

TAKUMA YONEDA

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EDUCATION

Toyota Technological Institute at Chicago (TTIC), Chicago, IL

PhD candidate in Computer Science, 2018 - present

Toyota Technological Institute (TTI), Aichi, Japan

Bachelor of Engineering, 2014 - 2018

(graduated at the top of the class)

RESEARCH INTEREST

Reinforcement Learning, Diffusion Models, Robotics, Large Language Models, Natural Language Processing and Deep Learning.

PUBLICATIONS (GOOGLE SCHOLAR)

6-DoF Stability Field via Diffusion Models

Takuma Yoneda*, Tianchong Jiang*, Gregory Shakhnarovich and Matthew R. Walter

In submission

Available at: <https://arxiv.org/pdf/2310.17649.pdf>

Statler: State-Maintaining Language Models for Embodied Reasoning

Takuma Yoneda*, Jiading Fang*, Peng Li*, Huanyu Zhang, Tianchong Jiang, Ben Picker, David Yunis, Shengjie Lin, Luzhe Sun, Richard Xu, Hongyuan Mei and Matthew Walter

To appear at IEEE International Conference on Robotics and Automation (ICRA) 2024

Available at: <https://arxiv.org/pdf/2306.17840.pdf>

Blending Imitation and Reinforcement Learning for Robust Policy Improvement

Xuefeng Liu, Takuma Yoneda, Matthew Walter, Yuxin Chen and Rick L. Stevens

To appear at International Conference on Learning Representations (ICLR) 2024 (spotlight)

Available at: <https://arxiv.org/pdf/2310.01737.pdf>

Cold Diffusion on the Replay Buffer: Learning to Plan from Known Good States

Zidan Wang, Takuma Yoneda, Takeru Oba, Rui Shen, Matthew Walter and Bradley C. Stadie

To appear at Conference on Robot Learning (CoRL) 2023

Available at: <https://arxiv.org/pdf/2310.13914.pdf>

Active Policy Improvement from Multiple Black-box Oracles

Xuefeng Liu*, Takuma Yoneda*, Chaoqi Wang*, Matthew Walter and Yuxin Chen

In Proceedings of International Conference on Machine Learning (ICML) 2023

Available at: <https://proceedings.mlr.press/v202/liu23av/liu23av.pdf>

To the Noise and Back: Diffusion for Shared Autonomy

Takuma Yoneda, Luzhe Sun, Ge Yang, Bradley Stadie and Matthew R. Walter

In Proceedings of Robotics: Science and Systems (RSS) 2023

Available at: <https://arxiv.org/abs/2302.12244>

Invariance Through Latent Alignment

Takuma Yoneda*, Ge Yang*, Matthew R. Walter, and Bradley Stadie

In Proceedings of Robotics: Science and Systems (RSS) 2022

Available at: <https://arxiv.org/pdf/2112.08526>

A Robot Cluster for Reproducible Research in Dexterous Manipulation

Felix Widmaier*, Manuel Wüthrich*, Stefan Bauer, Niklas Funk, Julen Uraín De Jesus, Jan Peters, Joe Watson, Claire Chen, Krishnan Srinivasan, Junwu Zhang, Jeffrey Zhang, Matthew R. Walter, Rishabh Madan, Charles Schaff, Takahiro Maeda, Takuma Yoneda, Denis Yarats, Arthur Allshire, Ethan K Gordon, Tapomayukh Bhattacharjee, Siddhartha S Srinivasa, Animesh Garg, Annika Buchholz, Sebastian Stark, Thomas Steinbrenner, Joel Akpo, Shruti Joshi, Vaibhav Agrawal, Bernhard Schölkopf
arXiv:2109.10957 2021

Available at: <https://arxiv.org/pdf/2109.10957>

Benchmarking Structured Policies and Policy Optimization for Real-World Dexterous Object Manipulation

Takuma Yoneda*, Niklas Funk*, Charles Schaff*, Rishabh Madan*, Julen Uraín De Jesus, Joe Watson, Ethan K Gordon, Felix Widmaier, Stefan Bauer, Siddhartha S Srinivasa, Tapomayukh Bhattacharjee, Matthew R. Walter, and Jan Peters

In Special Issue: Robotic Grasping and Manipulation Challenges and Progress, IEEE Robotics and Automation Letters.

