Kandai Watanabe

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Portfolio: https://watakandai.github.io/

EDUCATION

University of Colorado Boulder **Boulder, CO**
1st-year Ph.D. in Computer Science Aug 2019 - Present

Keio University **Tokyo, Japan**
Master of Engineering | Concentration in Robotics & Aerospace Eng. April 2017 - March 2019

- **GPA**: 3.73/4.0

University of Illinois at Urbana-Champaign **Champaign, IL**
Aerospace Engineering Program | Concentration in Aerospace Eng. & Computer Science Aug 2015 - May 2016

- **GPA**: 3.67/4.0 for CS

RESEARCH EXPERIENCE

Human Interaction and Robotics (HIRO) Group, University of Colorado Boulder **Boulder, CO**
Research Assistant Aug 2019 - Present

- Enhancing "Task Learning" by stacking Deep RL as a hierarchical system to learn atomic actions in the lower controller and learn task planning in the higher controller to achieve a long-term complex task (e.g. cooking)
- Manufacturing a flexible whole-body artificial skin (IMU+Proximity) for a manipulator (Python, C++, EAGLE)
- Derived a calibration algorithm to locate each sensor unit by forming it as a global optimization problem, which outperforms the previous method by 10 times in the estimation accuracy.
- Deriving a safety-guaranteed motion planning of a manipulator with the flexible skin for human-robot interaction

RESEARCH EXPERIENCE

Takahashi Laboratory, Keio University **Tokyo, Japan**
Research Assistant June 2016 - March 2019

- Derived an easy-to-teach motion learning algorithm for robotic arm which can learn an action in a small number of iterations (e.g. Throwing a dart: 30 iterations in average) leveraging the power of Bayesian Optimization
- Developed an object recognition (YOLO-v3) for a harvest robot for Prof. Jan Peters (TU Darmstadt) research
- Proposed a drone controller that suppresses movement that induces "Virtual Reality sickness" and presented at AIAA SciTech Conference 2019 and published in Journal of Intelligent & Robotic Systems.
- Implemented an entire system by myself that maps a drone's camera input to Oculus Rift and user's motion to drone's controller input via ROS
- Analyzed a post-experiment questionnaire measuring and quantifying customer's "virtual reality sickness" results to address the scientific needs.

RELEVANT PROJECT EXPERIENCE

Team Wolve'Z CanSat Project **Tokyo, Japan**
Software Development Manager (https://github.com/kandai-wata/cansat2017) March 2017 - Sep 2017

- Awarded 1st Place for Mission Competition at Worldwide CanSat Competition 2017 among 20 teams
- Managed and educated a team of 5, developing all-automated two-wheel rover software in C++ using Arduino
- Implemented a sensor driver, calibration algorithms, Attitude Estimate Decision Making, and Sequence algorithm.

EXTRACURRICULAR EXPERIENCE

PKSHA Technology Inc. **Tokyo, Japan**
Machine Learning Intern March 2019 - Present

- Developed a model to predict nonlinear pedestrian motion for 0.5s in the future with accuracy of about 80% using PCA + Random Forest.

SKILLS & INTERESTS

Languages: Japanese (*Native*), English (*Business*: TOEFL iBT 109), German (*Conversational*)
Skills: ROS, Gazebo, MoveIt, Linux, Windows Server, Digital Signal Processing, Raspberry Pi, EAGLE
Programming Languages: C++, C, Python, C#, Ruby, MATLAB, LabVIEW, JavaScript, HTTP
Interests: Avid Traveler (Visited 30+ countries), Competitive Soccer Player, Modern Gadgets

AWARDS & ACTIVITIES

1st Place at CanSat (Can-sized Satellite) Competition 2017 March 2017 - Sep 2017
JASSO (Japan Student Services Organization) Overseas Graduate Fellowship ($40,000/year for 3 years) July 2019
Keio University Global Fellowship ($50,000/year for 2 years) December 2018

PUBLICATIONS

- **K. Watanabe**, M. Takahashi, "Head-synced Drone Control for Reducing Virtual Reality Sickness", Journal of Intelligent & Robotic Systems (2019): 1-12.
- **K. Watanabe**, M. Takahashi, "Control System Design of a Quadrotor Suppressing the Virtual Reality Sickness." The 2018 AIAA Science and Technology Forum and Exposition (AIAA SciTech 2018), Gaylord Palms, Kissimee, Florida, USA

Teaching

Keio University **Tokyo, Japan**

Teaching Assistant Sep 2017 – March 2019

- Taught and advised C++ to 160 sophomore college students as part of a course curriculum for consecutive years