

RESEARCH INTERESTS

To develop machine intelligence by imitating human learning, inspired by how the human mind develops through interactions, and in turn understand human learning by investigating intelligent systems.

Fields and topics of interest include:

- Artificial Intelligence, Deep Learning, Cognitive Robotics, Reinforcement Learning
- Continual/Active/Online/Self-supervised Learning, Intrinsic Motivation, Machine Teaching
- Learning Theory, Human Information Process Model, Theory of Mind

EDUCATION

Seoul National University

Seoul, KR

M.S. in Computer Science, GPA: 4.25/4.3

Mar. 2019 - Feb. 2021

Advisor: Byoung-Tak Zhang

Thesis: “Continual Active Robot Learning using Self-organizing Neural Network”

Seoul National University

Seoul, KR

B.S. in Computer Science, GPA: 3.78/4.3 (*Cum Laude*)

Mar. 2012 - Feb. 2019

Combined Minor in Brain-Mind-Behavior

Thesis: “Human Recognition and Tracking for Mobile Robots using Visual Feature-based Human Re-identification”

PUBLICATIONS

INTERNATIONAL CONFERENCES & WORKSHOPS

- [6] Taehyeong Kim, **Injune Hwang**, Hyundo Lee, Hyunseo Kim, Won-Seok Choi, Joseph Lim, Byoung-Tak Zhang, “Message Passing Adaptive Resonance Theory for Online Active Semi-supervised Learning”, *Thirty-eighth International Conference on Machine Learning (ICML 2021)*, Virtual, 2021.
- [5] Won-Seok Choi, **Injune Hwang**, and Byoung-Tak Zhang, “ARLET: Adaptive Representation Learning with End-to-end Training”, *NeurIPS 2020 Workshop on BabyMind*, Virtual, 2020.
- [4] Taehyeong Kim, **Injune Hwang**, Gi-Cheon Kang, Won-Seok Choi, Hyunseo Kim, and Byoung-Tak Zhang, “Label Propagation Adaptive Resonance Theory for Semi-supervised Continuous Learning”, *45th International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2020)*, Virtual, 2020.
- [3] Chung-Yeon Lee, Hyundo Lee, **Injune Hwang**, and Byoung-Tak Zhang, “Visual Perception Framework for an Intelligent Mobile Robot”, *17th International Conference on Ubiquitous Robots (UR 2020)*, Virtual, 2020.
- [2] Chung-Yeon Lee, Hyundo Lee, **Injune Hwang**, and Byoung-Tak Zhang, “Spatial Perception by Object-Aware Visual Scene Representation”, *2nd Workshop on Deep Learning for Visual SLAM, at the IEEE International Conference on Computer Vision (ICCV) 2019*, Seoul, South Korea, 2019.
- [1] Kyung-Wha Park, Jin-Young Choi, Beom-Jin Lee, Chung-Yeon Lee, **Injune Hwang**, and Byoung-Tak Zhang, “VLAS: A Vision-Language-Action Integrated System for Mobile Social Service Robots”, *Federated AI for Robotics Workshop (FAIR) 2018, at the 27th International Joint Conference on Artificial Intelligence (IJCAI 2018)*, Stockholm, Sweden, 2018.

DOMESTIC CONFERENCES

- [4] **Injune Hwang**, and Byoung-Tak Zhang, “Machine Teaching for Online Active Semi-supervised Learning Models”, *Korea Computer Congress 2020 (KCC 2020)*, Virtual, 2020.
- [3] JeHwan Ryu, Taehyeong Kim, **Injune Hwang**, and Byoung-Tak Zhang, “Agile Adaptation to Stochastic Environment based on Observation-Prediction Error”, *Korea Software Congress 2019 (KSC 2019)*, Pyeongchang, South Korea, 2019.
- [2] Hyundo Lee, Chung-Yeon Lee, **Injune Hwang**, and Byoung-Tak Zhang, “Object-Aware Feature Augmentation for Robust Visual SLAM of Mobile Robots”, *Korea Software Congress 2018 (KSC 2018)*, Pyeongchang, South Korea, 2018 (*Excellent Undergraduate Paper Award*).
- [1] **Injune Hwang**, Chung-Yeon Lee, Hyundo Lee, and Byoung-Tak Zhang, “Human Recognition and Tracking on Mobile Robot using Visual Feature-based Person Re-identification Model”, *Korea Software Congress 2018 (KSC 2018)*, Pyeongchang, South Korea, 2018 (*Excellent Undergraduate Paper Award*).

