Jeremy Dasa Ariel Siburian

+81-70-8965-4314 jeremysiburian30@gmail.com LinkedIn GitHub Personal Page

Education

Waseda University 2020 - 2024 (Expected)

Bachelor of Engineering in Mechanical Engineering *Tokyo, Japan*

- Minor in Computer Science and Engineering
- **Research Seminar:** Intelligent Robotics at Sugano Laboratory
- **Research Supervisors:** Prof. Shigeki Sugano & Dr. Alexander Schmitz
- **Thesis Title:** "Comparative Study On Robotic Slip Detection Algorithms Using Distributed 3-Axis Tactile Sensing"

Internship Experience

OMRON SINIC X October 2023 – March 2024

Robotics Research Intern *Tokyo, Japan*

- **Supervisor(s):** Dr. Masashi Hamaya & Dr. Cristian C. Beltran-Hernandez
- Designed and developed an integrated task and motion planning framework for executing real-world cooking tasks using a dual-arm robotic system.
- Integrated the PDDLStream library with MoveIt Task Constructor multi-stage manipulation planner to enhance multi-step motion planning for interdependent tasks.
- Formulated PDDL-based predicates and action templates based on our proposed dual-arm slicing strategy and implemented policies to handle uncertainty in a dynamic environment, such as perception-based replanning.
- Demonstrated the proposed framework in simulation and real robot experiments through a case study of a cucumber slicing task. Augmented our framework with various cooking-related skills, such as object fixturing, force-based tip detection, and slicing using Reinforcement Learning (RL).
- Preliminary results of the proposed framework were accepted as a contribution (paper and demo video) and will be presented as a poster in the Cooking Robotics Workshop at ICRA 2024.
- ***Relevant skills:*** Python, PDDL/PDDLStream, MoveIt, ROS, Git Tools (GitHub, GitLab, GitKraken), Docker, LaTeX

DAIMLER TRUCKS ASIA April – September 2023

Plant Automation Intern *Kanagawa, Japan*

- **Supervisor(s):** Mr. Li-Chieh Richard Chen
- Proposed and developed a novel bin-picking system using vision and 3D tactile sensors with an approved R&D budget of 1.5 million yen (Approx. $10k USD).
- Developed custom Python algorithms for performing adaptive grasping and slip detection from tactile sensor data.
- Developed custom Python-based middleware for external communication between TM5-900 collaborative robot, 2F-85 Robotiq gripper, and 3D tactile sensors using socket communication protocol.
- Received official industrial robot operator training & certification from Omron Automation, covering the required safety standards, legal regulations, and general knowledge related to industrial robots in Japan.
- ***Relevant skills:*** Python, tactile sensors (uSkin), TM Robots (TMFlow), Git Tools (GitHub)

Publications

Integrated Task and Motion Planning for Real-World Cooking Tasks | *Paper Link*

- **J. Siburian**, C. C. Beltran-Hernandez, and M. Hamaya, "Integrated Task and Motion Planning for Real-World Cooking Tasks," in *ICRA2024 Workshop on Cooking Robotics: Perception and Motion Planning*, 2024.

Technical Projects

Presentation Quality Assessment Based On Audience Reactions using Neural Networks | *Paper Link*

- Developed a novel presentation scoring algorithm based on the level of audience engagements using machine learning (ML) and neural networks.
- Performed video pre-processing, face annotation, and data labeling on a dataset of classroom presentations using OpenCV and MTCNN face detection.
- Utilized 3 different ML models (2D CNN, ResNet50, 3D CNN) to extract spatio-temporal features and perform image classification to measure the level of audience engagement.

- Results and cross-comparison showed that a 2D CNN model resulted in a best accuracy of 85%.

"Cool-Tatsu" with Peltier Cooling Prototype | *Project Link*

- Designed and constructed the "Cool-Tatsu", a cooling table using a Peltier device, inspired from the design of the Japanese kotatsu in order to provide cost-friendly options for heatwaves in traditionally cold locations.
- A working prototype was built, and testing results showed a successful temperature drop of 4.7 degrees Celsius in the span of 5 minutes with an efficient energy use of 0.034 kWh.

Wearable Technology for the Visually Impaired Prototype | *Project Link*

- Designed and constructed a wearable technology for the visually impaired to improve obstacle detection and navigation with two available alert modes (vibration and buzzer mode).
- Prototype was constructed using Arduino Pro Mini and ultrasonic distance sensor.

Technical Skills

Programming Languages: Python, C/C++, Java, PDDL
Developer Tools/APIs: Git Tools (GitHub, GitKraken, GitLab), Docker, VS Code, PyCharm
Robotics Software/Frameworks: ROS, MoveIt, PDDLStream, PyBullet
Frameworks/Libraries: Numpy, Matplotlib, Scikit-learn, OpenCV, TensorFlow, Keras
Engineering Tools: MATLAB, KiCAD, TinkerCAD, AutoCAD
Robots: UR5e (Universal Robots), TM5-900 (Techman Robot)
Technologies/Others: Linux, Windows, Mac OSX, Arduino, Office, LaTeX

Professional Training & Certification

Industrial Robot Operator Training & Certification June 2023
Omron Automation *Tokyo, Japan*

- Received official industrial robot operator training and certification from Omron Automation, covering the required safety standards, legal regulations, and general knowledge related to industrial robots in Japan.
- Participated in a hands-on programming seminar for the TM series collaborative robots, including how to perform vision-based pick-and-place operations using TMflow software.

Extracurricular Activities

GOOGLE DEVELOPERS STUDENT CLUB (GDSC) WASEDA UNIVERSITY October 2022 - September 2023
Outreach Lead *Tokyo, Japan*

- GDSC Waseda is Waseda University's chapter of Google Developer Student Club supported by Google Developers.
- Contacted various organizations and invited Google Developer Experts (GDEs) for speaker sessions.
- Organized the Mini Solution Challenge, GDSC Waseda's annual offline event which featured projects done by the GDSC Waseda members who participated in the Google Solution Challenge 2023 and a networking session between participants. The 2023 event was held at Google Japan Office Shibuya with over 50+ participants.