Hogun Park

CONTACT

2066, Seobu-ro, Jangan-gu
Office 27310A, Engineering Building 2
Suwon, Republic of Korea (South Korea),16419

email: hogunpark@skku.edu
profile: hogunpark.com
lab: learndatalab.github.io

CURRENT POSITION

Sungkyunkwan University (SKKU), Suwon, Republic of Korea
Assistant Professor in College of Computing and Informatics — Sept. 2020 ~ Present
Head in Intelligent Software Department (Graduate Program) — Jun. 2023 ~ Present

INTEREST

Machine Learning and **Data Mining** for Graph and Text

EDUCATION

Purdue University, West Lafayette, IN, USA
Ph.D. in Computer Science — Aug. 2013 ~ Aug. 2020

- Thesis: Graph neural networks for semi-supervised learning with explainability
  - Worked on semi-supervised machine learning problems in relational data (e.g., social network and biology network) for user (or object) modeling and behavior prediction. (PAKDD 2020, IJCAI 2019, WWW 2018, WSDM workshop 2017)
  - Provided a method for generating explanations to representation learning models with its theoretical analysis. (*Neural Networks, Elsevier*)
  - Proposed a social network analysis framework for understanding online group behaviors. (*International Journal of Information Management, Elsevier*)
- Advisor: Prof. Jennifer Neville

Korea Advanced Institute of Science and Technology (KAIST)*, Daejeon, Korea
**Former Information and Communications Univ. (ICU) – merged into KAIST*
M.S in Computer Science — Aug. 2006 ~ Aug. 2008

- Thesis: An interactive information seeking interface for exploratory search
  - Proposed a framework for human-web interactions, which provides a personal workspace that can be created and manipulated cooperatively with search engines. This helps users conceptualize their information seeking tasks and record their trails using semantic representations. (ICEIS 2008, HCIR (now ACM CHIIR) 2008)
  - Worked on Natural Language Processing (NLP) projects for document classification, knowledge base construction, and contextual advertisement: Co-Project with **MIT Media Lab** (Dr. Henry Lieberman)
- Advisor: Prof. Sung-Hyon Myaeng

B.S in Computer Science and IT Business (Minor) — Feb. 2003 ~ Aug. 2006

- *Graduation with Honor – Magna cum laude* (***Class Rank***: **2nd**)

WORK EXPERIENCE SUMMARY

IBM Research - Almaden, San Jose, CA, USA
Research Intern, Cloud Analytics Research Team — Summer 2017 and 2018

- Proposed a machine learning framework for constraint-based output prediction to exploit domain knowledge using adversarial neural networks and developed a memory-neural network architecture for knowledge base construction from Text: 1 paper was published in (WWW 2018), and 2 U.S. patents were filed.

IBM Watson, Yorktown Heights/Somers, NY, USA
Research Intern, Cognitive Education Team — Summer 2016

- Developed a machine learning algorithm for predicting customers' behavior in a MOOC: our new deep knowledge tracing model decreased RMSE (Root Mean Square Error) by 0.15 than the state-of-the-art to predict the best intervention time for online learning.

Korea Institute of Science and Technology (KIST), Seoul, Korea

Research Scientist, Imaging Media Research Center Dec. 2008 ~ July 2013

- Led a team to build data analysis pipelines to manage nationwide travel information and tweets for 2 years: developed Front/back-end servers with Hadoop, MongoDB, Node.js, OpenLayers, Lucene, and Nutch.
- Worked on non-parametric keyword extraction on the real-time Twitter stream for 1 year. (EuroITV 2011, ACM SIGMM MIR (now ACM ICMR) 2010)
- Developed an Android 3D-Video Player for a Live Event, published in *Multimedia Systems Journal.*
- Standardized travel points of interest (POIs) for electronic information exchange among agencies in the United Nations for a year.

REFEREED PUBLICATION (INTETNATIONAL)

Machine Learning / Data Mining / Their Applications

+ means equal contribution, and * means its corresponding author.

