Hyeon-Ju Jeon

Contact Information

Data Assimilation Group, Data Preprocessing Team
Korea Institute of Atmospheric Prediction Systems (KIAPS)
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Research Interests

Spatiotemporal Graph Neural Network
Graph Representation Learning
Multi-modal and Irregular Real-world Data Analysis
Explainable AI
- Application Domain: Earth Science, Medical Epidemiology, Biomedical, Weather Forecasting, Bibliographic Network Analysis, Recommendation Systems, etc.

Work Experience

Korea Institute of Atmospheric Prediction Systems (KIAPS)
Research Scientist — October 2021-Present

- Developing intelligent weather prediction models
- Analyzing the characteristics of weather phenomena
- Impact analysis of various observation types

Education

Chung-Ang University, Seoul, Korea
M.S., Computer Engineering, March 2019 - February 2021
Thesis: Bibliographic network representation learning for research pattern analytics
GPA: 4.3

Myong-Ji College, Seoul, Korea
B.S., Computer Engineering, March 2015 - February 2019
GPA: 4.2

Honors and Grants

Best Researcher Award, Korea Institute of Atmospheric Prediction Systems (2022)
Best Paper Award, Computing4Human 2021 (2021)
Best Research Project Award, Center for Women in Science, Engineering, and Technology (2021)
Research Assistant, Chung-Ang University (2020)
Teaching Assistant, "Introduction to Artificial Intelligence and its Applications," Chung-Ang University (CAU CE S'20)
Teaching Assistant, "Basic Computer Programming," Chung-Ang University (CAU CE S'19)

Talks

Invited talks - The Department of AI at The Catholic Univ. of Korea (March 2025) AI application for weather forecasting

Invited talks - The Department of AI at The Catholic Univ. of Korea (March 2024) Introduction to AI technology for weather forecasting

Invited talks - International Conference on Next Generation Computing (July 2022) Efficient weather forecasting through deep learning based analysis of multi-modal observational data

PUBLICATIONS **Journal**

1. Daehun Kim*, **Hyeon-Ju Jeon***, Hyeyoon Jeong, O-Joun Lee, Hae Gyun Lim: Automated real-time red tide monitoring system using reflected ultrasonic signals and convolutional neural networks. *Engineering Applications of Artificial Intelligence*. (*Under review*, *Co-first authors)
2. Van Thuy Hoang, **Hyeon-Ju Jeon**, O-Joun Lee: Mitigating Degree Bias in Graph Representation Learning with Learnable Structural Augmentation and Structural Self-attention. *IEEE Transactions on Network Science and Engineering* 04/2025. (To Appear, **JCR Top 3.3%**)
3. Van Thuy Hoang, Tien-Bach-Thanh Do, Jinho Seo, Seung Charlie Kim, Luong Vuong Nguyen, Duong Nguyen Minh Huy, **Hyeon-Ju Jeon***, O-Joun Lee*: Halal or Not: Knowledge Graph Completion for Predicting Cultural Appropriateness of Daily Products. *IEEE Access* 01/2025; 13: 15158-15167. (*Co-correspondence)
4. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon, O-Joun Lee: Observation Impact Explanation in Atmospheric State Estimation using Hierarchical Message-Passing Graph Neural Networks. *Machine Learning: Science and Technology* 10/2024; 5(4): 045036. (**JCR Top 10.8%**)
5. Yeongho Sung*, **Hyeon-Ju Jeon***, Daehun Kim, Min-Seo Kim, Jaeyeop Choi, Hwan Ryul Jo, Junghwan Oh, O-Joun Lee, Hae Gyun Lim: Internal pipe corrosion assessment method in water distribution system using ultrasound and convolutional neural networks. *npj Clean Water* 07/2024; 7: 63. (*Co-first authors, **JCR Top 1.2%**)
6. **Hyeon-Ju Jeon**, Hyeon-Jin Jeon, Seung Ho Jeon: Predicting the Daily Number of Patients for Allergic Diseases based on Spatiotemporal Graph Convolutional Networks. *Plos One* 06/2024; 19(6): e0304106.
7. Ji Won Nam*, **Hyeon-Ju Jeon***, Jeong Eun Lee, O-Joun Lee, Hae Gyun Lim: Quantification of dysnatremia using single-beam acoustic microbeam and convolutional neural networks. *IEEE Sensors Journal* 04/2024; 24(7): 9626-9638. (*Co-first authors)
8. Jeong Eun Lee*, **Hyeon-Ju Jeon***, O-Joun Lee, Hae Gyun Lim: Diagnosis of diabetes mellitus using high frequency ultrasound and convolutional neural network. *Ultrasonics* 01/2024; 136: 107167. (*Co-first authors, **JCR Top 11.2%**)
9. Van Thuy Hoang, **Hyeon-Ju Jeon**, Eun-Soon You, Yoewon Yoon, Sungyeop Jung, O-Joun Lee: Graph Representation Learning and Its Applications: A Survey. *Sensors* 04/2023; 23(8): 4168.
10. **Hyeon-Ju Jeon**, Jason J. Jung: Discovering the Role Model of Authors by Research History Embedding. *Journal of Information Science* 02/2023: 49(4): 990-1006.
11. **Hyeon-Ju Jeon**, Hae Gyun Lim, K Kirk Shung, O-Joun Lee, Min Gon Kim: Automated cell-type classification combining dilated convolutional neural networks with label-free acoustic sensing. *Scientific Reports* 11/2022; 12: 19873.
12. **Hyeon-Ju Jeon**, Min-Woo Choi, O-Joun Lee: Day-Ahead Hourly Solar Irradiance Forecasting Based on Multi-Attributed Spatio-Temporal Graph Convolutional Network. *Sensors* 09/2022; 22(19): 7179.
13. O-Joun Lee, **Hyeon-Ju Jeon**, Jason J. Jung: Learning Multi-resolution Representations of Research Patterns in Bibliographic Networks. *Journal of Informetrics* 02/2021; 15(1): 101126. (**JCR Top 20%**)

