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Takuya Kiyokawa

Curriculum Vitae

About me I am an Assistant Professor in both of Harada Lab. of Osaka University and Robot Learning Laboratory of Nara Institute of Science and Technology (NAIST). My interests are robotic technologies for quickly deployable, agile reconfigurable, and collaborative robots.

Education

**Apr. 2018 - Mar. 2021, Doctor of Engineering,
Nara Institute of Science and Technology (NAIST)**

Advisor: Prof. Tsukasa Ogasawara

**Apr. 2016 - Mar. 2018, Master of Engineering,
Nara Institute of Science and Technology (NAIST)**

Advisor: Prof. Tsukasa Ogasawara

**Apr. 2014 - Mar. 2016, Bachelor of Engineering,
National Institute of Technology, Kumamoto College (NIT,K)**

Advisor: Prof. Hirohumi Ohtsuka

Educational and social activities

Lecturer, Mentor, and Consultant

May 2022 - present, Mentor and consultant, NAIST

"The 2nd Mid-sized Enterprise DX Acceleration Program" with DELL Technologies

Apr. 2021 - Jul. 2021, Lecturer, Osaka University

"A Door to Academia (Intelligent Robotic System)" for undergraduate students

Oct. 2017 - Jan. 2018, 3D-Printer Manager, NAIST

3D-printing assistant

Feb. 2017, NAIST Spring Seminar Lecturer

Theme: "Motion generation of robot picking based on object recognition"

July 2016, Lecturer, SSH (Super Science High school)

Theme: "Ball throwing robot arm"

Research Assistant

Apr. 2018 - Mar. 2019, Research Assistant, NAIST

Research: "Robot motion generation by multimodal teaching"

Teaching Assistant

Apr. 2017 - Aug. 2017, Advanced Robot Development I

NAIST IT3 Robot Technology Problem-Based-Learning

Apr. 2017 - Aug. 2017, Global Entrepreneur I, II, III, IV

NAIST Global Entrepreneurs in Internet-Of-Things (GEIOT)

Apr. 2017 - Aug. 2017, Prototyping Foundation A, B, C, D

NAIST GEIOT

Professional societies

Members

- IEEE
- RSJ
- SICE
- JSME
- JSAI

Committee

- 2022 JSME Robotics Mechatronics, Management Committee

Activities in academic societies

Peer review

- IEEE/SICE SII (20)
- IEEE ICRA (21, 22)
- IEEE RO-MAN (21)
- SICE (21)
- RSJ Advanced Robotics (21)
- IEEE ACCESS (21)
- RSJ JRSJ (21)
- IEEE RA-L (21, 22)
- MDPI Sensors (21)
- IEEE IROS (22)

Conference session chair

- IEEE CASE2021 (WeAT10, Deep Learning in Robotics and Automation)
- RSJ2021 (1G3, Robot hand/Gripper)
- RSJ2021 (2F4, Manipulation)

Professional experiences

Apr. 2021 - present, Specially-Appointed Assistant Professor, Harada Lab., Osaka University

Supervisor: Prof. Kensuke Harada

Apr. 2022 - present, Specially-Appointed Assistant Professor, Robot Learning Laboratory, Nara Institute of Science and Technology (NAIST)

Advisor: Prof. Matsubara

Apr. 2021 - Mar. 2022, Specially-Appointed Assistant Professor, Human Robotics Laboratory, Nara Institute of Science and Technology (NAIST)

Supervisor: Prof. Takahiro Wada and Prof. Jun Takamatsu

Jan. 2020 - Mar. 2021, Technical assistant - NEDO

Advanced Resource Circulation for Recyclable Aluminum/Plastic Materials

Oct. 2019 - June 2020, Research intern -

Microsoft Development Applied Robotics Research Team

Research in robotics and computer vision

Advisor: Dr. Katsushi Ikeuchi

June 2019 - Mar. 2020, Member - NAIST Creative and International Competitiveness Project (CICP 2019)

Project member: Naoki Shirakura, Takuya Kiyokawa, and Hikaru Kumamoto
Automation of Collecting Marine Debris Using an Underwater Robot