1. Hyunju Kang, Geonhee Han, **Hogun Park***, UNR-Explainer: Counterfactual Explanations for Unsupervised Node Representation Learning Models, International Conference on Learning Representations (ICLR 2024), 2024. (Acceptance rate: 31%)
2. Sungjune Kim, Gyusam Chang, Wonseok Roh, Dae-Neung Sohn, Jung-Tae Lee, **Hogun Park***, Sangpil Kim*, Self-supervised Multimodal Graph Convolutional Network for Collaborative Filtering, *Information Sciences, Elsevier, 2024.* (Impact Factor: 8.1, JCR Journal Rank: 7.9%)
3. Seongmin Park, Mincheol Yoon, Jae-woong Lee, **Hogun Park**, Jongwuk Lee, Toward a Better Understanding of Loss Functions for Collaborative Filtering, Proc. of the 32nd ACM International Conference on Information and Knowledge Management (CIKM), 2023. (Acceptance rate: 24%)
4. Sookyung Kim+, Gayoung Kim+, Ko Keun Kim, Suchan Park, Heesoo Jung, **Hogun Park***, Exploiting Relation-aware Attribute Representation Learning in Knowledge Graph Embedding for Numerical Reasoning, Proc. of the 29th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2023. (Acceptance rate: 22.1%)
5. **Hogun Park**, Jennifer Neville, Generating Post-hoc Explanations for Skip-gram-based Node Embeddings by Identifying Important Nodes with Bridgeness, *Neural Networks*, *Elsevier*, Volume 164, pp. 546-561, 2023. (Impact Factor: 9.657, JCR Journal Rank: 8.1%)
6. **Hogun Park**, Aly Megahed, Peifeng Yin, Yuya Ong, Pravar Mahajan, Pei Guo, Incorporating Experts' Judgment into Machine Learning Models, *Expert Systems with Applications*, *Elsevier*, 2023. (Impact Factor: 8.665, JCR Journal Rank: 8.1%)
7. Heesoo Jung, Sangpil Kim, and **Hogun Park***, Dual Policy Learning for Aggregation Optimization in Recommender Systems, The Web Conference (WebConf), 2023. (Acceptance rate: 19.2%)
8. Srinivas Gandla, Changgyun Moon, Seungho Baek, **Hogun Park***, Seonkuk Kim*, Laser-induced Carbonization for Anticounterfeiting Tags, *Advanced Functional Materials*, 2023. (Impact Factor: 19.924, JCR Journal Rank in Category (PHYSICS, APPLIED) : 4.7% (8/161)) [Accepted as a Cover page]
9. Heesoo Jung+, Soyoung Lee+, Hyeyun Lee+, Jaeseong Kim+, Srinivas Gandla, Kyung Jae Yoon, **Hogun Park***, Seonkuk Kim*, Stretchable Array sEMG Sensor with Graph Neural Network for Static and Dynamic Gestures Recognition System, *npj Flexible Electronics*, The Nature Partner Journals series. (Impact Factor: 12.019, JCR Journal Rank in Category (EE) : 3.8% (11/276)), 2023.

10. **Hogun Park**, Providing Post-hoc Explanation for Node Representation Learning Models Through Inductive Conformal Predictions, *IEEE Access*, 2022.
11. Heesoo Jung+, Soyoung Lee+, **Hogun Park***, sEMG-based gesture recognition with deep neural networks, Proc. of the VOICE AI Workshop at the 9th IEEE BigComp (BigComp 2022), 2022.
12. Hyunju Kang and **Hogun Park*,** Providing Node-level Local Explanation for node2vec through Reinforcement Learning, Proc. of Machine Learning on Graphs (MLoG) Workshop at the 15th ACM Conference on Web Search and Data Mining (WSDM 2022), 2022.
13. **Hogun Park**, Jennifer Neville, Role Equivalence Attention for Label Propagation in Graph Neural Networks, Proc. of the 24th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD 2020), 2020. (Acceptance rate: 21%)
14. I Luk Kim, Yunhui Zheng, **Hogun Park**, Weihang Wang, Wei You, Yousra Aafer, Xiangyu Zhang, Finding Client-side Business Flow Tampering Vulnerabilities, Proc. of the 42nd International Conference on Software Engineering (ICSE 2020), 2020. (Acceptance rate: 20.91%)
15. Jooho Kim, **Hogun Park***, A framework for understanding online group behaviors during a catastrophic event, *International Journal of Information Management*, *Elsevier*, 2020. (Impact Factor: 8.21, JCR Jouranl Rank in Category (*Information Science*): 1/87)
16. **Hogun Park**, Jennifer Neville, Exploiting Interaction Links for Node Classification with Deep Graph Neural Networks , Proc. of the 28th International Joint Conference on Artificial Intelligence (IJCAI 2019), 2019. (Acceptance rate: 17.89%)
17. **Hogun Park**, Hamid M. Nezhad, Learning Procedures from Text: Codifying How-to Procedures in Deep Neural Networks, Proc. of the 27th the Web Conference (WebConf), Cognitive Computing Track, 2018.
18. **Hogun Park**, John Moore, Jennifer Neville, Deep Dynamic Relational Classifiers: Exploiting Dynamic Neighborhoods in Complex Networks, Proc. of the MAISoN Workshop in 10th ACM Conference on Web Search and Data Mining (WSDM 2017), 2017.
19. **Hogun Park**, Sun-Bum Youn, Geun-Yong Lee, Heedong Ko, Trendy Episode Detection at a Very Short Time Granularity for Intelligent VOD Service, Proc. of the 9th European Interactive TV Conference (EuroITV 2011, now ACM IMX), pp. 80-83. 2011.
20. Yuchul Jung, **Hogun Park**, and Sung-Hyon Myaeng, A Hybrid Mood Classification Approach for Blog Text, Proc. of the 9th Pacific Rim International Conference on Artificial Intelligence (PRICAI 2006), pp.1099-1103, 2006. (Acceptance rate: 28.8%)

