Jia Lin Hau

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EDUCATION

University of New Hampshire, Advisor: Marek Petrik 01/2019 - present
M.S / Ph.D. in Computer Science GPA: 4.00
Relevant Coursework: Reinforcement Learning, Advance Machine Learning, Mathematical Optimization, Algorithms, Computer Graphics, Assembly Language, System Programming, Formal Specification, Database System.

University of New Hampshire, Advisor: Linyuan Li 09/2015 - 09/2018
B.S. in Applied Mathematics: Economics GPA: 3.89
Relevant Coursework: Machine Learning, Forecasting Analysis, Numerical Methods, Linear Algebra, Differential Equation, Multi-Dimensional Calculus, Econometrics, Probability Theory, Statistical Inference, Financial Mathematics.

EXPERIENCE

UNH Computer Science Department - *Research Assistant* 06/2020 - present
Research interest: Reinforcement learning, risk-averse optimization, machine learning, Bayesian method.

UNH Computer Science Department - *Teaching Assistant* 01/2019 - 05/2020
Assembly Language and Machine Organization, Scientific Programming in Python and C, Computer networks, Machine Learning

EMOAI Emotion recognition application to avoid depression **– *Developer and Use Case Finder*** 02/2019 - 04/2019

- Spearheaded Deep Learning (CNN) emotion recognition project with pre-trained models to accurately classify users' facial expressions.
- Proposed groundbreaking application of the use of facial and emotion recognition technology to identify and prevent depression.
- Implemented active learning by allowing users to verify/update labels of their own emotion which enable personalized classification.

Boston Road Runner – *Data Analyst* 09/2018 - 12/2018

- Preprocessed (handle missing values, duplicates, and apply consistent formatting) data of participants and sponsors.
- Developed auto-regression time series models in R to predict future trends in the number of participants for upcoming races.
- Designed 3NF database schema using ERD and relation schema to reduce anomalies and improve data quality and integrity.
- Created data visualizations using Tableau, which allow peers and sponsors easily interpret and understand data insights.

CRACC A social application that connect people to play sports together **– *Analyst / Android Developer*** 01/2017 - 01/2018

- Collected data from various sources (API, Kaggle, BLS), analyzed and created data visualizations with Python.
- Communicated effectively with the IOS team to ensure consistent UI (XML) and functionality (Java) using Android Studio.
- Integrated with Firebase for users' data, and developed features that query weathers and navigation data based on users' location.

RESEARCH PUBLICATIONS AND PREPRINTS

On Dynamic Programming Decompositions of Static Risk Measures in Markov Decision Processes. **Jia Lin Hau**, Erick Delage, Marek Petrik, Mohammad Ghavamzadeh ArXiv 2023

- Proved that the popular decomposition approach to solving MDPs with CVaR and EVaR objectives is suboptimal despite the claims to the contrary, which assumed it to be correct and optimal for a decade.
- Illustrated previous EVaR decomposition is incorrect and proposed a correct EVaR risk level decomposition for *policy evaluation*.
- Showed that unlike CVaR and EVaR for *policy optimization*, VaR decomposition does not suffer from saddle-point gap thus is optimal.

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

- Contributed to advancing risk averse Markov decision processes (MDPs) by providing new theoretical results and practical algorithms.
- Proposed new polynomial time MDPs algorithms for Entropic Risk Measure (ERM) and Entropic Value at Risk (EVaR) objectives.
- Proved our algorithms return the optimal policy for finite horizon MDPs and delta-optimal policy for infinite horizon MDPs.
- Implemented these algorithms and conducted extensive experimentation to evaluate their accuracy and efficiency using Julia and R.

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

- Proposed a novel framework to jointly model the epistemic and aleatory uncertainties in safe Reinforcement Learning (RL).
- Proved that entropic risk-aversion can be solved optimally and efficiently in RASR setting with time-dependent dynamic program.

OTHER ONGOING PROJECTS

Risk Averse Distributional Deep Q Network 09/2023 – present
Proposed a theoretically proven accurate framework to optimize risk averse objective for continuous domain include (Atari Gym). Demonstrated that our algorithm is more stable and converge to a better policy. Our algorithm consistently outperforms Rainbow DQN across the domains.

SKILLS

Programming Language: Python, R, Julia, C/C++, SQL, MATLAB, HTML, CSS, JavaScript, XML, Java
Tools: OpenGL, Tensorflow, PyTorch, Numpy, Scikit-learn, Caret, Git, Excel, ERDPlus, Tableau, PowerBI, AWS