June 2019 - Mar. 2020, Member - NAIST CICP 2019

Project member: Hiroki Katayama and Takuya Kiyokawa

Robot Audition-Based Grasping System Under Varied Illumination

Mar. 2019 - June 2019, Research intern - Microsoft Research

Research in robotics and computer vision

Advisor: Dr. Katsushi Ikeuchi

June 2018 - Mar. 2019, Creater - IPA Mitou project 2018

Project member: Takuya Kiyokawa and Keita Tomochika

Developing a framework for quickly deploying image recognition AI

June 2018 - Mar. 2019, Leader - NAIST CICP 2018

Project member: Takuya Kiyokawa, Tatsuya Sakuma, Pedro Miguel Uriguen Eljuri, Shori Kinoshita, Yuto Tsuchiya, and Kento Tariki

CAD-Based and Domain Adaptive Robotic Assembly System

Apr. 2016 - Mar. 2019, Collaborative researcher - NIT,K

Collaborative research on throwing motion analysis for baseball

Sept. 2018 - Dec. 2018, Research intern - Microsoft Research Asia

Research in computer vision

Advisor: Dr. Wenjun Zeng

June 2017 - Mar. 2018, Member - NAIST CICP 2017

Project member: Keita Tomochika and Takuya Kiyokawa

Development of an automatic annotation tool for object detection

Apr. 2016 - Mar. 2018, Technical assistant - ATOUN Inc.

Development of a power assist robot for lift-up motion

Aug. 2016 - Sept. 2016, System engineering intern - YASKAWA Electric Corporation

Training on simulation and deployment of industrial robotic system

Sept. 2015, Visiting student - Ngee Ann Polytechnic

2-weeks' lecture of training on implementation of digital signal processing

Aug. 2014 - Sept. 2014, Software development intern - Tokyo Electron Kyusyu Limited

Software development of semiconductor manufacturing equipment

Sept. 2012, Exchange student - Temasek Polytechnic

Student exchange program for 2-weeks

Skills

Languages

- Japanese (native)
- English (TOEIC score 880, 2019)

OS

- Windows
- Unix/Linux

Programming

- C/C++/C#
- Python2/3
- MATLAB/Simulink

Robotic Device

- KUKA LBR iiwa 14 R820
- Universal Robots UR3e/5e
- KAWADA Robotics HIRO-NX
- Robotiq 2F-85, 2F-140, Hand-E
- YASKAWA MOTOMAN SDA5F
- DENSO COBOTTA
- UFACTORY uArm Swift Pro
- OnRobot RG2/6, VG10, VGC10

Vision Sensors

- Intel RealSense D400-series
- Stereolabs ZED2
- Microsoft Azure Kinect
- ASUS Xtion2

Software and Hardware

- Programming for robotics (ROS, Keras, Pytorch, etc.)
- 3D CAD and 3D printing (Fusion 360, SolidWorks, etc.)
- Motion capture system (Optitrack Motive, DKH Frame-DIAS, etc.)
- Embedded system (Raspberry Pi, Arduino, Android, etc.)

