3618002>

Dilina Chandika Rajapakse and Douglas Leith. 2022. Fast and Accurate User Cold-Start Learning Using Monte Carlo Tree Search. In Proceedings of the **16th ACM Conference on Recommender Systems (RecSys '22)**. Association for Computing Machinery, New York, NY, USA, 350–359. <https://doi.org/10.1145/3523227.3546786>

Awards, Fellowships, & Grants

2021-2025 **Doctoral Research Grant**, Science Foundation Ireland

Mar 2018 **Merit Award - Electrical and Electronic Engineering**, Sri Lanka Institute of Information Technology

2014-2018 **Dean's List and Scholarship awardee - Faculty of Engineering**, Sri Lanka Institute of Information Technology

2013 **Gained 3A* at Cambridge International A Level in June 2013 Examinations**, Outstanding Cambridge Learner Award Ceremony, Sri Lanka

2012 **2nd highest mark in Sri Lanka in the June 2012 examinations over three Cambridge AS Levels**, Outstanding Cambridge Learner Award Ceremony, Sri Lanka

Teaching Experience

2021-2024 **Teaching Assistant**, School of Computer Science and Statistics, Trinity College Dublin

Extra-curricular/ Volunteer

2024-2026 **ACM RecSys conference, ACM TORS journal**, Reviewer

2023 **4th IEEE UK&I Young Professionals Postgraduate STEM Research Symposium**, Reviewer

2016 **IEEE Student Branch - Sri Lanka Institute of Information Technology**, Treasurer

Technical Skills

Machine Learning and Deep Learning: Pytorch, Tensorflow, MXnet, OpenVino, OpenCV, Hugging face, Transformers, LLM, etc.

Programming: Python (strong), C++/C (strong), Matlab, R, Java, Android

Technical: Linux/Unix, Git, Docker, AWS, GCP, Kafka, Flask, Database (SQL, MongoDB)

*References available upon request.