Lun Ai

Research Associate @ Imperial College London
Department of Computing
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Research Interests

- Inductive Logic Programming, Program Induction, Symbolic AI
- Machine Learning Comprehensibility, Explainable AI
- Discovery Biology, Computational Scientific Discovery

Education

PhD, Computing Science, **Imperial College London, UK** 09/2019 - 12/04/2024

Thesis: Effects of Machine-Learned Logic Theories on Human Comprehension in Machine-Human Teaching

Methods: Program Synthesis, Inductive Logic Programming, Explainable AI

MEng, Computer Science (Artificial Intelligence), **Imperial College London, UK** 03/10/2015 - 28/06/2019

A-level, New Talent Academy, Beijing, China 09/2012 - 06/2015

Subjects: Physics(A*)/Chemistry(A*)/Further Mathematics(A*)/Pure Mathematics(A+)

Employment

Research Associate (Current), Project BBSRC AI-4-EB, Imperial College London, UK 23/10/2022 -

Developed a resource-efficient active learning system to automate gene functions discovery

Methods: Active learning, Discovery Biology, Logic Programming

Research Assistant, Project EU Horizon TAILOR, Imperial College London, UK 19/11/2020 - 22/10/2022

Quantified human comprehension for evaluating Ultra-Strong Machine Learning

Methods: Inductive Logic Programming, Explainable AI

Research Support Officer, EPSRC Network+ HLC, Imperial College London, UK 11/05 - 18/11/2020

Co-organised the 2nd International Joint Conference on Learning and Reasoning

Conference site: https://ijclr22.doc.ic.ac.uk/

Software Engineer Intern, Schlumberger Technology Center, Norway 09/04 - 21/09/2018

Developed a Google Cloud auto-parameterisation service for geographic data analysis

Skills: Tensorflow, Pytorch, Google GAE & GCP, Docker, Python, C#, Kubernetes

Software Engineer Part-time, LV8Sports (startup), UK 05/11/2017 - 03/04/2018

Created a prototype of a mobile physical training assistant on the Android platform

Skills: OpenCV, Android, Java, C++

Software Engineer Intern, Yiwei Tech (startup), China 09/07 - 11/09/2016

Built a browser web service for mobile video streaming

Skills: HTML, Javascript, Java

Organisation

Research Associate Representative, Department of Computing, Imperial College London, UK 2024

Instructor, Hello World Hack (Junior Woman Hackathon), Imperial College London, UK 2024

Organising Committee, the 2nd International Joint Conference on Learning and Reasoning, IJCLR 2022

Awards

The Best Poster, Department of Computing Poster Competition, Imperial College London 2021

Overall Best Project, Microsoft 3Hack Hackathon, Imperial College London, UK 2017

Entry Scholarship, Imperial College London, UK 2015

Program Committee/Reviewing

The 39th International Conference on Logic Programming, ICLP 2023

The 45th Cognitive Science Society Conference, CogSci 2023

Machine Learning Journal, MLJ 2023

The 2nd International Joint Conference on Learning and Reasoning, IJCLR 2022

Publications

Journals

L. Ai, J. Langer, S. H. Muggleton and U. Schmid, "Explanatory machine learning for sequential human teaching," **Machine Learning**, 112:3591–3632, Jun. 2023. doi:10.1007/s10994-023-06351-8.

L. Ai, S. H. Muggleton, C. Hocquette, M. Gromowski and U. Schmid. "Beneficial and harmful explanatory machine learning," **Machine Learning**, 110:695-721, Mar. 2021. doi:10.1007/s10994-020-05941-0.

Pre-print

L. Ai, S. H. Muggleton, S.-S. Liang, and G. S. Baldwin. "Boolean matrix logic programming for active learning of gene functions in genome-scale metabolic network models," **arXiv**, May. 2024. doi:10.48550/arXiv.2405.06724.

L. Ai, S. H. Muggleton, S.-S. Liang, and G. S. Baldwin. "Simulating Petri nets with Boolean Matrix Logic Programming," **arXiv**, May. 2024. doi:10.48550/arXiv.2405.11412.

L. Ai, S.-S. Liang, W.-Z. Dai, L. Hallett, S. H. Muggleton, and G. S. Baldwin. "Human comprehensible active learning of genome-scale metabolic networks," **arXiv**, Aug. 2023. doi:10.48550/arXiv.2308.12740.

Oral Presentations

Conferences

L. Ai, S.-S. Liang, S. H. Muggleton, and G. S. Baldwin, "A Comprehensible Framework to Active Learning Genome-Scale Metabolic Networks," **AAAI** Fall Symposium on AI for Synthetic Biology, Nov. 2023.

L. Ai, J. Langer, S. H. Muggleton and U. Schmid, "Explanatory machine learning for sequential human teaching," the 3rd International Joint Conference on Learning & Reasoning (**IJCLR**), Nov. 2023.

L. Ai, S.-S. Liang, W.-Z. Dai, L. Hallett, S. H. Muggleton, and G. S. Baldwin, "Human comprehensible active learning of genome-scale metabolic networks," **AAAI** Spring Symposium on Computational Approaches to Scientific Discovery, Mar. 2023.

L. Ai, S. H. Muggleton, C. Hocquette, M. Gromowski and U. Schmid, "Beneficial and harmful explanatory machine learning," the 1st International Joint Conference on Learning & Reasoning (**IJCLR**), Oct. 2021.

L. Ai, S. H. Muggleton, C. Hocquette, M. Gromowski and U. Schmid, "Beneficial and harmful explanatory machine learning," the Conference on Trustworthy AI Through The Integration Of Learning, Optimisation & Reasoning (**TAILOR**), Sep. 2021.

Other

L. Ai, S.-S. Liang, W.-Z. Dai, L. Hallett, S. H. Muggleton, and G. S. Baldwin, "Active Learning of Genome-Scale Metabolic Networks via Abduction," Nanjing University AI Summer School, Jul. 2023.

L. Ai, S.-S. Liang, S. H. Muggleton, and G. S. Baldwin,"AI-4-EB Network Engineering," AI-4-EB AI and Engineering Biology Consortium, London, UK, Apr. 2023.

L. Ai, S. H. Muggleton, "Effects of machine-learned logic theories on human comprehension," Imperial College London Explainable AI Seminar Series, London, UK, Jul. 2022.

L. Ai, S. H. Muggleton, C. Hocquette, M. Gromowski and U. Schmid, "Beneficial and harmful explanatory machine learning," the Dagstuhl Seminar on Approaches and Applications of Inductive Programming, May. 2021.