Publications

Journals

1. Enrique Coronado, Takuya Kiyokawa Gustavo A. Garcia Ricardez, Ixchel G. Ramirez-Alpizar, Gentiane Venture and Natsuki Yamanobe: **“Evaluating quality in Human-Robot Interaction: a Systematic Search and Classification of Performance and Human-Centered Factors, Measures and Metrics Towards an Industry 5.0,”** *Journal of Manufacturing Systems*, vol. 63, pp. 392-410, 2022. (Impact Factor: 8.633)
2. Hao Chen, Takuya Kiyokawa, Weiwei Wan and Kensuke Harada: **“Category-Association Based Similarity Matching for Novel Object Pick-and-Place Task,”** *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 2961-2968, 2022. (Impact Factor: 3.741, will be presented at ICRA2022)
3. Takuya Kiyokawa, Hiroki Katayama, Yuya Tatsuta, Jun Takamatsu and Tsukasa Ogasawara, **“Robotic Waste Sorter with Agile Manipulation and Quickly Trainable Detector,”** *IEEE ACCESS*, vol. 9, pp. 124616-124631, 2021. (Impact Factor: 3.745)
4. Naoki Shirakura, Takuya Kiyokawa, Hikaru Kumamoto, Jun Takamatsu and Tsukasa Ogasawara, **“Collection of Marine Debris by Jointly Using UAV-UUV with GUI for Simple Operation,”** *IEEE ACCESS*, vol. 9, pp. 67432-67443, 2021. (Impact Factor: 3.745)
5. Kento Tariki, Takuya Kiyokawa, Tomoki Nagatani, Jun Takamatsu and Tsukasa Ogasawara, **“Generating Complex Assembly Sequences from 3D CAD Models Considering Insertion Relations,”** *Advanced Robotics*, vol. 35, no. 6, pp. 337-348, 2021. (Impact Factor: 1.247)
6. Takuya Kiyokawa, Keita Tomochika, Jun Takamatsu and Tsukasa Ogasawara, **“Efficient Collection and Automatic Annotation of Real-world Object Images by Taking Advantage of Post-diminished Multiple Visual Markers,”** *Advanced Robotics*, vol. 33, no. 24, pp. 1264-1280, 2019. (Impact Factor: 1.247)
7. Yuto Tsuchiya, Takuya Kiyokawa, Gustavo Alfonso Garcia Ricardez, Jun Takamatsu and Tsukasa Ogasawara, **“Pouring from Deformable Containers Using Dual-Arm Manipulation and Tactile Sensing,”** *International Journal of Robotic Computing (IJRC)*, vol. 1, no. 2, pp. 123-143, 2019. (presented at IRC2019)
8. Takuya Kiyokawa, Keita Tomochika, Jun Takamatsu and Tsukasa Ogasawara, **“Fully Automated Annotation with Noise-Masked Visual Markers for Deep-Learning-Based Object Detection,”** *IEEE Robotics and Automation Letters (RA-L)*, vol. 4, no. 2, pp. 1972-1977, 2019. (Impact Factor: 3.741, presented at ICRA2019)

International conferences

1. Tatsuya Sakuma, Takuya Kiyokawa, Jun Takamatsu, Takahiro Wada and Tsukasa Ogasawara: “**Soft-Jig: A Flexible Sensing Jig for Simultaneously Fixing and Estimating Orientation of Assembly Parts**,” in *IEEE Int. Conf. on Robotics and Automation (ICRA2022)*, pp. 10945-10950, May, 2022.
2. Hao Chen, Takuya Kiyokawa, Weiwei Wan and Kensuke Harada: “**Category-Association Based Similarity Matching for Novel Object Pick-and-Place Task**,” in *IEEE Int. Conf. on Robotics and Automation (ICRA2022)*, Philadelphia (PA), USA, May, 2022 (**IEEE RAS Japan Joint Chapter Young Award**).
3. Takuya Kiyokawa, Hiroki Katayama, Jun Takamatsu, Shigeki Koyanaka and Tsukasa Ogasawara: “**Robotic Image Dataset Collection System Accomplished by Domain Adaptation for Robotic Waste Sorter**,” in *IEEE Int. Conf. on Automation Science and Engineering (CASE2021)*, Online, August, 2021 (industry paper).
4. Takuya Kiyokawa, Tatsuya Sakuma, Jun Takamatsu and Tsukasa Ogasawara: “**Soft-Jig-Driven Assembly Operations**,” in *IEEE Int. Conf. on Robotics and Automation (ICRA2021)*, pp. 3466-3472, Online, June, 2021 (**IEEE RAS Japan Joint Chapter Young Award**).
5. Takuya Kiyokawa, Jun Takamatsu and Tsukasa Ogasawara: “**Assembly Sequences Based on Multiple Criteria Against Products with Deformable Parts**,” in *IEEE Int. Conf. on Robotics and Automation (ICRA2021)*, pp. 975-981, Online, June, 2021.
6. Naoki Wake, Riku Arakawa, Iori Yanokura, Takuya Kiyokawa, Kazuhiro Sasabuchi, Jun Takamatsu and Katsushi Ikeuchi: “**A Learning-from-Observation Framework: One-Shot Robot Teaching for Grasp-Manipulation-Release Household Operations**,” in *IEEE/SICE Int. Symp. on System Integration (SII2021)*, TuC2.2, Online, January, 2021.
7. Hiroki Katayama, Takuya Kiyokawa, Jun Takamatsu and Tsukasa Ogasawara: “**Azimuth Angle Estimation Based on Sound Wave Reflection for Mirrors and Transparent Objects**,” in *IEEE/SICE Int. Symp. on System Integration (SII2021)*, WeC3.1, Online, January, 2021.
8. Naoki Shirakura, Takuya Kiyokawa, Hikaru Kumamoto, Jun Takamatsu and Tsukasa Ogasawara: “**Semi-automatic Collection of Marine Debris by Collaborating UAV and UUV**,” in *IEEE Int. Conf. on Robotic Computing (IRC2020)*, pp. 412-413, Online, November, 2020.
9. Kento Tariki, Takuya Kiyokawa, Gustavo Alfonso Garcia Ricardez, Jun Takamatsu and Tsukasa Ogasawara: “**3D Model-Based Assembly Sequence Optimization Using Insertionable Properties of Parts**,” in *IEEE/SICE Int. Symp. on System Integration (SII2020)*, We2E.6, Honolulu, Hawaii, USA, January, 2020.

