Jia Lin Hau

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Research Interests

Reinforcement learning, machine learning, Bayesian method, risk-averse optimization, financial mathematics, and actuarial science.

Education

University of New Hampshire — Advisor: Marek Petrik — 2019 - present
Ph.D in Computer Science — GPA: 4.00/4.00

University of New Hampshire — Advisor: Marek Petrik — 2019 - 2022
M.S. in Computer Science. — GPA: 4.00/4.00

University of New Hampshire — Advisor: Linyuan Li — 2015 - 2018
B.S. in Applied Mathematics: Economics. — GPA: 3.89/4.00

Professional Experience

UNH Computer Science Department
Research Assistant - Reinforcement Learning and Robustness Lab — 2020 - present

Teaching Assistant

CS 520 - Assembly language programming and machine organization	Spring 2020
CS 410P - Introduction to scientific programming in Python	Spring 2020
CS 410C - Introduction to scientific programming in C	Fall 2019
CS 725 - Computer networks	Fall 2019
CS 410P - Introduction to scientific programming in Python	Spring 2019

Idea Math
Junior Instructor/ Summer Camp Resident Assistant — 2018 - 2019

- Enhance elementary school students' problem-solving skills for Mathematics competition.
- Created study plans for the class and conducted group activities with students.
- Structured activities and events for residential students.

UNH International Student Organization
Vice President — 2017 - 2018

- Collaborated with other organizations to spread culture awareness.
- Allocated tasks for volunteers and executive members based on their unique advantages.

UNH Mathematics Center
Mathematics Center Tutor — 2017- 2018

- Clarified Mathematics concepts and assisted students with their homework.
- Organized a study plan and helped students to catch up with class content.
- Conducted review sessions to help students prepare for quizzes and exams.

UNH Residential Life
Resident Assistant — 2016 - 2017

- Structured social activities and created a safe/supportive environment for 500 residents.
- Responsible for proper protocol involving responding to alcohol intoxication and roommate issues.

Publications

Entropic Risk Optimization in Discounted MDPs. **Jia Lin Hau**, Marek Petrik, Mohammad Ghavamzadeh — AISTATS 2023

Few practical risk-averse objectives admit dynamic programming (DP) formulation, which is the mainstay of most MDP and RL algorithms. In this paper, we derive a new DP formulation for discounted risk averse MDPs with Entropic Risk Measure (ERM) and Entropic Value at Risk (EVaR) objectives. We

proposed a new polynomial-time algorithm for computing them and our algorithm outperforms other risk averse algorithms over a variety of tabular domains.

RASR: Risk-Averse Soft-Robust MDPs with EVaR and Entropic Risk. **Jia Lin Hau**, Marek Petrik, Mohammad Ghavamzadeh, Reazul Russel — ArXiv 2022

Prior work on safe Reinforcement Learning (RL) has studied risk-aversion to randomness in dynamics (aleatory) and to model uncertainty (epistemic) in isolation. We propose and analyze a new framework to jointly model the risk associated with epistemic and aleatory uncertainties in finite-horizon and discounted infinite-horizon MDPs. We call this framework that combines Risk-Averse and Soft-Robust methods RASR. We show that when the risk-aversion is defined using either EVaR or the entropic risk, the optimal policy in RASR can be computed efficiently with time-dependent dynamic program.

Workshops

Robust pest management using reinforcement learning. Talha Siddique, **Jia Lin Hau**, Shadi Atallah, Marek Petrik — RLDM 2019

We provided a robust framework to behave risk aversely for domains with limited data. We utilized STAN Bayesian statistical inference along with MCMC sampling to capture prior knowledge, generate posterior datasets, and compute the optimal Robust MDP policy via policy iteration.

Reviewing

International Conference on Machine Learning 2022 (ICML)
NeurIPS 2021 Workshop on Safe and Robust Control of Uncertain Systems

Class Projects

Cryptocurrency Forecasting Analytics. **Jia Lin Hau**, Gerasimos Mouikis, Spencer Pope — May 2018

Forecasted cryptocurrency with Vector Auto Regression on the log of log-return of the closing price.

MDP on Blackjack. **Jia Lin Hau**, Marek Petrik — Jul 2018

Utilized MDP (Value Iteration) to solve for the optimal action (Stand, Hit, Split, Double, or Surrender) for Blackjack with R.

EMOAI *- UNH 2019 Holloway prize competition (Semi-final).* Shayan Amani, **Jia Lin Hau**, Chao Chi Cheng, Lekyang Sai — Apr 2018

Deep Learning facial recognition to avoid depression.

WTI *- UNH 2017 Fall stock pitch competition (Semi-final).* **Jia Lin Hau** — Oct 2017

Selected high profit stock with Advance Technical Indicator.

Other Involvement

Manchester City **Marathon** by SNHU (1st in Co-ed Relay)	2016
Seacoast **Half Marathon** in Portsmouth (4th in division)	2015
Certified *PADI* Advanced Open Water **Scuba Diver**	2013
Certified *NAUI* Open Water **Scuba Diver**	2019
Passed **Actuarial Science** Exam P: Probability	2018
Bloomberg Market Concepts (**BMC**) Completion	2018
Member of *Pi Mu Epsilon* of National Honorary **Mathematics** Society	2017 - 2018

Skills

Programming Languages: Python, R, MATLAB, Julia, C, C++, SQL
Tools: Git, Excel, JMP, BMC, Tableau
Languages: English, Malay, Mandarin, Cantonese.