

Masahiko Osawa

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PhD Student (Michita Imai Laboratory)
School of Science for Open and Environmental Systems
Graduate School of Science and Technology
Keio University

Contact Information

Address: 26-203, 3-14-1, Hiyoshi, Kohoku-ku, Yokohama-shi, Kanagawa, Japan

Email: mosawa@ailab.ics.keio.ac.jp

Phone: 81-45-566-1749

Fax: 81-45-566-1749

Web: <https://www.masahiko-osawa.com/>

Education

Master of Engineering, Keio University, Japan, 2017

Bachelor of Engineering, Keio University, Japan, 2015

High School, Tokyo Tech High School of Science and Technology, Japan, 2011

Professional Positions

Apr. 2017 -	Research Fellow, The Japan Society of the Promotion of Science (DC1)
Jan. 2016 – Mar. 2017	Project Researcher, DWANGO Co., Ltd. Dwango AI Laboratory
Apr. 2015 – Nov. 2015	Researcher, JST/CREST

Grant

2017 Apr – 2020 Mar. Grant-in-Aid for JSPS Research Fellow

Funding Agency: Japan Society for the Promotion of Science

Grant Number: 17J00580

Title: Development of RBM-based cognitive architecture
focused on the hippocampus

Role: PI

Amount: 3,100,000 JPY

Publications and Presentations

<International Conference>

- [1] **Masahiko Osawa**, Yuta Ashihara, Takuma Seno, Michita Imai, and Satoshi Kurihara, Accumulator Based Arbitration Model for both Supervised and Reinforcement Learning Inspired by Prefrontal Cortex, The 24th International Conference on Neural Information Processing, 2017. (Submitted)
- [2] **Masahiko Osawa** and Michita Imai: The Functional Plausibility of Topologically Extended Models of RBMs as Hippocampal Models, Annual International Conference on Biologically Inspired Cognitive Architectures, 2017. (Accepted)
- [3] Sei Ueno, **Masahiko Osawa**, Michita Imai, Tsuneo Kato and Hiroshi Yamakawa: Reinforcement Learning Framework for Robots in the Real World that Extends Cognitive Architecture: Prototype Simulation Environment “Re:ROS”., Annual International Conference on Biologically Inspired Cognitive Architectures, 2017. (Accepted)
- [4] **Masahiko Osawa**, Michita Imai, and Hiroshi Yamakawa: An Implementation of Working Memory Using Stacked Half Restricted Boltzmann Machine: Toward to Restricted Boltzmann Machine-Based Cognitive Architecture., The 23rd International Conference on Neural Information Processing, pp. 342-350, Kyoto, Japan, 2016.
- [5] Hiroshi Yamakawa, **Masahiko Osawa** and Yutaka Matsuo: Whole Brain

Architecture Approach Is a Feasible Way Toward an Artificial General Intelligence, The 23rd International Conference on Neural Information Processing, pp. 275-281, Kyoto, Japan, 2016.

- [6] Hirokazu Kiyomaru, **Masahiko Osawa** and Hiroshi Yamakawa: BiCAmon: Activity monitoring tool on 3D connecome structures for various cognitive architectures, International Neuroinformatics Coordinating Facility Neuroinformatics 2016, Reading, United Kingdom, 2016.
- [7] **Masahiko Osawa** and Masafumi Hagiwara: Analyses of Learning Characteristics of RBMs and an Automatic Method for Deciding the Number of Hidden Units, International Symposium on Advanced Intelligent Systems, F1a-5, Mokpo, Korea, 2015.
- [8] Yu Yamagishi, **Masahiko Osawa**, and Masafumi Hagiwara: A Learning Method for Echo State Networks Using RBM, F1a-3, International Symposium on Advanced Intelligent Systems, Mokpo, Korea, 2015.

<Domestic Conference (Japan)>

- [1] **Masahiko Osawa**, and Michita Imai: “Learning of Unpleasant Stimuli and Expressing Avoiding Behavior of Semi-Autonomous Telepresence Robot”, The 31th Annual Conference of the Japanese Society for Artificial Intelligence, 2017
- [2] Yuta Ashihara, **Masahiko Osawa**, Daiki Shimada, Satoshi Kurihara, and Michita Imai: “Proposal of Hierarchical Derepression Model using Prefrontal Accumulator Model”, The 31th Annual Conference of the Japanese Society for Artificial Intelligence, 2017
- [3] **Masahiko Osawa**, and Michita Imai: “A Practical Application of Rodent-Level Cognitive Architecture to HAI for Human-Level Artificial General Intelligence”, Japan Society for Artificial Intelligence 5th SIG-AGI2017
- [4] Yosuke Fukuchi, **Masahiko Osawa**, Taichi Sono, Hiroshi Yamakawa, and Michita Imai: “Self-model acquisition and target explanation of a deep reinforcement learning agent”, Japan Society for Artificial Intelligence 5th SIG-AGI, 2017
- [5] Kosuke Yamada, **Masahiko Osawa**, and Michita Imai: “Proposal of D-DALP: A Method to Automatically Tune the Number of Hidden Units