14. **Hyeon-Ju Jeon**, O-Joun Lee, Jason J. Jung: Is performance of scholars correlated to their research collaboration patterns? *Frontiers in big Data* 11/2019; 2(39).

Conference

1. **Hyeon-Ju Jeon**, Hyeon-Jin Jeon, Seong Ho Jeon (2025). Micro- and Macro-View Graph Structure Learning for Forecasting Allergic Disease Case Counts under Air Pollution Exposure. *in Proceedings of the Conference on Information and Knowledge Management* (**CIKM 2025**). (*Under Review*)
2. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon, O-Joun Lee (2025). Discovering Spatial Correlations between Earth Observations in Global Atmospheric State Estimation by using Adaptive Graph Structure Learning. *in Proceedings of the Workshop on TerraBytes: Towards global datasets and models for Earth Observation* (**TerraBytes 2025**), *co-located with the 42nd International Conference on Machine Learning* (**ICML 2025**). (*Under Review*)
3. Raeseol Park, **Hyeon-Ju Jeon**, Dae-Hyun Sun, et al (2025). Pioneering Adaptive Strategies for Korea Integrated Model in the Face of Climate Change. *in Proceedings of the 2025 Annual Seminar of the European Centre for Medium-Range Weather Forecasts* (ECMWF Annual Seminar 2025), Bonn, Germany; April 2025.
4. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon, O-Joun Lee (2024). Explainable Graph Neural Networks for Observation Impact Analysis in Atmospheric State Estimation. *in Proceedings of the Workshop on Explainable machine learning for sciences* (**XAI4Sci 2024**), *co-located with the 38th Annual AAAI Conference on Artificial Intelligence* (**AAAI 2024**), Vancouver, Canada; February 2024.
5. Jeong Eun Lee, **Hyeon-Ju Jeon**, O-Joun Lee, Hae Gyun Lim (2023). Blood Glucose Classification Using high-Frequency Ultrasound and Artificial Intelligence. *in Proceedings of the 2023 IEEE International Ultrasonics Symposium* (IEEE IUS 2023), Montreal, Canada; September 2023.
6. Ji Won Nam, **Hyeon-Ju Jeon**, Jeong Eun Lee, O-Joun Lee, Hae Gyun Lim (2023). Classification of Red Blood Cells for the Diagnosis of dysnatremia Based on Ultrasound and Convolutional Neural Networks. *in Proceedings of the 2023 IEEE International Ultrasonics Symposium* (IEEE IUS 2023), Montreal, Canada; September 2023.
7. Jeong Eun Lee, **Hyeon-Ju Jeon**, O-Joun Lee, Hae Gyun Lim (2023). High-frequency ultrasound and convolutional neural network: A Potential tool for diagnosis of diabetes mellitus. *Samsung Global Technology Symposium*, Seoul, Korea; April 2023.
8. Hui-Nae Kwon, **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon, and Seon Ki Park (2023). Bias correction of aircraft temperature observations in the Korean Integrated Model based on a deep learning approach. *in Proceedings of the EGU General Assembly 2023* (EGU 2023), Vienna, Austria; April 2023, EGU23-12218.
9. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon (2023). Estimating the observation impact based on attentive 3d-convolutional RNN. *in Proceedings of the 24th International TOVS Study Conference* (ITSC 2023), Tromso, Norway; March 2023.
10. Eun-jin Kim, **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon (2023). A Study on Machine Learning-Based Quality Control Techniques for the Satellite Radi-

ance Data Assimilation. *in Proceedings of the 24th International TOVS Study Conference* (ITSC 2023), Tromso, Norway; March 2023.

11. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon (2022). What Meteorological Characteristics Do Affect Weather Forecasts? *in Proceedings of the 3rd International Conference on Human-centered Artificial Intelligence* (Computing4Human 2022), Hanoi, Vietnam; December 2022.
12. Nam D Vo, O-Joun Lee, Khac-Hoai Nam Bui, Hae Gyun Lim, **Hyeon-Ju Jeon**, Phuong-Mai Nguyen, Jin-Taek Kim, Bui Quang Tuyen, Jason J Jung, Thuy Anh Vo (2021). Computing4Human 2021: *The 2nd International Conference on Human-centered Artificial Intelligence. The 2nd International Conference on Human-centered Artificial Intelligence* (Computing4Human 2021), Da Nang, Vietnam; October 2021. (**Editorial**)
13. **Hyeon-Ju Jeon**, Gyu-Sik Choi, Se-Young Cho, Hanbin Lee, Hee Yeon Ko, Jason J Jung, O-Joun Lee, Myeong-Yeon Yi (2021). Learning Contextual Representations of Citations via Graph Transformer. *in Proceedings of the 2nd International Conference on Human-centered Artificial Intelligence* (Computing4Human 2021), Da Nang, Vietnam; December 2021.
14. **Hyeon-Ju Jeon**, O-Joun Lee, Jason J. Jung (2019). Is Performance of Scholars Correlated to their Research Collaboration Patterns? *in Proceedings of the 6th Workshop on Big Scholarly Data* (**BigScholar 2019**), *co-located with the 28th ACM International Conference on Information and Knowledge Management* (**CIKM 2019**), Beijing, China; November 2019.

Pre-print

1. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon, O-Joun Lee: Explainable Graph Neural Networks for Observation Impact Analysis in Atmospheric State Estimation. arXiv preprint 03/2024; arXiv:2403.17384. (Preprint)
2. **Hyeon-Ju Jeon**, Jeon-Ho Kang, In-Hyuk Kwon, O-Joun Lee: CloudNine: Analyzing Meteorological Observation Impact on Weather Prediction Using Explainable Graph Neural Networks. arXiv preprint 02/2024; arXiv:2402.14861. (Preprint)

Patent

1. Jason J. Jung, **Hyeon-Ju Jeon** (2023). Explainable role model recommendation method and apparatus thereof, NO. 10-2021-0029267, issued June 2023.

Research Project

Principal Investigator

- Development of GNN-Based Citation Context Extraction and Analysis System for Intelligent Knowledge Information Services (2021/05/01 – 2021/10/31), Supported by the Women In Science, Engineering and Technology (WISET) grant funded by the Korea government (MSIT), **Best Research Project Award**.
- Explainable Recommendation Service based on Graph Embedding by Processing Academic Big Data (2020/05/01 – 2020/10/31), Supported by the Women In Science, Engineering and Technology (WISET) grant funded by the Korea government (MSIT).
- Social data modeling for resolving differences in perceptions of online users (2020/06/01– 2020/11/30), Supported by the Korea Institute of Human Resources Develop-

ment in Science and Technology (KIRD) grant funded by the Korea government (MSIT).

Teaching Experience

LG CNS 2021-2022
Lecturer in Database Modelling Methodologies and Practices

- Developed and conducted lectures and facilitated hands-on exercises
- Provided one-on-one feedback on practical application in real-world scenarios

Chung-Ang University Spring 2020
Teaching Assistant in Introduction to Artificial Intelligence and its Applications

- Attended class while observing learning and teaching throughout course
- Assisted students with assignments and material comprehension

Chung-Ang University Spring 2019
Teaching Assistant in Basic Computer Programming

- Graded weekly assignments and moderated questions and answers at the end of class
- Developed lesson plan and lead programming class sessions

Skills and Abilities

Programming: Python, Java, C, JSP, JavaScript
Machin Learning Frameworks: Pytorch, TensorFlow, JAX
Database: Oracle, Neo4j
Operation Systems: Linux, Windows
Language: Korean, English, Chinese