Akifumi Wachi

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Research Interests

My research interests lie primarily in reinforcement learning, and span the entire theory-to-application spectrum from foundational advances all the way to deployment in real systems. Especially, I am interested in safe reinforcement learning to optimize an agent policy in safety critical environments.

Work Experience

Senior Research Scientist   Sep 2022 - present
LINE Corporation

Research Scientist   Apr 2018 - Aug 2022
IBM Research AI

Research Assistant   Apr 2017 - Mar 2018
National Institute of Communication Technology (NICT)

Research Assistant   Apr 2016 - Mar 2018
Japan Aerospace Exploration Agency (JAXA)

Education

Mar 2021	Ph.D. in Computer Science at University of Tsukuba
Mar 2018	M.S. in Aeronautics and Astronautics at University of Tokyo
Mar 2016	B.S. in Aeronautics and Astronautics at University of Tokyo

Publications

1. <u>Akifumi Wachi</u>, Yunyue Wei, Yanan Sui, "Safe Policy Optimization with Local Generalized Linear Function Approximations" Neural Information Processing Systems (NeurIPS), 2021.

2. Ran Iwamoto, Ryosuke Kohita, <u>Akifumi Wachi</u>, "Polar Embedding" The SIGNLL Conference on Computational Natural Language Learning (CoNLL), 2021.

3. Daiki Kimura, Masaki Ono, Subhajit Chaudhury, Ryosuke Kohita, <u>Akifumi Wachi</u>, Don Joven Agravante, Michiaki Tatsubori, Asim Munawar, Alexander Gray, "Neuro-Symbolic Reinforcement Learning with First-Order Logic" Empirical Methods in Natural Language Processing (EMNLP), Short paper, 2021.

4. Ryosuke Kohita, <u>Akifumi Wachi</u>, Daiki Kimura, Subhajit Chaudhury, Michiaki Tatsubori, Asim Munawar, "Language-based General Action Template for Reinforcement Learning Agents" Association for Computational Linguistics (ACL), Findings, 2021.

5. Ryosuke Kohita, <u>Akifumi Wachi</u>, Yang Zhao, Ryuki Tachibana, "Q-learning with Language Model for Edit-based Unsupervised Summarization" Empirical Methods in Natural Language Processing (EMNLP), 2020

6. <u>A. Wachi</u>, Y. Sui, "Safe Reinforcement Learning in Constrained Markov Decision Processes",

International Conference on Machine Learning (ICML), 2020

7. <u>A. Wachi</u>, "Failure-Scenario Maker for Rule-based Agent using Multi-agent Adversarial Reinforcement Learning and its Application to Autonomous Driving", International Joint Conference on Artificial Intelligence (IJCAI), 2019

8. <u>A. Wachi</u>, Y. Sui, Y. Yue, M. Ono, "Safe Exploration and Optimization of Constrained MDPs using Gaussian Processes", AAAI conference on Artificial Intelligence (AAAI), 2018

9. R. Takahashi, R. Sakagami, <u>A. Wachi</u>, Y. Kasai, S. Nakasuka, "The Conceptual Design of a Novel Simple and Small-sized Mars lander", IEEE Aerospace Conference, 2018

10. R. Sakagami, R. Takahashi, <u>A. Wachi</u>, Y. Koshiro, H. Maezawa, Y. Kasai, S. Nakasuka, "Integral Design Method for Simple and Small Mars Lander System Using Membrane Aeroshell", Acta Astronautica.

11. <u>A. Wachi</u>, R. Takahashi, R. Sakagami, Y. Koshiro, Y. Kasai, S. Nakasuka, "Feasibility Study for Mars Landing with Small Space Probe", AIAA SPACE and Astronautics Forum and Exposition (2017 AIAA SPACE Forum), 2017.

12. R. Takahashi, <u>A. Wachi</u>, R. Funase, S. Nakasuka "Hazard Avoidance Control Using Stochastic Optimization for Mars Safe Landing", 31st International Symposium on Space Technology and Sciences, 2017.

13. <u>A. Wachi</u>, "Low-Thrust Trajectory Design to Improve Overall Mission Success Probability Incorporating Target Changes in Case of Engine Failures", 31st International Symposium on Space Technology and Science (ISTS), 2017. **Nominated to Best Student Paper Award: First Prize (General Chairperson Award)**

14. <u>A. Wachi</u>, N. Ozaki, S. Nakasuka, "Fault-Tolerant Low-Thrust Trajectory Design with Backups for Multiple Targets", 20th IFAC Symposium on Automatic Control in Aerospace (ACA), 2016. **Nominated to the Best Student Paper Award: First Prize.**

INVITED TALK

1. Safe Exploration and Optimization of MDPs using Gaussian Processes, Machine Learning based Risk-Sensitive workshop (organized by NASA JPL and Caltech), Pasadena, California, USA, Apr 21, 2017

2. Automation Challenges for Small Satellites, Machine Learning based Risk-Sensitive workshop (organized by NASA JPL and Caltech), Pasadena, California, USA, Apr 21, 2017

ACADEMIC SERVICES

Conference Reviewing

- ICML 2021 - 2022
- NeurIPS 2021 - 2022
- ICLR 2022 - 2023
- IJCAI 2020 - 2022
- AAAI 2020 - 2022
- EMNLP 2020

- ACL 2020 - 2021

Journal Reviewing

- ACM Transactions on Evolutionary Learning and Optimization (Associate Editor)
- Advances in Space Research
- Transactions of the Japanese Society for Artificial Intelligence (in Japanese)

AWARDS

Dean's Award (second prize), from Faculty of Engineering, The University of Tokyo, 2018

Best Student Paper Award, First Prize (General Chairperson Award), Joint Conference: 31st ISTS, 26th ISSFD, and 8th NSAT, 2017, http://www.ists.or.jp/wp-content/uploads/2016/03/31_Prize-List.pdf

Best Student Paper Award (First Prize), IFAC Symposium on Automatic Control in Aerospace (ACA), 2016, http://aca2016.ngcaerospace.com/studentaward.php

FELLOWSHIP

Financial support to participate in Thirty-second AAAI conference on Artificial Intelligence by Society for Promotion of Space Science (SPSS), $1.5K, February, 2018

Financial support to participate in International Astronautical Congress (IAC) by the Japan Society for Aeronautical and Space Sciences (JSASS), $2.5K, September, 2017

Go Global Scholarships 2016 Short Study Abroad Scholarships: the University of Tokyo, $1K/month, 3 months, 2016

Fellowship of the Leading Graduates Schools Program: Global Leader Program for Social Design and Management by the Ministry of Education, Culture, Sports, Science and Technology in Japan, $1K/month, 1 year, 2016

Financial support to visit California Institute of Technology (Caltech) and NASA/JPL by the University of Tokyo, $1.0K, February, 2014