Chun Kai Ling

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EDUCATION

Computer Science Department, Carnegie Mellon University 2017-present
Ph.D. Student, Computer Science
Fields: Artificial Intelligence, Machine Learning, Game Theory.
Advisors: J. Zico Kolter, Fei Fang
Expected graduation date: 2023

National University of Singapore (NUS) 2011-2015
B.Eng.(Hons), First Class, Computer Engineering, GPA: 5.0/5.0
Minor in Mathematics, Exchange Program to HKUST.

RESEARCH

Graduate-Research Assistant(Ph.D. student), CMU
Project: *End-to-End learning of Two-Player Zero Sum Games*
Designed a differentiable module able to learn payoff-matrices in 2 player extensive form imperfect information games, using only samples from equilibrium strategies.
Skills: Pytorch, Cython, Optimization, Game Theory

Project: *Extensive Form Correlated Equilibrium*
Created benchmark games for Extensive Form Correlated Equilibrium. Analyzed their solutions and described ways in which mediators may achieve incentive compatibility. Designed scalable solvers utilizing regret minimization and subgame resolving.
Skills: C/C++, Optimization, Game Theory

Other projects:
- Learning multi-player correlated behavior with neural network policies.
- Learning fully differentiable joint Cumulative Distribution Functions and Copulas.

Summer Research Intern, Facebook AI Research, NYC 2019
Project: *Safe Search for Stackelberg Equilibrium in Extensive-Form Games*
Designed methods to approximate Stackelberg equilibira in general sum extensive-form games in an online manner while providing guarantees on solution qualities.
Supervised by Noam Brown.
Skills: Python, Rust, Optimization, Game Theory

Research Assistant, Department of Computer Science, NUS 2017
Project: *Network Anomaly Detection*
Applied statistics and machine learning to cluster and identify potential anomalies in unlabelled netflow data.
Skills: Applied Machine Learning

Signal Processing Lab, DSO National Laboratories 2015-2016
Projects: *Computer Vision, Image Processing, Machine Learning, Optimization*
Applied machine learning and signal processing for object detection, segmentation, image and video enhancement and super-resolution. System administrator for the lab.
Skills: Matlab, Image Processing, Optimization

Honors Dissertation, NUS 2014-2015
Project: *Planning and Learning in Spatiotemporal Environmental Phenomena*
Formulated, analyzed and evaluated the Gaussian Process Planning framework, a novel non-myopic, Bayes-adaptive model-based planning framework with applications in Bayesian Optimization and Active Learning. Published in AAAI '16.
Skills: Gaussian Processes, Machine Learning

Undergraduate Part-time Research Assistant, NUS 2014
Project: *Point Cloud Registration*
Performed feature extraction used to align noisy point clouds obtained via Structure from Motion. Experimented with standard LIDAR datasets and attempted to reproduce results on noisy point clouds obtained using SfM.

Undergraduate Research Opportunities Programme, NUS 2013-2014
Project: *Computational intelligence for MRI image segmentation*
Studied Markov random fields and experimented with t-mixture models to improve robustness in brain tumour segmentation.
Skills: Matlab, Graphical Models

Research Intern, Centre for Strategic Infocomm Technologies 2014
Project: *Static Analysis of Binary Executables*
Investigated and proposed methods to perform automatic function and instruction matching of x86 assembly code, in the absence of function symbols. Wrote tools to distinguish between code and data in disassembled binaries.

AWARDS

DSO National Laboratories
KiNETIC and Group accomplishment award for a classified project. 2016

National University of Singapore
Valedictorian for the class of Computer Engineering graduates. 2015
IES Gold Medal. Top graduating student. 2015
Lee Kuan Yew Gold Medal. Best graduate through the course of study. 2015
DSTA Gold Medal. Best final year student for Computer Engineering. 2015
NUS Faculty Scholarship. 2011-2015
Deans List for Semesters 1 through 6. Amongst top 5 % of students. 2011-2014
Alcatel Lucent Telecomm. Award. Best performance in a class for Networks. 2014
Top 2 Term Project for the class 'AI Planning and Decision Making'. 2014
Micron Prize. Top 2nd year student. 2012
Finalist in NUSACM iCode intra-college algorithmic programming competition. 2012

PUBLICATIONS

Chun Kai Ling, Fei Fang. Safe Subgame Resolving for Extensive Form Correlated Equilibrium (To appear in AAAI'22) [15% acceptance rate]

Chun Kai Ling, Noam Brown. Safe Search for Stackelberg Equilibria in Extensive-Form Games (AAAI '21) [21% acceptance rate]

Chun Kai Ling, Fei Fang, J. Zico Kolter. Deep Archimedean Copulas (NeurIPS '20) [20.1% acceptance rate]

Dmitrii Kharkovskii, **Chun Kai Ling**, Bryan Kian Hsiang Low. Nonmyopic Gaussian Process Optimization with Macro-Actions (AISTATS '20) [28.7% acceptance rate]

Gabriele Farina, **Chun Kai Ling**, Fei Fang, Tuomas Sandholm. Correlation in Extensive-Form Games: Saddle-Point Formulation and Benchmarks (NeurIPS '19) [21.6% acceptance rate]

Gabriele Farina, **Chun Kai Ling**, Fei Fang, Tuomas Sandholm. Efficient Regret Minimization Algorithm for Extensive-Form Correlated Equilibrium (NeurIPS '19) [21.6% acceptance rate]

Chun Kai Ling, Fei Fang, J. Zico Kolter. Large Scale Learning of Agent Rationality in Two-Player Zero-Sum Games (AAAI '19) [16.2% acceptance rate]

Chun Kai Ling, Fei Fang, J. Zico Kolter. What Game Are We Playing? End-to-end

Learning in Normal and Extensive Form Games (IJCAI '18) [20.5% acceptance rate] **Distinguished Paper Award**. 7 papers were selected out of 710 acceptances and 3470 submissions.

Chun Kai Ling, Kian Hsiang Low, and Patrick Jaillet. Gaussian Process Planning with Lipschitz Continuous Reward Functions: Towards Unifying Bayesian Optimization, Active Learning, and Beyond (AAAI '16) [25.8% acceptance rate]

WORKSHOP AND PREPRINTS

Chun Kai Ling, J. Zico Kolter, Fei Fang. What game are we playing? Differentiably learning games from incomplete observations. (NIPS '17 Deep Reinforcement Learning Symposium)

TALKS

End-to-end Learning in Normal and Extensive Form Games.
2018 AAMAS-IJCAI Workshop on Agents and Incentives in Artificial Intelligence (AI^3)
2018 IJCAI main track (at Stockholm)
2018 Cylab Partners Conference (at CMU)

TEACHING

Artificial Intelligence Methods for Social Good (08-737)	Spring 2018
Graduate Artificial Intelligence	Spring 2019

COURSEWORK

Analytical Performance Modeling (15-857)	Fall 2017
Fundamentals of Learning from the Crowd (10-709)	Fall 2017
Graduate Artificial Intelligence (15-780)	Spring 2018
Advanced Algorithms (15-850)	Fall 2018
Logical Foundations of Cyber-Physical Systems (15-824)	Fall 2018
Advanced Operating Systems and Distributed Systems (15-712)	Fall 2020

OTHERS

Software Engineering Intern, Graymatics 2013
Wrote tools to speed up machine learning pipelines. Contributed to the implementation of a image-sharing social media platform. Wrote a desktop application to help end-users organize digital media.

Temporary Administrative Assistant, Health Promotion Board 2012
Temporary Tax Officer, Inland Revenue Authority of Singapore 2011
Air Defence Weapon Operator, 160 Squadron 2009-2011