Chuhuan Huang 黄楚焕

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Education

Ph.D. in Mathematics @ Johns Hopkins University, starting from 08/2023
M.A. in Applied Mathematics @ University of Southern California, 08/2021 - 05/2023
B.S. in Math – Computer Science @ University of California, San Diego, 08/2016 - 03/2020

Thesis

A Survey on the Computational Hardness of Linear-structured Markov Decision Processes, ongoing,
advised by Professor Steven M. Heilman @ University of Southern California

- we are investigating i) the equivalent condition for computational and statistical gap in Reinforcement learning ii) the relationship between the computational hardness of the linear-structured Markov decision processes and the rank of the transition matrix in the corresponding Markov chain
- we typically need to carefully design a reduction from a linear-structured MDP to a well-known computationally hard problem.

Awards

Graduate Fellowship @ Department of Mathematics, Johns Hopkins University, starting from 08/2023
Graduate Teaching Assistantship w/ stipend and tuition remission @ Department of Mathematics, University of Southern California, 08/2022- 05/2023
Provost Honors of Thurgood Marshall College @ University of California, San Diego, 09/2017- 03/2019

Activities

Playoffs team in Men's Basketball A League, Intramural Sports, UCSD, Captain/Point Guard in 2018, 2019 and 2020 season
Elite 8 in China Amateur Athletic Union National Finals at Beijing, CHN, Captain/Point Guard
32/128 team in 2020 NBA 3X3 at Changsha, Hunan, CHN, Captain/ Point Guard

Internships

Founder Securities, Institute of Financial Technology: Data Analyst Assistant 01/2021- 04/2021

- analyzing the correlations and connections between and within the stock communities, using TensorFlow-implemented convolutional neural networks.

UC San Diego Health: Physical Therapist Assistant 12/2018- 01/2019, 04/2019- 06/2019

- assisting PT to analyze the structural weakness of the patient in rehabilitation phase, for further injuries prevention.

Recent Projects

Chuhuan Huang, Approaching MAX-CUT thru reinforcement learning, supervised by Professor Steven Heilman, 2022

- Approaching MAX-CUT problem by using Actor-Critic algorithm-trained LSTM-based pointer networks and compared with known Semidefinite programming benchmarks, using LSTM framework in Keras.
- Our approach is averagely 33% faster SDP benchmark in predicting and reaches 86% accuracy of the benchmark.
- Our approach is unfortunately unstable: when graph with more than 150 vertices is fed, the training we sometimes run into NaN error in the training phase and sometimes poor performance in predicting phase.

Chuhuan Huang, Simulation of MDP and Decision-generating thru Value Iteration , 2021

- modeling a stochastic process in a game using the Markov decision process, and implementing the policy generating mechanism through Value Iteration, a dynamic-programming-based algorithm, in Python.

Languages

Mandarin/Chinese	---	Native language
English	---	Daily working language with high proficiency
Python/LaTeX	---	Daily programming language with high proficiency
C++/java/R	---	Proficient degree-level training