

MOTOYA OHNISHI

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EDUCATION

M.S. in Electrical Engineering and Computer Science KTH Royal Institute of Technology, Stockholm, Sweden	Apr 2016 - Mar 2019 GPA: 4.82/5.00
M.S. in Electronics and Electrical Engineering Keio University, Tokyo, Japan	Apr 2016 - Mar 2019 GPA: 3.83/4.00
B.E. in Electronics and Electrical Engineering Keio University, Tokyo, Japan	Apr 2012 - Mar 2016 GPA: 3.96/4.00

PUBLICATION

- **M. Ohnishi**, M. Yukawa, M. Johansson, and M. Sugiyama, "Continuous-time Value Function Approximation in Reproducing Kernel Hilbert Spaces", *Advances in Neural Information Processing Systems (NeurIPS) 31*, 2018, (will be presented at NeurIPS2018, Montreal, Quebec, Canada, Dec. 3-8, 2018, *arXiv preprint arxiv:1806.02985*). (News: <https://aip.riken.jp/news/nips2018/>)
- **M. Ohnishi**, and M. Yukawa, "Online Nonlinear Estimation via Iterative L^2 -Space Projections: Reproducing Kernel of Subspace", *IEEE Transactions on Signal Processing (TSP)*, vol. 66, no. 15, pp. 4050-4064, 2018.
- **M. Ohnishi**, L. Wang, G. Notomista, and M. Egerstedt, "Barrier-Certified Adaptive Reinforcement Learning with Applications to Brushbot Navigation", *IEEE Transactions on Robotics (TRO)*, (Conditionally Accepted), (*arXiv preprint arXiv:1801.09627*). (Video: <https://www.youtube.com/watch?v=qXgHrrCcftM>)
- **M. Ohnishi**, and M. Yukawa, "Online Learning in L^2 Space with Multiple Gaussian Kernels", *European Signal Processing Conference (EUSIPCO)*, pp. 1594-1598, 2017.

RESEARCH EXPERIENCE

- | | |
|--|--|
| Model-based Continuous-time Value Function Approximation in RKHSs
Advisor: Masashi Sugiyama | RIKEN
May 2018 – present |
| <ul style="list-style-type: none">- Proposed a model-based value function approximation working in reproducing kernel Hilbert spaces for systems described by stochastic differential equations- Showed that the continuous-time formulation is methodologically more desirable over the discrete-time formulation in terms of affinity for the control theory and susceptibility to numerical errors (Used Python)- Showed that the proposed framework also reproduces some of the existing model-based discrete-time value function approximation in RKHSs | |
| Barrier-Certified Adaptive RL – Applications to Brushbot Navigation
Advisor: Magnus Egerstedt | Georgia tech
Jul 2017 – Jan 2018 |
| <ul style="list-style-type: none">- Developed a safe learning framework that guarantees Lyapunov stability of the safe set under nonstationary dynamics- Developed an algorithm for identifying a dynamical structure (e.g., control affine) via sparse adaptive filter- Proposed a novel kernel-based model-free adaptive reinforcement learning- Proposed a discrete-time control barrier certificate that defines convex constraints- Applied the proposed method to navigations of BrushBot at the Robotarium at Georgia tech | |
| Online Nonlinear Estimation in the L^2 Space – Fixed Point Theory
Advisor: Masahiro Yukawa | Keio Univ
Aug 2015 - Dec 2017 |
| <ul style="list-style-type: none">- Began with the question: Should we always select RKHSs for efficiently conducting adaptive nonlinear estimation?- Proposed a novel nonlinear estimation technique working in the L^2 space to speed-up learning- Showed importance of properly selecting metric for <i>nonlinear</i> function estimation tasks | |

EMPLOYMENT

- Research Assistant (The Center for Advanced Intelligence Project, RIKEN)** May 2018 - present
- Belong to the mathematical science team led by **Kenichi Bannai**
- Collaborated with Masashi Sugiyama, Mikael Johansson, and Masahiro Yukawa
- Visiting Researcher (GRITS Lab, Georgia Institute of Technology)** Jul 2017 - Jan 2018
- Conducted research at the GRITS Lab led by **Magnus Egerstedt**
- PhD mentors: Li Wang, Gennaro Notomista
- Research Assistant (Dept. Automatic Control, KTH)** Dec 2016 - Jan 2017
- Director: **Mikael Johansson** (Collaborator: Shuqi Xu)
- Developed a toolbox of Nonlinear Model Predictive Control (NMPC) for Julia
- Created a new modeling language (interaction) with MathProgBase to efficiently solve NMPC problems
- Teaching Assistant (Dept. Electronics and Electrical Engineering, Keio)** Apr 2018 - Aug 2018
- Taught undergraduate students how to design an integrator and NAND circuits
with an operational amplifier and a transistor
Apr 2016 - Aug 2016
- Taught how to use oscilloscopes, signal generators, etc.

ACTIVITIES

Peer-Reviewer Experience

- IEEE Transactions on Signal Processing (TSP)

Workshop

- RIKEN AIP & National University of Singapore @Singapore Sept 2018
Poster presentation: Online Nonlinear Estimation via Iterative L^2 -Space Projections
- RIKEN AIP & Israeli universities/institutes @Tel Aviv Nov 2018
Poster presentation: Continuous-time Value Function Approximation in Reproducing Kernel Hilbert Spaces

AWARDS & GRANTS

- Funai Overseas Scholarship** Nov 2018
Fellowship for Ph.D. study abroad (2019-2021: Expected)
- NeurIPS 2018 Travel Award** Oct 2018
Travel grant awarded to selected presenters of NeurIPS 2018
- Grants for International Human Resources** Nov 2017
Scholarship awarded to selected Keio university students studying abroad
- KLL Master Research Grant** Aug 2017
Research grant for master students presenting their researches at international conferences
- Travel Grant** Jun 2017
Travel grant awarded by the School of Electrical Engineering, KTH, to selected students conducting their master thesis projects outside of Sweden
- Grants of the Scandinavia-Japan Sasakawa Foundation** Mar 2017
Research grant awarded for selected projects related to Scandinavian countries
- Grants for International Human Resources** Nov 2016
- Best Undergraduate Research Award** Mar 2016
The best undergraduate research award in the field of information technology in Dept. EEE, Keio Univ.

LANGUAGES AND OTHER INFORMATION

- Language** Japanese (Mother tongue), English (Advanced, TOEFL(2018/3): 107/120),
Chinese (Intermediate), Swedish (Passed B1/B2 level)
- OS** Linux, Max, Windows
- Programming** C, Python, Julia, Matlab, GAMS, (SQL, C++)
- Software/Other skills** Openshot, OpenCV, OpenAI Gym, HTML, CSS, Raspberry Pi, Arduino,
Microsoft Office, Tex, Emacs, Atom, vim,
(Vicon Motion Capture System, ROS, PyTorch), etc.