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github.com/Acciorocketships

RESEARCH AREAS

- Graph Neural Networks
- Transformers
- Multi-Robot Systems
- Reinforcement Learning
- Self-Supervised Learning
- Mathematics

PROJECTS

Generalised Aggregation

- Parametrises the space of aggregation functions, making them learnable
- Increases the representational complexity of GNN architectures, boosting performance on benchmarks
- Defines a “generalised distributive property”, which facilitates time and space efficient algorithms

Set Autoencoder

- Introduces a set encoder and set decoder, which define a bijective mapping between sets and fixed-size embeddings
- Enables architectures that produce variable-sized, order-independent outputs
- Serves as the key component in an application-agnostic communication strategy—a GNN trained in an unsupervised manner to reduce partial observability

Integrable Neural Network

- Defines a method for computing *analytic* integrals over neural networks, allowing one to represent the exact integral of a learned function
- Proposes approaches for applying constraints to the learned function (e.g. positivity, bounded integrals, etc)
- Suggests several applications, including modelling continuous probability distributions, trajectory optimisation, and distance metrics

LANGUAGES / TOOLS

- Python
- PyTorch
- Java
- JAX
- Matlab

Ryan Kortvelesy

Machine Learning Research Scientist

EDUCATION



University of Cambridge
PhD, Computer Science
Graph Neural Networks for Multi-Agent Learning

2019-2023



University of Pennsylvania
BSE, Electrical Engineering
*Minors in Computer Science and Mathematics
Graduated Summa Cum Laude*

2016-2019

WORK EXPERIENCE



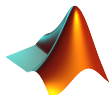
Software Development Engineer I
Amazon – Seattle, WA

Summer 2019



Intern
JHU Applied Physics Lab, NASA – Laurel, MD

Summer 2018



Software Engineering Intern
Mathworks – Natick, MA

Summer 2017

SELECTED PUBLICATIONS

Generalised f-Mean Aggregation for Graph Neural Networks NeurIPS 2023
Ryan Kortvelesy, Steven Morad, Amanda Prorok

Permutation-Invariant Set Autoencoders with Fixed-Size Embeddings for Multi-Agent Learning AAMAS 2023
Ryan Kortvelesy, Steven Morad, Amanda Prorok

Reinforcement Learning with Fast and Forgetful Memory NeurIPS 2023
Steven Morad, Ryan Kortvelesy, Amanda Prorok

POPGym: Benchmarking Partially Observable Reinforcement Learning ICLR 2023
Steven Morad, Ryan Kortvelesy, Matteo Bettini, Stephan Liwicki, Amanda Prorok

ModGNN: Expert Policy Approximation in Multi-Agent Systems with a Modular Graph Neural Network Architecture ICRA 2021
Ryan Kortvelesy, Amanda Prorok

Fixed Integral Neural Networks Technical Report 2023
Ryan Kortvelesy

QGNN: Value Factorisation with Graph Neural Networks Under Review
Ryan Kortvelesy, Amanda Prorok