10. Kento Tariki, Takuya Kiyokawa, Tomoki Nagatani, Jun Takamatsu and Tsukasa Ogasawara: **“3D Model-Based Non-interference Assembly Sequence Generation for Products with a Large Number of Parts,”** in *IEEE Int. Conf. on Cybernetics and Intelligent Systems and IEEE Int. Conf. on Robotics, Automation and Mechatronics (CIS-RAM2019)*, MoB3.63, Bangkok, Thailand, November, 2019.
11. Takuya Kiyokawa, Keita Tomochika, Jun Takamatsu and Tsukasa Ogasawara: **“Fully Automated Annotation with Noise-Masked Visual Markers for Deep-Learning-Based Object Detection,”** in *IEEE Int. Conf. on Robotics and Automation (ICRA2019)*, TuAT1.6, Montreal, Canada, May, 2019.
12. Yuto Tsuchiya, Takuya Kiyokawa, Gustavo Alfonso Garcia Ricardez, Jun Takamatsu and Tsukasa Ogasawara: **“Pouring from Deformable Containers Using Dual-Arm Manipulation and Tactile Sensing,”** in *IEEE Int. Conf. on Robotic Computing (IRC2019)*, pp. 357-362, Naples, Italy, February, 2019.
13. Takuya Kiyokawa, Ming Ding, Gustavo Alfonso Garcia Ricardez, Jun Takamatsu and Tsukasa Ogasawara: **“Generation of a Tactile-Based Pouring Motion Using Fingertip Force Sensors,”** in *IEEE/SICE Int. Symp. on System Integration (SII2019)*, Tu2D.3, Paris, France, January, 2019.
14. Takuya Kiyokawa, Kosei Nojiri, Hirohumi Ohtsuka and Youji Okayama, **“Estimation of Kinematics Parameters dependent on Pronation Supination for Modeling Forearm Skeletal System Based on CT Images,”** in *IEEE/SICE Int. Symp. on System Integration (SII2015)*, ThAT6.3, Nagoya, Japan, December, 2015.
15. Kosei Nojiri, Takuya Kiyokawa and Yoji Okayama, **“Forearm Skeleton Modeling for Pro-/supination Movement Using CT Image Measurement,”** in *IEEE/ASME Int. Conf. on Advanced Intelligent Mechatronics (AIM2015)*, SaD2.7, Busan, Korea, July, 2015.

Patents

1. Keita Tomochika, Takuya Kiyokawa, Tsukasa Ogasawara, Jun Takamatsu and Ming Ding, “**LEARNING DATASET CREATION METHOD AND DEVICE,**” PCT application, International publication, WO 2019/189661 A1 (2019), US patent, US 11,276,194 (2022).
2. Keita Tomochika, Takuya Kiyokawa, Tsukasa Ogasawara, Jun Takamatsu and Ming Ding, “**Creation Method of Training Data Set, Object Recognition and Pose Estimation Method,**” Japanese Patent No. 6474179, 2017.

