

Geraud Nangue Tasse

Website: geraudnt.github.io
Github: github.com/geraudnt

Email: geraudnt@gmail.com
Location: Johannesburg, ZA

My life philosophy *"What I cannot create, I do not understand" - Richard Feynman*

Education

Ph.D. Computer Science, University of the Witwatersrand , 2021-Present.

M.Sc. Computer Science (with distinction), University of the Witwatersrand, 2019.

B.Sc. Hons Computer Science Mathematics (with distinction), Rhodes University, 2018.

B.Sc. Computer Science, Pure Maths, Applied Maths Physics (distinction), Rhodes Univ., 2015-2017.

Summer Schools

CIFAR Deep Learning + Reinforcement Learning Summer School (*Remotely*), 2020

IBRO-SIMONS Computational Neuroscience Imbizo (*Cape Town, ZA*), 2020

Employment

Sessional Lecturer, University of the Witwatersrand, Johannesburg, ZA, 2022.

Lecturing the "Computational Intelligence" MSc course covering optimisation methods in general and specific areas like evolutionary algorithms and particle swarm optimisation.

PhD Research Intern at IBM, New York, US, 2022.

I worked on compositional generalisation in hierarchical reinforcement learning.

Teaching Assistant at Neuromatch Deep learning Summer School, Remotely, 2021.

I was a reinforcement learning project TA for a number of project groups. I was recognised for "most groups mentored" and "most timezones covered".

Research Assistant at RAIL Lab, Remotely, 2020.

I worked on extending my MSc work on composition in RL and writing a journal paper on it.

Tutor, Rhodes University, Grahamstown, ZA, 2015 - 2018.

I was an undergraduate computer science 1 and physics 1 tutor; I also graded computer science practicals.

Fellowships and Scholarships and Awards

IBM PhD Research Fellowship , 2021

Postgraduate PhD Merit Award for MSc with distinction , 2020

Deep Learning Indaba Research Poster Prize , 2019

Deep Learning Indaba-X (ZA) Hackathon Prize , 2019

Open Box Prize for Best Computer Science Honours Student, 2018

Janinne Franke Prize for the Best Computer Science Honours Project , 2018

Trevor Williams Scholarship, 2018

Henderson Scholarship, 2018

Dean's list for Academic Merit BSc , 2017

Rhodes-Investec Top 100 Award for Academic Excellence , 2017

Programming

Python, C#, Java

Research

Ph.D Computer Science, University of the Witwatersrand, 2021 - Present (ongoing).

Keywords: Reinforcement Learning, Lifelong Learning, Composition. Supervised by Prof Benjamin Rosman

*Title: **Towards Lifelong Reinforcement Learning through Temporal Logics and Zero-Shot Composition.***

M.Sc Computer Science (with distinction), University of the Witwatersrand, 2020.

Keywords: Reinforcement Learning, Task composition, Python. Supervised by Steven James, Prof Benjamin Rosman

*Title: **A Task Algebra For Agents In Reinforcement Learning.***

This work addresses the problem of zero-shot logical composition by first formally defining the composition of tasks as operators acting on a set of tasks in an algebraic structure. This provides a structured way of doing task compositions and a theoretically rigorous way of studying them. We propose a framework for defining lattice algebras and Boolean algebras in particular over the space of tasks. This allows us to formulate new tasks in terms of the negation, disjunction, and conjunction of a set of base tasks. We then show that by learning a new type of goal-oriented value functions and restricting the rewards of the tasks, an agent can solve composite tasks with no further learning.

B.Sc Hons Computer Science Mathematics (with distinction), Rhodes Univ., 2018.

Keywords: Neural Networks, Hyperparameter Optimization, Python. Supervised by James Connan

*Title: **Hypersearch: A Parallel Training Approach For Optimizing Neural Networks Performance.***

This work proposes a novel embarrassingly parallel algorithm, Hypersearch, that takes advantage of both worlds (hyperparameter optimization and parallel programming). Hypersearch works by training multiple neural networks of same architecture but different hyperparameters in parallel while optimizing both networks and hyperparameters. We manage to provide good evidence that Hypersearch not only performs well in realistic settings, but is also competitive against state-of-the-art Hyperparameter optimization alternatives.

Peer-reviewed papers

Generalisation in Lifelong Reinforcement Learning through Logical Composition.

Geraud Nangue Tasse, Steven James and Benjamin Rosman.

In Proceedings of the Tenth International Conference on Learning Representations (ICLR), 2022. [URL]

A Boolean Task Algebra for Reinforcement Learning.

Geraud Nangue Tasse, Steven James and Benjamin Rosman.

In Advances in Neural Information Processing Systems (NeurIPS), 2020. [URL]

World Value Functions: Knowledge Representation for Multitask Reinforcement Learning.

Geraud Nangue Tasse, Steven James and Benjamin Rosman.

In Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM), 2022. [URL]

World Value Functions: Knowledge Representation for Learning and Planning.

Geraud Nangue Tasse, Steven James and Benjamin Rosman.

In Planning and Reinforcement Learning Workshop (ICAPS), 2022. [URL]

Hypersearch: A Parallel Training Approach For Improving Neural Networks Performance.

Geraud Nangue Tasse and James Connan.

Black in AI workshop at the 33rd Conference on Neural Information Processing Systems (NeurIPS), 2019.

Blogs

Blog post on my Boolean task algebra NeurIPS paper.

<https://www.raillab.org/posts/a-boolean-task-algebra-for-reinforcement-learning>, 2019.

Reviewing

International Conference of Machine Learning (ICML)

Conference on Neural Information Processing Systems (NeurIPS)

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Black in AI workshop at the Conference on Neural Information Processing Systems (NeurIPS)