

# Hyunsoo Cho



## RESEARCH INTERESTS

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### Machine Learning

- Anomaly Detection, Distributional Shift, Self-Supervised Learning, Unsupervised Learning

### Natural Language Processing

- Foundation Model, Prompt Engineering, Parameter-efficient Transfer Learning, In-Context Learning, Weakly-Supervised Learning

## EDUCATION

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- **Ph.D.** Computer Science and Engineering, Seoul National University Mar. 2019 — Feb. 2023
  - **Dissertation:** *A Deep Representation Learning for Unsupervised Anomaly Detection.*
  - **Advisor:** Sang-goo Lee
  - **Committee:** U Kang, Sang-goo Lee, Seung-won Hwang, Sungzoon Cho (SNU), Taeuk Kim (HYU)
- **M.S.** Computer Science and Engineering, Seoul National University Sep. 2016 — Aug. 2018
  - **Dissertation:** *Visual Question Answering using Simple Natural Language Processing.*
  - **Advisor:** Sang-goo Lee
- **B.S.** Computer Science and Engineering, Chung-ang University Mar. 2012 — Aug. 2016

## PUBLICATIONS

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### Pre-print & Under review

- [1] **Integrating Two Perspectives on Distributional Shift in Natural Language Understanding.**  
Hyuhng Joon Kim, **Hyunsoo Cho**, Sang-Woo Lee, Junyeob Kim, Choonghyun Park, Sang-goo Lee, Kang Min Yoo, Taeuk Kim.  
*Under review*

### International

- [1] **Probing Out-of-Distribution Robustness of Language Models with Parameter-Efficient Transfer Learning.**  
**Hyunsoo Cho**, Choonghyun Park, Junyeob Kim, Hyuhng Joon Kim, Kang Min Yoo, Sang-goo Lee.  
*The 12th Joint Conference on Lexical and Computational Semantics (\*SEM 2023).*
- [2] **CELDA: Leveraging Black-box Language Model as Enhanced Classifier without Labels.**  
**Hyunsoo Cho**, Youna Kim, Sang-goo Lee.  
*The 61st Annual Meeting of the Association for Computational Linguistics (ACL 2023).*
- [3] **Prompt-Augmented Linear Probing: Scaling Beyond The Limit of Few-shot In-Context Learners.**  
**Hyunsoo Cho**, Hyuhng Joon Kim, Junyeob Kim, Sang-Woo Lee, Sang-goo Lee, Kang Min Yoo, Taeuk Kim.  
*Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI 2023).*
- [4] **Ground-Truth Labels Matter: A Deeper Look into Input-Label Demonstrations.**  
Kang Min Yoo\*, Junyeob Kim\*, Hyuhng Joon Kim, **Hyunsoo Cho**, Hwiyeol Jo, Sang-Woo Lee, Sang-goo Lee, Taeuk Kim.  
*The 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP Oral 2022).*
- [5] **Enhancing Out-of-Distribution Detection in Natural Language Understanding via Implicit Layer Ensemble.**  
**Hyunsoo Cho**, Choonghyun Park, Jaewook Kang, Kang Min Yoo, Taeuk Kim, Sang-goo Lee.  
*Findings of the Association for Computational Linguistics: EMNLP 2022 (Findings of EMNLP 2022).*
- [6] **Self-Generated In-Context Learning: Leveraging Auto-regressive Language Models as a Demonstration Generator.**  
Hyuhng Joon Kim, **Hyunsoo Cho**, Junyeob Kim, Taeuk Kim, Kang Min Yoo, Sang-goo Lee  
*Workshop on Large-scale Pre-trained Language Models (LPLM 2022) at NAACL 2022.*

- [7] **Masked Contrastive Learning for Anomaly Detection.**  
**Hyunsoo Cho**, Jinseok Seol, Sang-goo Lee.  
*The 30th International Joint Conference on Artificial Intelligence (IJCAI 2021).*
- [8] **Leveraging Class Hierarchy in Fashion Classification.**  
**Hyunsoo Cho**, Chaemin Ahn, Kang Min Yoo, Jinseok Seol, Sang-goo Lee.  
*The 2nd Workshop on Computer Vision for Fashion, Art and Design 2019 (CVFAD 2019) at ICCV 2019.*
- [9] **Stochastic Relational Network.**  
Kang Min Yoo, **Hyunsoo Cho**, Hanbit Lee, Jeeseung Han, Sang-goo Lee.  
*The 1st Workshop on Statistical Deep Learning in Computer Vision 2019 (SDLCV 2019) at ICCV 2019.*
- [10] **Automatic Generation of Multiple-Choice Fill-in-the-blank Question Using Document Embedding.**  
Junghyuk Park, **Hyunsoo Cho**, and Sang-goo Lee.  
*The 19th International Conference on Artificial Intelligence in Education (AIED 2018).*

