Seunggeun **CHI**

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Research Interests

My research interests lie in **Machine Learning** and its applications to real-world problems. **Representation Learning** in **Computer Vision** problems is my primary study. My research also spans over **Combinatorial Optimization** problems which aim to extract rules by applying **Reinforcement Learning**.

Education

Purdue University
West Lafayette, U.S.

PH.D. STUDENT IN ELECTRICAL AND COMPUTER ENGINEERING — *Aug. 2021 - current*

- *C-Design Lab*, Advisor : Karthik Ramani

Seoul National University
Seoul, S.Korea

M.S. IN COMPUTER SCIENCE AND ENGINEERING — *Mar. 2019 - Aug. 2021*

- *Optimization Lab*, Advisor : ByungRo Moon

Seoul National University
Seoul, S.Korea

B.S. IN COMPUTER SCIENCE AND ENGINEERING — *Mar. 2013 - Feb. 2019*

- *Computer Architecture Lab*, Advisor : SangLyul Min

Publications

Conference Proceedings

- **S. Chi***, H. Chi*, Q. Huang, K. Ramani. Skeleton-ODE: Learning Representation by Predicting the Future for Online Skeleton-based Action Recognition *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023, submitted*
- **S. Chi***, H. Chi*, S. Chan, K. Ramani. Pose Relation Transformer Refine Occlusions for Human Pose Estimation. *IEEE International Conference on Robotics and Automation (ICRA), 2023, submitted*
- [**C2**] H. Chi, M. H. Ha, **S. Chi**, S. Lee, Q. Huang, K. Ramani. InfoGCN: Representation Learning for Human Skeleton-based Action Recognition. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022*
- [**C1**] M. H. Ha, **S. Chi**, S. Lee, Y. Cha, B. R. Moon. Evolution-based Meta Reinforcement Learning for Portfolio Optimization. In proceedings of the 23rd *The Genetic and Evolutionary Computation Conference (GECCO), 2021*

Research & Project

Skeleton-based action sequence generation with salient atomic actions
C-Design Lab, Purdue Univ.

RESEARCH ASSISTANT — *Dec. 2022 -*

- Encode latent action trajectory with Neural ODE.
- Extract the salient action frames of actions, and define atomic actions with the salient action frames.
- Apply diffusion model to generate continuous action sequences with atomic actions.

Weakly Supervised Action Segmentation for Video
C-Design Lab, Purdue Univ.

RESEARCH ASSISTANT — *July. 2020 - Sept. 2020*

- Introduced a loss function for video segmentation combining Triplet loss and Temporal Cycle Consistency Loss
- Defined the Action Segmentation problem as a Neural Machine Translation problem
- Visualized the attention matrices to interpret Machine's inference

Improving Multi-Joint dynamics with Contact(MuJoCo) by applying Hierarchical Reinforcement Learning
OptLab, Seoul National Univ.

RESEARCH ASSISTANT — *Sep. 2019 - Jul. 2020*

- Proposed a hierarchical architecture to give the agent frequent reward signals by setting subgoals
- Designed and developed a hierarchical architecture of model and environment
- Applied policy gradient with self-critical sequence training in optimization

Predicting stock price by applying Combinatorial Optimization
OptLab, Seoul National Univ.

RESEARCH ASSISTANT — *Jan. 2019 - Jun. 2019*

- Analyzed data with the ANOVA(Analysis of variance) method and Regression method
- Applied Genetic Algorithm, Evolutional Computation, and Fourier transformation to find better solutions
- Applied distributed computing to accelerate independent computation

Accelerating computation of Machine Learning by using Field-Programmable Gate Array — *ArchiLab, Seoul National Univ.*

Research Assistant — *Aug. 2018 - Jan. 2019*

- Applied methods of SIMD(Single Instruction Multiple Data) with the low-level language of Verilog
- Reduced data size with SVD(Singular Value Decomposition)
- Rearranged units to utilize parallel computation

Designing spatial-navigation on chrome-extension — *ArchiLab, Seoul National Univ.*

Research Assistant — *Sep. 2018 - Dec. 2018*

- formulated malfunctioning cases and defined user-friendly environment
- Developed user-friendly navigation UI
- `https://github.com/WICG/spatial-navigation`

Skills

Research and Development Stacks

Major Languages	**Python**, **C/C++**, java, Verilog
Machine Learning	**PyTorch**, **TensorFlow**
Computer Vision	OpenCV, OpenGL
Web Languages	Nginx, HTML5, PHP, JavaScript, CSS
Database	MySQL, SQLite

Other Tools and Skills

Other Langauges	Shell Scripts(bszh, zsh), Matlab, R
Operating Systems	macOS, Linux Debian/Ubuntu, Windows
Text Editors & IDE	**Vim**, VSCode, Eclipse
Software	SolidWorks, Catia, AutoCAD
VCS	Git

Working Experience

SK Hynix — *Icheon, S.Korea*

Intern Researcher — *Sep. 2017 - Dec. 2017*

- Designed an exclusive chip for testing 3D NAND flash architecture and verified the reliabilty of existing architectures
- Developed a module for predicting locality of data and tested it with real data

Korean National Police Agency — *Dokdo, S.Korea*

Dokdo Security Police — *Dec. 2013 - Sep. 2015*

- Defended the disputed territory as a squad leader

Teaching Experience

CS.4190.681A	**Genetic Algorithm**, 2019-spring, 2021-spring	*Teaching Assistant*
CS.4190.407	**Algorithm**, 2019-fall, 2020-spring	*Teaching Assistant*
CS.M1522.407	**Data Structure**, 2019-spring, 2020-spring, 2021-spring	*Teaching Assistant*
CS.4190.308	**Computer architecture**, 2018-spring	*Teaching Assistant*
CS.035.001	**Digital Computer Concept and Practice**, 2017-fall, 2018-fall	*Teaching Assistant*
PE.051.004	**Volley ball**, 2018-fall, 2019-spring, 2021-spring	*Teaching Assistant*

Honors & Awards

Competition of accelerating General-Purpose GPU sponsored by Intel — *Manycore Programming Lab*

1st place — *2018*

The National Scholarship for Science and Engineering — *Korea Ministry of Science and ICT*

Full scholarship — *Mar. 2018 - Aug. 2021*