TAKEHIKO OHKAWA

4802 Forbes Avenue, Pittsburgh, PA 15213, USA

E-mail: ohkawa-t@iis.u-tokyo.ac.jp, Homepage: https://tkhkaeio.github.io/

RESEARCH INTEREST

My research objective is to build a real-world visual perception system for understanding human behavior in diverse domains and applications. I focus on extending in-the-wild perception systems for comprehension of daily human activities to diverse deployment scenarios while alleviating dataset bias, such as environment changes, viewpoint shifts, and the differences in an agent's embodiment, e.g., between humans and robots. To achieve this, I am working on machine learning under distribution shift and human behavior understanding in videos, specializing in domain adaptation, generative modeling, first-person/embodied vision, and vision-and-language.

EDUCATION

Carnegie Mellon University   *September 2021 - May 2022 (expected)*
Research Scholar at Robotics Institute
- Advisor: Prof. Kris Kitani
- Research theme: *Cross-Domain 2D and 3D Hand Detection*
- Supported by ACT-X, Japan Science and Technology Agency

The University of Tokyo
Ph.D. candidate in Information Science and Technology   *October 2021 - Present*
- Advisor: Prof. Yoichi Sato
- Research theme: *Understanding Human Behavior in Diverse Domains and Applications*

M.A.S. in Interdisciplinary Information Studies   *April 2020 - September 2021*
- GPA: 4.00/4.00 (based on WES)
- **Early graduation for 1.5 years**
- **The first early-graduated master's student in school**
- Advisors: Prof. Yoichi Sato and Prof. Jun Rekimoto
- Thesis: *Consensus Pseudo-Labeling for Domain Adaptation of First-Person Hand Segmentation*

Tokyo Institute of Technology   *April 2017 - March 2020*
B.E. in Computer Science
- GPA: 3.93/4.00 (based on WES)
- **Early graduation for 3 years**
- **Ranked 1st out of 4 early graduates in class**
- Advisor: Prof. Nakamasa Inoue
- Thesis: *Augmented Cyclic Consistency Regularization for Unpaired Image-to-Image Translation*

PUBLICATIONS

Journal

1. **Foreground-Aware Stylization and Consensus Pseudo-Labeling for Domain Adaptation of First-Person Hand Segmentation**
   Takehiko Ohkawa, Takuma Yagi, Atsushi Hashimoto, Yoshitaka Ushiku, and Yoichi Sato
   IEEE Access 2021

International Conference

2. **Augmented Cyclic Consistency Regularization for Unpaired Image-to-Image Translation**
   Takehiko Ohkawa, Naoto Inoue, Hirokatsu Kataoka, and Nakamasa Inoue
   In International Conference on Pattern Recognition (**ICPR2020**)

Technical Reports/Short Papers

- **Domestic Conferences in Japan**

3. **Verification of Cyclical Annealing for Object-Oriented Representation Learningn**
Atsushi Kobayashi*, Hideki Tsunashima*, <u>Takehiko Ohkawa</u>, Hiroaki Aizawa, Qiu Yue, Hirokatsu Kataoka, Shigeo Morishima
In IEICE Technical Report (**PRMU2021**)

4. **Foreground-Aware Stylization and Consensus Pseudo-Labeling for Domain Adaptation of First-Person Hand Segmentation**
<u>Takehiko Ohkawa</u>, Takuma Yagi, Atsushi Hashimoto, Yoshitaka Ushiku, and Yoichi Sato
In Meeting on Image Recognition and Understanding (**MIRU2021**)
Long Oral, MIRU Student Encouragement Award

5. **Style Adapted DataBase: Generalizing Hand Segmentation via Semantics-aware Stylization**
<u>Takehiko Ohkawa</u>, Takuma Yagi, and Yoichi Sato
In IEICE Technical Report (**PRMU2020**)
PRMU Best Presentation Award of the Month

6. **Consistency Regularization using Data Augmentation for Cycle-Consistent GANs**
<u>Takehiko Ohkawa</u>, Naoto Inoue, Hirokatsu Kataoka, and Nakamasa Inoue
In Meeting on Image Recognition and Understanding (**MIRU2020**)

7. **Stabilizing Object-aware Representation Learning with Cyclical Annealing on KL Regularization**
Hideki Tsunashima, <u>Takehiko Ohkawa</u>, Hiroaki Aizawa, Hirokatsu Kataoka, and Shigeo Morishima
In Meeting on Image Recognition and Understanding (**MIRU2020**)

PATENT

Consensus Pseudo-Labeling Using Different Datasets, Japan (in submission)

<u>Takehiko Ohkawa</u>, Takuma Yagi, Atsushi Hashimoto, Yoshitaka Ushiku, and Yoichi Sato

AWARDS

MIRU Student Encouragement Award at MIRU2021	*July 2021*
PRMU Best Presentation Award of the Month at PRMU2020	*October 2020*

GRANTS

JSPS Research Fellowship for Young Scientists (DC1)	*April 2022 - March 2025 (expected)*
($\approx$ 100,000 USD for 3 years)	
JST ACT-X "Math and Info" (PI)	*November 2020 - March 2023 (expected)*
($\approx$ 100,000 USD for 2.5 years)	
JEES/Softbank AI Scholarship ($\approx$ 9,000 USD)	*April 2020 - March 2021*
Tokio Marine Kagami Memorial Foundation Scholarship ($\approx$ 9,000 USD)	*April 2018 - March 2020*

PROJECTS

JSPS "Skill Discovery and Transfer for Adaptive Activity Understanding" *April 2022 - March 2025 (expected)*

I will be a Research Fellow (DC1) in the program of "Research Fellowship for Young Scientists," The Japan Society for the Promotion of Science (JSPS). The acceptance rate is around 20% among Japanese Ph.D. candidates. My project aims to discover domain-common primitives representing actions and transfer the knowledge of detecting them to another activity video. This skill discover and transfer framework in action recognition will achieve better generalization to novel users' actions. I will work on domain adaption and activity recognition.