## Domestic

- [1] **FastText를 적용한 한국어 단어 임베딩.**  
**Hyunsoo Cho**, Sang-goo Lee.  
*Korea Software Congress (KSC 2017).*

## PATENTS

- Anomaly Detection System and Method for Setting Threshold Thereof (international - America, China, Korea)

## WORK EXPERIENCE

### Naver AI Lab.

- Research Intern Apr. 2022 — Aug. 2022, Mar. 2023 — Current

## RESEARCH EXPERIENCE

### HyperCLOVA X - Korean Hyperscale Conversational Language Model

*Naver Corp.* Mar. 2023 — Current

- Enhancing language model’s coding capability
- Synthetic code data generation

### Enhancing Natural Language Understanding via Pre-trained Language Models

Led by Prof. Sang-goo Lee (PI), with *Naver Corp.* Apr. 2021 — Current

- Parameter-efficient transfer learning.
- Prompt optimization.
- Unsupervised Out-of-distribution leveraging pre-trained language models.

### An Advanced Study of QA Technologies for Intelligent Assistant System

Led by Prof. Sang-goo Lee (PI), with *Hyundai Motors.* Mar. 2020 — Feb. 2021

- Supervised out-of-Distribution detection in spoken language understanding.
- Enhancing SLU classifier performance.
- Survey on Korean pre-trained language models.

### Text and Sentiment Analysis for Fashion Trend Analysis

Led by Prof. Sang-goo Lee (PI), with *Korea Creative Content Agency (KOCCA).* Jul. 2019 — Jun. 2020

- Determining the importance and emotion from collected fashion posting (e.g., likes, emoticons, comments.).
- Extract notable keywords and entity names from the collected fashion posting (e.g., title, comment).
- Devising efficient deep learning-based fashion category classifier.

## AWARDS & HONORS

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| • <b>Outstanding Ph.D. Dissertation Award</b> - <i>Seoul National University</i> | <b>Feb. 2023</b> |
| • <b>Best Poster Award</b> - <i>AIIS Fall Retreat</i>                            | <b>Nov. 2021</b> |
| • <b>Academic Excellence Scholarship</b> - <i>Chung-ang University</i>           | <b>Feb. 2015</b> |

## ACADEMIC SERVICES

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### Reviewer:

- The Annual Meeting of the Association for Computational Linguistics (**ACL**): 2022, 2023
- The North American Chapter of the Association for Computational Linguistics (**NAACL**): 2022
- The International Conference On Computational Linguistics (**COLING**): 2022
- The Conference on Empirical Methods in Natural Language Processing (**EMNLP**): 2022
- The Association for the Advancement of Artificial Intelligence (**AAAI**): 2023
- The Joint Conference on Lexical and Computational Semantics (**\*SEM**): 2023

## VISITING TALKS

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| • Poster presentation - <i>AIIS Fall Retreat</i>   | <b>Nov. 2022</b> |
| • Invited speaker - <i>Tech talk, Naver Enterprise</i>   | <b>Mar. 2022</b> |
| • Invited speaker - <i>Tech talk, Kakao Enterprise</i>   | <b>Jan. 2022</b> |
| • Invited speaker - <i>Tech talk, Hyperconnect Enterprise</i>  | <b>Jan. 2022</b> |
| • Poster presentation - <i>AIIS Fall Retreat</i>   | <b>Nov. 2021</b> |
| • Invited speaker - <i>The 2nd Workshop on Artificial Intelligence for Anomalies and Novelties, AI4AN 2021 at IJCAI 2021</i> | <b>Aug. 2021</b> |
| • Invited speaker - <i>2018 토대연구 학술회의 &lt;이보형 民俗樂 Odyssey&gt; at Korean Music Society</i>                                    | <b>May. 2018</b> |

## TEACHING EXPERIENCE

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|---|---------------------|
| • <b>Advanced Database</b><br>– <i>Department of Computer Science &amp; Engineering, SNU - TA</i>                 | <b>Fall. 2019</b>   |
| • <b>Introduction to Databases</b><br>– <i>Department of Computer Science &amp; Engineering, SNU - TA</i>         | <b>Fall. 2017</b>   |
| • <b>IT Entrepreneurship</b><br>– <i>Department of Computer Science &amp; Engineering, SNU - TA</i>               | <b>Fall. 2017</b>   |
| • <b>Advanced Computer Science Seminar</b><br>– <i>Department of Computer Science &amp; Engineering, SNU - TA</i> | <b>Spring. 2017</b> |

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