Available at: <https://arxiv.org/pdf/2105.02087>

Grasp and motion planning for dexterous manipulation for the real robot challenge

Takuma Yoneda*, Charles Schaff*, Takahiro Maeda, and Matthew R. Walter
arXiv:2101.02842 2020

Available at: <https://arxiv.org/pdf/2101.02842>

Pow-Wow: A Dataset and Study on Collaborative Communication in Pommerman

Takuma Yoneda, Matthew Walter and Jason Naradowsky

In the First Workshop on Language in Reinforcement Learning (LaReL), ICML 2020.

Available at: <https://arxiv.org/pdf/2009.05940>

UCL Machine Reading Group: Four Factor Framework For Fact Finding (HexaF)

Takuma Yoneda, Jeff Mitchell, Johannes Welbl, Pontus Stenetorp and Sebastian Riedel

In Proceedings of the First Workshop on Fact Extraction and VERification (FEVER), EMNLP 2018, Brussels, Belgium, 2018.

Available at: <http://www.aclweb.org/anthology/W18-5515.pdf>

Bib2vec: Embedding-based Search System for Bibliographic Information

Takuma Yoneda, Koki Mori, Makoto Miwa and Yutaka Sasaki

In Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics, EACL 2017, Valencia, Spain, 2017.

Available at: <https://aclanthology.org/E17-3028.pdf>

INTERNSHIPS

Preferred Networks, Inc.

Summer 2019

Tokyo, Japan

Research on multi-agent collaboration with Deep Reinforcement Learning.

University College London

Summer 2018

London, U.K.

Research and development of a natural language based information retrieval and fact-checking system. We won 2nd place in FEVER (Fact Extraction and VERification) competition with our system.

VASILY, Inc. (acquired by ZOZO Technologies, Inc.)

Summer 2017

Tokyo, Japan

Research and development on learning multi-modal latent space for fashion items and their natural language descriptions.

Yamaha Motor Co., Ltd.

Spring 2017

Shizuoka, Japan

Developing a light-weight vehicle recognition system for motorcycles.

Toyota Motor Corporation

Spring 2015

Aichi, Japan

Learning Toyota Production System (TPS) and how the system improves efficiencies of manufacturing.

ACHIEVEMENTS

Real Robot Challenge; 1st place (out of 5 teams)

November 2020

We worked on an object manipulation task wherein a robot attempts to grasp and orient a rectangular object to target pose. This task was surprisingly hard, with existing RL algorithms failing because of the high degrees of freedom present in the system. We implemented a planning-based controller and trained a second residual policy on top of the planner, allowing us to use RL and planning in one loop. To demonstrate the sim-to-real capabilities of our method, we also transferred the learned policy from a simulated Tri-finger robot to a real robot. This sim-to-real approach worked very well, and lead to our team (TTIC) obtaining 1st place in a real-world object manipulation competition: Real Robot Challenge hosted by Max Planck Institute. Winning the challenge, we are granted a cash prize of 12,500 EUR.

Fact-extraction and Verification shared task; 2nd place (out of ~ 25 teams)

August 2018

In this NLP research, we considered the timely problem of combating fake-news. During my internship at University College London, I led a project under Prof. Sebastian Riedel, to develop a method that automatically verifies if a given sentence is factually correct. This algorithm was also able to explain the reasoning behind its decisions by extracting relevant quotes from Wikipedia. With our approach, we participated in the fact-extraction and verification shared task competition. Our score obtained second place.