

Changhun Lee

PH.D. · DEPARTMENT OF INDUSTRIAL ENGINEERING, UNIST

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Education

Ulsan National Institute of Science and Technology (UNIST)

Ulsan, Republic of Korea

MSc.-Ph.D. INDUSTRIAL ENGINEERING

2016.03 - 2023.02

- Advisor: Dr. Chiehyeon Lim
- Dissertation Title: "Tackling Three Problems in Controlled Sequence Generations: Bridging Reinforcement Learning with Language Models"

Ajou University

Suwon, Republic of Korea

BSc. ECONOMICS

2011.03 - 2015.02

Professional Experience

- 2023.03-
Present **Postdoctoral Researcher**, Graduate School of Artificial Intelligence, UNIST
- 2023.03 **Participating Researcher**, Research Project Meeting, Kakao Enterprise Corp.
- 2019-2022 **Principal Investigator**, Granted Research Program, Daewoong Pharmaceuticals Foundation
- 2021.11-
2021.12 **Research Advisor**, Project-based Learning Program, LG Electronics
- 2018-2019 **Co-founder**, Data Team, Smart Ship Venture Tech
- 2017.07-
2017.12 **Data Scientist Intern**, Business Planning Department, Hyundai Mipo Dockyard
- 2016-2017 **Graduate Teaching Assistant**, Department of Industrial Engineering, UNIST

Awards, Fellowships, & Grants

- 2023 **UNIST Best Research Award**, Ulsan National Institute of Science and Technology
- 2022 **Prominent Presentation Award**, The Korean Nutrition Society
Best Oral Presentation Award, Korean Academy of Pediatric Allergy and Respiratory Disease
- 2020 **Best Poster Presentation Award**, The Korean Nutrition Society
Minister of Science and ICT Award, Korea Institute of Science and Technology
- 2018 **Daewoong Research Scholarship Grant**, Daewoong Pharmaceuticals Foundations
- 2013 **Student Best Paper Award**, Korean Association for Policy Sciences

Publications

CONFERENCE & JOURNAL

- Changhun, Lee.**, Chiehyeon Lim. (2023). "Theoretical Principles of Controllable Generation: Reinforcing the Levenshtein Agent Mitigates the Discrepancy Problem," *To be submitted to AAAI'24 (conference)*
- Changhun, Lee.**, Chiehyeon Lim. (2023). "Analyzing the Controllability of Language Models and Improving the Control Performance with Reward Dropout," *Under Review in EMNLP'23 (conference)*
- Changhun, Lee.**, Soohyeok Kim., Sehwa Jeong., Jayun Kim., Yeji Kim., Chiehyeon Lim., Minyoung Jung. (2023). "Artificial intelligence generates allergy-free high-nutrition diets: A first study on the real-world solution development and its evaluation," *To be submitted to Allergy (journal)*.

- Changhun, Lee.**, Soohyeok Kim., Jayun Kim., Chiehyeon Lim., Minyoung Jung. (2022). "Challenges of diet planning for children using artificial intelligence," *Nutrition Research and Practice*, 16(6), 801-812. (journal)
- Jongkyung Shin.*, **Changhun, Lee.***, Chiehyeon Lim., Yunmo Shin., Junseok Lim. (2022). "Recommendation in Offline Stores: A Gamification Approach for Learning the Spatiotemporal Representation of Indoor Shopping," *In Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (pp. 3878-3888). (conference)
- Changhun, Lee.**, Soohyeok Kim., Sehwa Jeong., Chiehyeon Lim., Jayun Kim., Yeji Kim., Minyoung Jung. (2021). "MIND dataset for diet planning and dietary healthcare with machine learning: Dataset creation using combinatorial optimization and controllable generation with domain experts," *In Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks Track (Round 2)*. (conference)
- Changhun, Lee.**, Soohyeok Kim., Chiehyeon Lim., Jayun Kim., Yeji Kim., Minyoung Jung.. (2021). "Diet Planning with Machine Learning: Teacher-forced REINFORCE for Composition Compliance with Nutrition Enhancement," *In Proceedings of the 27th ACM SIGKDD Conference on Knowledge Discovery & Data Mining* (pp. 3150-3160). (conference)
- Changhun, Lee.**, Chiehyeon Lim. (2021). "From technological development to social advance: A review of Industry 4.0 through machine learning," *Technological Forecasting and Social Change*, 167, 120653. (journal)
- Min Jung., Chiehyeon Lim., **Changhun, Lee.**, Soohyeok Kim., Jayun Kim. (2020). "Human dietitians vs. Artificial intelligence: Which diet design do you prefer for your children?," *Journal of Allergy and Clinical Immunology*, 147(2), AB117. (journal)