- Effective for Deep Learning”, Japan Society for Artificial Intelligence 5th SIG-AGI, 2017
- [6] Yosuke Fukuchi, **Masahiko Osawa**, Taichi Sono, Hiroshi Yamakawa, and Michita Imai: “Interpretation of Deep Reinforcement Learning Agent's Intentions with Self Model”, The 79th National Convention of Information Processing Society of Japan, 2017
 - [7] Yuta Ashihara, **Masahiko Osawa**, Daiki Shimada, Satoshi Kurihara, and Michita Imai: “Arbitration of hierarchical architecture using accumulator”, The Society of Instrument and Control Engineers Technical Committee on Decentralized Autonomous Systems, 2017
 - [8] **Masahiko Osawa**, Yuta Ashihara, Daiki Shimada, Michita Imai, and Satoshi Kurihara: “Arbitration of multiple learner and application of cognitive architecture using accumulator utilizing prefrontal area”, Japan Society for Artificial Intelligence 4th SIG-AGI, 2016
 - [9] Sei Ueno, **Masahiko Osawa**, Michita Imai, and Tsuneo Kato: "Toward Deep Reinforcement Learning of Robots in the Real World. -Prototyping of a Simulation Environment “Re:ROS”-", Japan Society for Artificial Intelligence 4th SIG-AGI, 2016.
 - [10] Yosuke Fukuchi, **Masahiko Osawa**, Taichi Sono, Hiroshi Yamakawa, and Michita Imai: "Investigation of a Self-model based on messages from another skilled agent", HAI Symposium, 2016.
 - [11] **Masahiko Osawa**, Michita Imai, and Hiroshi Yamakawa: "A Conception of Interaction Models Using Rodents Level Cognitive Architecture ", IEICE, vol. 116, no. 306, CNR2016-14, pp. 1-6, 2016.
 - [12] **Masahiko Osawa**, Hiroshi Yamakawa, and Michita Imai: "Extended Models of Restricted Boltzmann Machine Focused on Structure of Hippocampus", Japan Society for Artificial Intelligence 3rd SIG-AGI, 2016.
 - [13] Saki Ogawa, **Masahiko Osawa**, and Masafumi Hagiwara: "The Estimation System of Color Impression using Deep Learning", Japan Society of Kansei Engineering Ambiguity and Kansei, 2015.
 - [14] **Masahiko Osawa**, and Masafumi Hagiwara: "A Memory Transfer Model from Intermediate-term to Long-term ", 25th Annual Conference of

Japanese Neural Network Society, pp. 46-47, 2015.

- [15] Yu Yamagishi, **Masahiko Osawa**, and Masafumi Hagiwara: "A Learning Method for Echo State Networks Using RBM ", 25th Annual Conference of Japanese Neural Network Society, pp.94-95, 2015.
- [16] **Masahiko Osawa**, and Masafumi Hagiwara: "Proposal of a Memory Model using Deep Learning Based on the Hippocampus Cerebral Neocortex System", The 29th Annual Conference of the Japanese Society for Artificial Intelligence, 2015.
- [17] **Masahiko Osawa**, and Masafumi Hagiwara: "A Proposal of Novel Data Detection Method and Its Application to Incremental Learning for RBMs , " IEICE, vol.114, no.259, NC2014-118, pp.283-288.
- [18] **Masahiko Osawa**, and Masafumi Hagiwara: "Analysis of Learning Characteristics of RBM and Automatic Method for Deciding the Number of Hidden Neurons", IEICE, vol.114, no.259, NC2014-22, pp.7-12, 2014.

<Magazine>

- [1] **Masahiko Osawa**: "Whole Brain Architecture Future Leaders", Artificial Intelligence, Vol. 32, No. 2, pp. 268–269, 2017

Service Activities

<Review>

The 23rd International Conference on Neural Information Processing
5th International Conference of on Human-Agent Interaction

<Invited Presentation>

- [1] The Computer Software Association of Japan "Toward to Rodent Level Artificial General Intelligence" 2017-6.
- [2] Special Interest Group - Whole Brain Architecture, "Toward to Rodent Level Cognitive Architecture", 2017-3.
- [3] The 19th Workshop of the Whole Brain Architecture Future Leaders, "Ten selection of the thinking by a future Interdisciplinary researcher --- from view of the cognitive, neuro, and AI", 2016-11.
- [4] Special Interest Group - Whole Brain Architecture, "Create Hippocampus - -- RBM Based Cognitive Architecture", 2016-7.

- [5] The 14th Workshop of the Whole Brain Architecture Future Leaders: CASUAL TALK “About Whole Brain Architecture Future Leaders”, 2016-6.
- [6] 1st Whole Brain Architecture Symposium, Panelist, 2016-4.
- [7] The 5th Workshop of the Whole Brain Architecture Future Leaders: Recurrent Neural Networks, Organizer, 2015-3.
- [8] The 2nd Workshop of the Whole Brain Architecture Future Leaders: Convolutional Neural Networks, Organizer, 2015-11.
- [9] The 1st Workshop of the Whole Brain Architecture Future Leaders: Deep Learning, Main Speaker 2014-10.

Professional Society

The Japanese Society for Artificial Intelligence

Japanese Neural Network Society

Japanese Cognitive Science Society

IEEE

Asia Pacific Neural Network Assembly