JST ACT-X "Human Behavior Understanding via Imitative AI Agents" *November 2020 - March 2023 (expected)*

I am **the youngest Principal Investigator** of the research project called "ACT-X," Japan Science and Technology Agency (JST), selected among prospective Japanese researchers (including Ph.D. students, Postdocs, Research Associates, and Assistant Professors). My project aims to extract the tacit knowledge of human hand skills and transfer it to robots so that they can perform tasks like humans. I am working on hand-object interaction analysis and behavior modeling with Prof. Kris Kitani at Carnegie Mellon University. One of our works was accepted to **IEEE Access 2021**.

***cvpaper.challenge*, AIST** *February 2019 - Present*

I serve as a student researcher in the research group of "cvpaper.challenge" under Dr. Hirokatsu Kataoka, National Institute of Advanced Industrial Science and Technology (AIST). I am working on policy learning of embodied agents in household simulation and the training stabilization of deep generative models. One of our works was accepted to **ICPR2020**.

DGM Implementation, Matsuo Lab, UTokyo *March 2020 - April 2020*

I participated in the seminar on deep generative models (DGM) in the laboratory of Prof. Yutaka Matsuo. I implemented a series of generative algorithms, such as GAN, VAE, Flow, and Energy-based models.

Toxicity Prediction, Sekijima Lab, Tokyo Tech *May 2019 - August 2019*

I worked on toxicity prediction using deep graphical models under Prof. Masakazu Sekijima. I implemented graph convolutional neural networks for analyzing the structure of chemical compounds and their toxicity.

Speech & Vision, Shinoda Lab, Tokyo Tech *February 2019 - October 2019*

I developed deep generative models for translating visual styles between image domains under Prof. Koichi Shinoda and Prof. Nakamasa Inoue. I also joined the laboratory seminar on speech recognition and computer vision.

Alpha"Othello" Zero *October 2018 - January 2019*

I conducted an advanced research project in the undergraduate lecture on "Artificial Intelligence" given by Prof. Koichi Shinoda. I implemented a lighter version of the AlphaZero algorithm for the Othello game, including monte carlo tree search and self-play reinforcement learning.

NLP Implementation, Matsuo Lab, UTokyo *August 2018 - September 2018*

I participated in the NLP seminar in the laboratory of Prof. Yutaka Matsuo. I implemented NLP algorithms using deep learning, such as Word2Vec, Seq2Seq, Attention-based machine translation, and GAN-based text generation, under the guidance of Prof. Naoaki Okazaki and Prof. Yoshimasa Tsuruoka.

NLP Implementation, Okazaki Lab, Tokyo Tech *March 2018 - August 2018*

I participated in the NLP seminar at the Okazaki laboratory. I implemented 100 fundamental algorithms of natural language processing and machine learning, such as text preprocessing, part-of-speech tagging, dependency parsing, word embedding, and deep machine translation, under the guidance of Prof. Naoaki Okazaki.

WORK EXPERIENCE

Robotics Institute, Carnegie Mellon University *September 2021 - Present*
Research Scholar
Topics: hand-object interaction understanding and domain adaptation
Advisor: Prof. Kris Kitani

Institute of Industrial Science, The University of Tokyo *December 2020 - Present*
Research Assistant
Topics: first-person vision and hand-object interaction understanding
Advisor: Prof. Yoichi Sato

OMRON SINIC X Corp. *August 2020 - August 2021*
Research Internship
Topics: domain adaptation, activity understanding, and vision-and-language
Mentors: Dr. Yoshitaka Ushiku and Dr. Atsushi Hashimoto

Neural Pocket Inc. *October 2019 - May 2020*
Research Internship
Topics: generative domain adaptation and face recognition

Department of Computer Science, Tokyo Institute of Technology *August 2019 - March 2020*
Research Assistant
Topics: large-scale media computing experiments using a series of supercomputers at TokyoTech.
Advisor: Prof. Nakamasa Inoue

teamLab Inc. *August 2019*
Engineering Internship
Topics: neural image editing and style modification
Division: interactive group and computer vision group

Cross Compass Ltd. *December 2017 - November 2018*
Research Internship
Topics: visual pattern recognition, deep generative models, and reinforcement learning.

SKILL

Programming: Python, C/C++, Java, Matlab, R, HTML, CSS, Processing
Libraries: PyTorch, OpenCV, Keras, OpenAI Gym, Stanford CoreNLP, NLTK

COURSEWORKS

Probability Theory and Statistics, Mathematical Optimization, Statistical Learning Theory, Statistical Signal Processing, Pattern Recognition, Biological Data Analysis, Image Sensing, Computer Vision, Intelligent Informatics (Image Recognition and Detection), Artificial Intelligence, Visual Media Engineering (Multi-Media Information Processing), Applied Computer Science (Human-Computer Interaction), Parallel Programming

COMMUNITY SERVICE

Volunteer at ICCV 2019, Soul, Korea *October 2020 - November 2020*
Volunteer at SingularityU Japan Summit 2017, Tokyo, Japan *September 2017*