Sotetsu Koyamada

Graduate School of Informatics, Kyoto University
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INTERESTS

I am interested in developing machine learning solutions for familiar problems to us by utilizing both of the engineering approach and scientific method. As a research topic, my primary interest is reinforcement learning, and its application to imperfect information game (Mahjong, Poker and so on).

EDUCATION

Ph.D. candidate of Informatics Apr 2015 - Present
Kyoto University
Advisor: Shin Ishii

Master of Informatics Apr 2013 - Mar 2015
Kyoto University
Advisor: Shin Ishii
Thesis title: "Principal Sensitivity Analysis and Its Application to Knowledge Discovery in Functional Neuroimaging"

Bachelor of Economics Apr 2008 - Mar 2013
Kyoto University
Advisor: Masaaki Iiyama

PROFESSIONAL EXPERIENCE

Research intern Apr 2018 - Mar 2020
Microsoft Research Asia, Beijing, China
Developed the first super-human Mahjong AI, Suphx, with the other team members. I developed a distributed reinforcement learning system, which can efficiently work over a hundred GPUs, resulting in more than 20× speeding up. Utilizing the RL system, I run tremendeous number of experiments and improved the AI performance dramatically (2.6× stronger). Also, I contributed to the domain knowledge of Japanese Mahjong as an only Japanese member.

Research assistant Aug 2016 - Mar 2018
National Institute of Advanced Industrial Science and Technology, Tokyo, Japan
Developed a new training objective function for neural sequence prediction, which uses α-divergence to theoretically bridge the gap between maximum likelihood-based methods and reinforcement learning.

Machine learning engineer Apr 2015 - Mar 2018
Recruit Holdings Co., Ltd., Tokyo, Japan
Constructed predictive APIs on Hadoop and Spark platform to improve KPIs (key performance indicators). The system was working for more than 30 major web services, including suumo.jp, jalan.net, and carsensor.net.

Research assistant Oct 2013 - Mar 2015
ATR Cognitive Mechanisms Laboratories, Kyoto, Japan
Developed a subject-independent brain decoder using neural networks and proposed a new algorithm for data-driven scientific discovery from nonlinear classifiers.

RESEARCH

Books

- **S. Koyamada** et al.: Japanese translation of "Algorithms for Reinforcement Learning" by C. Szepesvári, Kyoritsu Shuppan.
  - Chief editor. Managed the entire project ran by 12 team members.
  - Wrote an additional chapter about deep reinforcement learning.

Publications

- J. Li, **S. Koyamada**, Q. Yi, G. Liu, C. Wang, R. Yang, L. Zhao, T. Qin, T.Y. Liu, H.W. Hon: **"Suphx: Mastering Mahjong with Deep Reinforcement Learning."** arxiv:2003.13590, 2020.
- **S. Koyamada**, Y. Kikuchi, A. Kanemura, S. Maeda, and S. Ishii: **"Neural sequence model training via α-divergence minimization."** ICML Workshop on Learning to Generate Natural Language, 2017.
- **S. Koyamada**, M. Koyama, K. Nakae, and S. Ishii: **"Principal sensitivity analysis."** In Proceedings of the Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD), 621-632, 2015.
- **S. Koyamada**, Y. Shikauchi, K. Nakae, M. Koyama, S. Ishii **"Deep learning of fMRI big data: a novel approach to subject-transfer decoding."** arXiv:1502.00093, 2015.
- **S. Koyamada**, Y. Shikauchi, K. Nakae, and S. Ishii: **"Construction of subject independent brain decoders for human fMRI with deep learning."** The International Conference on Data Mining, Internet Computing, and Big Data, 60-68, 2014.

Other presentations

- S. Koyamada: "Principal Sensitivity Analysis." Machine Learning Summer School 2015 Kyoto, Kyoto, Sep 1, 2015 (poster presentation)
- S. Koyamada, Y. Shikauchi, K. Nakae, M. Koyama, and S. Ishii: "Knowledge Discovery for Nonlinear Classifier in Functional Neuroimaging." 10th AEARU Workshop on Computer Science and Web Technology, Tsukuba, Feb 26, 2015 (poster presentation)
- S. Koyamada, Y. Shikauchi, K. Nakae, and S. Ishii: "Learning the subject-independent discriminative features from the large-scale fMRI database." Neuro2014, Yokohama, Sep 13, 2014 (poster presentation)

GRANTS AND SCHOLARSHIPS

Repayment Exemption of Student Loan for Students with Excellent Grades
Apr 2013 - Mar 2015
Japan Student Services Organization (JASSO), Japan
Approx. 1,056,000 JPY

Student Scholarship Apr 2018 -Sep 2018
Tobitate! Study Abroad Initiative, Japan
Approx. 870,000 JPY

TEACHING

Teaching assistant Jul 23, 2014
Lecture sessions on deep learning, Kyoto University, Japan

Teaching assistant Oct 2013 - Mar 2014
"Introduction to Computer Science." Kyoto University, Japan

SKILLS

Programming skills

- Programming language: **C++**, **Python**, C#, Go, Java, R
  - GitHub repo: https://github.com/sotetsuk
- Deep learning framework: PyTorch, TensorFlow
- Middleware/Infrastructure: Docker, AWS, GCP, RDBMS, Hadoop, Spark
- Others: Git, SQL, LaTeX

Language

Japanese (native), English