CURRICULUM VITAE

MASATARO ASAI, PH.D

Research Staff Member IBM Research

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EDUCATION

- 04/01/2015–03/31/2018 Ph.D, Department of General Systems Studies, Graduate School of Arts and Sciences, The University of Tokyo. (Degree awarded on 03/22/2018.)
- Field of Study: Artificial intelligence, heuristic search, planning, scheduling, optimization.

Advisor: Alex Fukunaga.

04/01/2013–03/31/2015 M.A., Department of General Systems Studies, Graduate School of Arts and Sciences, The University of Tokyo.

Field of Study: Artificial intelligence, heuristic search, planning, scheduling, optimization.

Advisor: Alex Fukunaga.

04/01/2009-03/31/2013 B.Eng., Faculty of Engineering, The University of Tokyo.

Field of Study: Traffic simulation, Multi-agent systems, spatial search.

Advisor: S. Yoshimura. H. Fujii.

AWARDS

Research Fellow (DC2), Japan Society for the Promotion of Science (Equivalent of NSF Grant in Japan; stipends and individual research budget of 10000 USD/year)(Apr. 2016-)

JSAI Annual Conference Student Incentive Award, The Japanese Society for Artificial Intelligence (Mar. 2017)

WORK EXPERIENCE

- 04/01/2018– Research Staff Member at IBM Research Tokyo, IBM Japan. 19-21 Nihonbashi Hakozaki-cho Chuo-ku, Tokyo, Japan. 103-8510.
- Job description: Development of novel algorithms for connecting symbolic and neural AI systems for the explainable, accountable AIs that better suit real-world applications under human interactions and legal regulations. More concretely,
 - Data gathering and preprocessing for machine learning
 - Designing machine learning models
 - Designing and improving machine learning training algorithms
 - Statistical analysis of the machine learning models
 - Algorithmic improvement for reasoning processes
 - Algorithmic improvement for operations research
 - Algorithmic improvement for heuristic graph search
 - System integration for machine learning systems and reasoning systems
 - Customer interaction and customer project proposals
 - Customer projects research & development
 - Patent filling
 - Academic publishing
 - Open source publishing (e.g. on Github)

- Support and maintenance of open sourced projects
- Industrial, academic, internal outreach for promoting new IBM technologies (e.g. attending and presenting at conferences)
- Professional hiring at the academic conferences
- IBM-internal communication, collaboration and information sharing between international labs.

Achievements: See the list of publications after 2019 in the Selected Publications section below.

- Patents: DISCRETE FEATURE REPRESENTATION WITH CLASS PRIORITY, US Patent Appl. No. 16/290250 – PERMUTATION-INVARIANT OPTIMIZATION METRICS FOR NEURAL NETWORKS, US Patent
 - Appl. No. 16/366678
- **08/01/2016–10/31/2016** Research Internship at **IBM Research Ireland.** Project name: Robust Activity Planning and Scheduling with Multi-Modal Travel. Developed an efficient algorithm for multi-worker routing.

04/01/2016–03/31/2018 Research Fellow (DC2), Japan Society for the Promotion of Science.

SELECTED PUBLICATIONS

- Masataro Asai and Hiroshi Kajino. Towards Stable Symbol Grounding with Zero-Suppressed State AutoEncoder. In Proc. International Conference of Automated Planning and Scheduling(ICAPS) (accept ratio 33%, CORE2017 Rank: A*), San Francisco, Calfornia, USA, July 2019.
- [2] Masataro Asai. Unsupervised Grounding of Plannable First-Order Logic Representation from Images. In Proc. International Conference of Automated Planning and Scheduling(ICAPS) (accept ratio 33%, CORE2017 Rank: A*), San Francisco, Calfornia, USA, July 2019.
- [3] Masataro Asai. Set Cross Entropy: Likelihood-based Permutation Invariant Loss Function for Probability Distributions. **arXiv preprint arXiv:1812.01217**, 2019.
- [4] Masataro Asai and Alex Fukunaga. Classical Planning in Deep Latent Space: Bridging the Subsymbolic-Symbolic Boundary. In Proc. AAAI Conference on Artificial Intelligence (accept ratio 26%, CORE2017 Rank: A*), New Orleans, Louisiana, USA, February 2018.
- [5] Masataro Asai, Akihiro Kishimoto, Adi Botea, Radu Marinescu, Elizabeth M. Daly, and Spyros Kotoulas. Efficient Optimal Search under Expensive Edge Cost Computation. In Proc. International Joint Conference on Artificial Intelligence (IJCAI) (accept ratio 26%, CORE2017 Rank: A*), Melbourne, Australia, August 2017.
- [6] Masataro Asai and Alex Fukunaga. Exploration Among and Within Plateaus in Greedy Best-First Search. In Proc. International Conference of Automated Planning and Scheduling(ICAPS) (accept ratio 33%, CORE2017 Rank: A*), Pittsburgh, USA, June 2017.
- [7] Masataro Asai and Alex Fukunaga. Tie-Breaking Strategies for Cost-Optimal Best First Search. In J. Artif. Intell. Res.(JAIR) (accept ratio 12%), volume 58, pages 67–121, January 2017.
- [8] Masataro Asai and Alex Fukunaga. Tiebreaking Strategies for A* Search: How to Explore the Final Frontier? In Proc. AAAI Conference on Artificial Intelligence (accept ratio 26%, CORE2017 Rank: A*), Arizona, USA, February 2016.
- [9] Masataro Asai and Alex Fukunaga. Solving Large-Scale Planning Problems by Decomposition and Macro Generation. In Proc. International Conference of Automated Planning and Scheduling(ICAPS) (accept ratio 33%, CORE2017 Rank: A*), Jerusalem, Israel, June 2015.
- [10] Masataro Asai and Alex Fukunaga. Fully Automated Cyclic Planning for Large-Scale Manufacturing Domains. In Proc. International Conference of Automated Planning and Scheduling(ICAPS) (accept ratio 33%, CORE2017 Rank: A*), Portsmouth, NH, June 2014.

TECHNICAL SKILL

Programming Paradigm: Object-Oriented programming, Functional programming, Logic / Rule-based programming, Metaprogramming, low-level optimization, Domain Specific Language(DSL) development, compile-time optimization.

Development: Git, GitHub Flow, Test-Driven Development and Continuous Integration (Travis-CI / CircleCI).

Languages: (Professional) Common Lisp, C++, Bash, Python, Javascript / Coffeescript, C, (Intermediate) Java, (Elementary) Ruby

Frameworks: TensorFlow/Keras, Cloud (Amazon AWS, Torque/PBS, OpenLava, cfncluster), Node.js

LANGUAGE ABILITY

English: TOEFL 105/120 (Reading:29/30, Listening:29/30, Speaking:22/30, Writing:25/30, Dec 2014).

COMMUNITY SERVICES / OTHER ACTIVITIES

(present) Open source activities on Github.

(2016-) AAAI Student Member. Reviewer for ICAPS (2016), AAAI (2015,2018), IJCAI(2019).

(2019) numcl, A Numpy clone in Common Lisp. Was temporarily #5 on Hacker News and gained 300+ stars.

(2015) eazy-opencl : Common Lisp interface to OpenCL 2.0 (GPGPU language similar to CUDA).

(2015) Contributer of POCL, a vender-agnostic Portable OpenCL implementation in C and C++.

(2015) trivia, trivia.balland2006 : An extensible and fast pattern matching compiler in Common Lisp.

(2013–present) Compute cluster maintainance and management (80 cores) with NFS/NIS/Torque-PBS. Live monitoring/power consumption management. Secure VPN network over the campus.