Presentations

* presenting author; + mentored undergraduate

CONTRIBUTED PRESENTATIONS

- Sehwa Jeong.+, Soohyeok Kim, **Changhun, Lee.**, Jayun Kim., Yeji Kim., Chiehyeon Lim., Minyoung Jung.* 2022. Toward the Diet Planning with Artificial Intelligence for Children with Food Allergies. Flash Talk Session: EAACI Hybrid Congress 2022, Prague, Czech Republic
- Changhun, Lee.***, Soohyeok Kim., Sehwa Jeong.+, Chiehyeon Lim., Jayun Kim., Yeji Kim., Minyoung Jung. 2021. MIND dataset for diet planning and dietary healthcare with machine learning: Dataset creation using combinatorial optimization and controllable generation with domain experts. Best Paper Sessions: Korean Artificial Intelligence Association 2021, Virtual
- Changhun, Lee.**, Soohyeok Kim., Jayun Kim., Chiehyeon Lim., Minyoung Jung.* 2021. Human- or Artificial Intelligence-designed Diets: Which Do You Prefer for Your Children? Poster Presentation: AAAAI 2021, Virtual

Research Experience

UNIST - Dept of Industrial Engineering & Grad of Artificial Intelligence

Ulsan, South Korea

FUNDING AGENCY: MINISTRY OF EDUCATION

2021 - present

- Project: Develop and validate a learning framework for interaction and co-evolution between humans and AI

UNIST - Dept of Industrial Engineering

Ulsan, South Korea

FUNDING AGENCY: MINISTRY OF SMES AND STARTUPS

2021 - 2023

- Project: Developing intelligent bio-omics analysis technology

UNIST - Dept of Industrial Engineering

Ulsan, South Korea

FUNDING AGENCY: MINISTRY OF EDUCATION

2020 - 2022

- Project: Develop a methodology for identifying latent factors explaining variability in social science big data

UNIST - Dept of Industrial Engineering

Ulsan, South Korea

FUNDING AGENCY: MINISTRY OF SCIENCE AND ICT

2020-2021

- Project: Development of a non-face-to-face precision dietary AI service system tailored to the gut flora of pediatric atopic diseases

UNIST - Dept of Industrial Engineering

Ulsan, South Korea

FUNDING AGENCY: DAEWOONG PHARMACEUTICS FOUNDATION

2019 - 2022

- Project: Development of a data reorganization and recommendation system to reduce the cost of the drug discovery

UNIST - Dept of Industrial Engineering*Ulsan, South Korea*

FUNDING AGENCY: MINISTRY OF EDUCATION

2018 - 2021

- Project: Structural Analysis of the Process of Technological Innovation in the Fourth Industrial Revolution

UNIST - Dept of Industrial Engineering*Ulsan, South Korea*

FUNDING AGENCY: MINISTRY OF SCIENCE AND ICT

2018-2019

- Project: Research on servitization in Industry 4.0 through regional industrial-academic cooperation

UNIST - Dept of Industrial Engineering*Ulsan, South Korea*

FUNDING AGENCY: ULSAN NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY

2017-2020

- Project: Understand the key research and application industries of the Fourth Industrial Revolution