Grants and Research Projects

Apr. 2021 - present, New Energy and Industrial Technology Development Organization (NEDO), Project P20012, Subcontracted from AIST, Principal investigator

Research member: Takuya Kiyokawa and Jun Takamatsu “**Innovative plastic resource recycling process technology development**”

Apr. 2021 - Mar. 2022, Research Grant from Foundation for NAIST

Research member: Takuya Kiyokawa, Jun Takamatsu and Kensuke Harada “**Agile Reconfigurable Robotic Assembly System**”

June 2019 - Mar. 2020, NAIST CICIP 2019

Project member: Naoki Shirakura, Takuya Kiyokawa, and Hikaru Kumamoto “**Automation of Collecting Marine Debris Using an Underwater Robot**”

June 2019 - Mar. 2020, NAIST CICIP 2019

Project member: Hiroki Katayama and Takuya Kiyokawa “**Robot Audition-Based Grasping System Under Varied Illumination**”

Apr. 2019, The NEC C&C Foundation, Grants for Researchers Attending International Conferences

For participation at **IEEE International Conference on Robotics and Automation 2019 (ICRA2019)**

June 2018 - Mar. 2019, NAIST CICIP 2018

Project member: Takuya Kiyokawa, Tatsuya Sakuma, Pedro Miguel Uriguen Eljuri, Shori Kinoshita, Yuto Tsuchiya, and Kento Tariki “**CAD-Based and Domain Adaptive Robotic Assembly System**”

June 2017 - Mar. 2018, NAIST CICIP 2017

Project member: Keita Tomochika and Takuya Kiyokawa “**Automatic Annotation of Training Data for Robot Picking System**”

Honors and Awards

May 2022, IEEE RAS Japan Joint Chapter Young Award, ICRA2022

Chen Hao (student advisee), Takuya Kiyokawa, Weiwei Wan and Kensuke Harada, “**Category-Association Based Similarity Matching for Novel Object Pick-and-Place Task**”

Mar. 2022, Telecommunication System Technology Student Award

Takuya Kiyokawa, Keita Tomochika, Jun Takamatsu and Tsukasa Ogasawara, “**Fully Automated Annotation With Noise-Masked Visual Markers for Deep-Learning-Based Object Detection,**” IEEE, Robotics and Automation Letters, April, 2019.

Sept. 2021, International Session Best Presentation Award Finalist, RSJ2021

Chen Hao, Takuya Kiyokawa, Weiwei Wan and Kensuke Harada, “**Vision-Based Novel Object Grasping based on Object-Semantics Matching with Grasp Database**”

July 2021, Repayment Exemption for Students with Excellent Grades

Japan Student Services Organization (JASSO) Type 1 scholarship, Total exemption

June 2021, IEEE RAS Japan Joint Chapter Young Award, ICRA2021

Takuya Kiyokawa, Tatsuya Sakuma, Jun Takamatsu and Tsukasa Ogasawara, “**Soft-Jig-Driven Assembly Operations**”

Nov. 2019, Special Award, Technical Academy Research Presentation in IIFES 2019

Takuya Kiyokawa, Jun Takamatsu and Tsukasa Ogasawara, “**A Technology to Quickly Collect Dataset Using a Robot for Object Detection AI**”

May 2019, Certified as Super Creator by IPA and METI of Japan, MITOU program 2018

Takuya Kiyokawa and Keita Tomochika, “**A Framework for Quickly Deploying Image Recognition AI**”

There are only 327 super creators in Japan from 2000 to 2019

Feb. 2019, Excellent Research Project Award, NAIST CICP 2018

Takuya Kiyokawa, Tatsuya Sakuma, Pedro Miguel Uriguen Eljuri, Shori Kinoshita, Yuto Tsuchiya and Kento Tariki, “**CAD-Based and Domain Adaptive Robotic Assembly System**”

July 2018, Repayment Exemption for Students with Excellent Grades

Japan Student Services Organization (JASSO) Type 1 scholarship, Half exemption

International Exhibitions and Workshops

June 2021, IEEE RAS Rehabilitation and Assistive Technologies based on Soft Robotics (SofTech-Rehab)

Participat selected based on the evaluation of their Curriculum Vitae and a motivational letter

Jan. 2020, Consumer Electronics Show (LAS VEGAS, US)

“Make AI Smarter, Quickly Sort Items” (poster and demonstration)

Dec. 2019, Workshop for CICIP 2019 (Nara)

“Robot Audition-Based Grasping System Under Varied Illumination” (poster and demonstration)

Dec. 2017, Workshop for CICIP 2017 (Nara)

“Automatic Annotation of Training Data for Robot Picking System” (poster and demonstration)

Articles

Dec. 2021, TechExplore, “A soft jig that could enhance the performance of general-purpose assembly robots”

<https://techxplore.com/news/2021-12-soft-jig-general-purpose-robots.html>