PATENTS

APPLICATIONS

- [2] Byoung-Tak Zhang, Chung-Yeon Lee, Hyundo Lee, and **Injune Hwang**, “Method and Apparatus for Enhancing Image Feature Point in Visual SLAM by using Object Label”, PCT App. PCT/KR2019/016641, 2019.
- [1] Byoung-Tak Zhang, Chung-Yeon Lee, Hyundo Lee, and **Injune Hwang**, “Method and Apparatus of Visual Feature Augmentation for Visual SLAM using Object Labels”, Korean Patent App. 10-2019-0039736, 2019.

EXPERIENCE

LG Electronics, AI Laboratory

Research Intern (Advisor: Joseph Lim)

Seoul, KR

May 2021 - Nov. 2021

- Member of Self-Learning Task

Research on efficient domain adaptation methods for RL algorithms

Seoul National University, Biointelligence Laboratory

Graduate Researcher (Advisor: Byoung-Tak Zhang)

Seoul, KR

Mar. 2019 - Feb. 2021

- BabyMind project student co-leader

Developed self-organizing model for robot learning with Softbank Robotics NAO

Seoul National University, Biointelligence Laboratory

Undergraduate Research Intern (Advisor: Byoung-Tak Zhang)

Seoul, KR

Jan. 2018 - Feb. 2019

- RoboCup@Home main developer in team ‘Aupair’

Developed AI modules for Softbank Robotics Pepper (in Python & ROS)

- World Robot Challenge secondary developer in team ‘Tidyboy’

Developed AI modules for Toyota HSR (in Lua & ROS)

INCA Internet

Software Developer (as a substitute for compulsory military service)

Seoul, KR

Sep. 2015 - Nov. 2017

- Keyboard stroke protection software (nProtect) developer

Maintained security software using end-to-end key stroke encryption

TEACHING

• **Teaching Assistant**

Seoul National University

Spring 2019

- Introduction to Artificial Intelligence (L0444.000300, in Korean)

Roles: Practice session lecturer, exam grader, term project manager

SCHOLARSHIPS AND AWARDS

- **Merit-based scholarship (20%)** 2020
Seoul National University
- **Excellent Undergraduate Paper Award**, Korea Software Congress (KSC) 2018 2018
The Korean Institute of Information Scientists and Engineers
- **4th place**, World Robot Challenge 2018 - Service Robotics Category, Partner Robot Challenge (Real Space) 2018
World Robot Summit
- **4th place**, RoboCup@Home 2018 - Social Standard Platform League 2018
RoboCup Federation
- **National Scholarship For Science and Engineering** 2014 - 2015, 2018
Korea Student Aid Foundation
Full tuition support for 4 semesters (discontinuation due to military service)

EXTRACURRICULAR ACTIVITIES

- Member of Computer Security Research Club ‘Guardian’, Seoul National University 2012–2015
Executable binary program analyst, Club president (2014)
 - Discovering vulnerabilities in Linux & Windows binary programs both statically and dynamically
 - Participated in hacking competitions (DEF CON 21 *Finalist*, 2014 Korea WhiteHat Contest *Finalist*)

REFERENCES

- **Byoung-Tak Zhang**
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Seoul National University
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- **Joseph J. Lim**
Assistant Professor Department of Computer Science
University of Southern California
limjj@usc.edu