Intelligent User Interface

21. Dongmahn Seo, Suhyun Kim, **Hogun Park**, Heedong Ko, Real-time Panoramic Video Streaming System with Overlaid Interface Concept for Social Media, *Multimedia Systems*, *20*, *6*, pp. 707-719, 2014.
22. Dongmahn Seo, Suhyun Kim, **Hogun Park**, Heedong Ko, User Generated Highlight System for Baseball Games with Social Media Activities, Proc. of the 32th IEEE International Conference on Consumer Electronics (ICCE 2014), pp. 353-354, 2014.
23. **Hogun Park**, Geun-Yong Lee, Dongmahn Seo, Sun-Bum Youn, Suhyun Kim, Heedong Ko, N-Screen Live Baseball Game Watching Platform: Novel Interaction Concepts within a Public Setting (demo), Proc. of the 9th ACM European Interactive TV Conference (EuroITV 2011, now ACM IMX), pp. 13-14. 2011.

24. Sun-Bum Youn, **Hogun Park**, Geun-Young Lee, Dongmahn Seo, Suhyun Kim, Heedong Ko, Social Media-Based Three-Screen TV Service, Proc. of the 29th IEEE International Conference on Consumer Electronics (ICCE 2011), pp. 920-921. 2011.
25. **Hogun Park**, Sun-Bum Youn, Eugene Hong, Changhyeon Lee, Yong-Moo Kwon, Heedong Ko, Myon-Woong Park, Young Tae Sohn, Jae Kwan Kim, Sharing of Baseball Event through Social Media, Proc. of the 11th ACM SIGMM International Conference on Multimedia Information Retrieval (MIR 2010, now ACM ICMR), pp. 389-392, 2010.
26. **Hogun Park**, Sung-Hyon Myaeng, Gwan Jang, Jong-wook Choi, Sooran Jo, Hyungchul Roh, SketchBrain: An Interactive Information Seeking Interface for Exploratory Search, Proc. of the Human-Computer Interaction and Information Retrieval (HCIR 2008, now ACM CHIIR), pp. 53-56, 2008.
27. **Hogun Park**, Sung-Hyon Myaeng, Gwan Jang, Jong-wook Choi, Sooran Jo, Hyungchul Roh, An Interactive Information Seeking Interface for Exploratory Search, Proc. of the 10th International Conference on Enterprise Information System (ICEIS 2008), pp. 276-285, 2008.

Task-based Conversational Agent

28. **Hogun Park**, Yoonjung Choi, Yuchul Jung, and Sung-Hyun Myaeng, Supporting Mixed Initiative Human-Robot Interaction: A Script-based Cognitive Architecture Approach, Proc. of the 21st IEEE International Joint Conference on Neural Network (IJCNN 2008), pp. 4106-4112, 2008.
29. Yuchul Jung, Yoonjung Choi, **Hogun Park**, Wookhyun Shin, and Sung-Hyon Myaeng, Integrating Robot Task Scripts with a Cognitive Architecture for Cognitive Human-Robot Interaction, Proc. of the 5th IEEE International Conference on Information Reuse and Integration (IRI 2007), pp.152-157, 2007.
30. Yuchul Jung, **Hogun Park**, Yoonjung Choi, and Sung-Hyon Myaeng, Designing a Cognitive Case-Based Reasoning Framework for Home Service Robots, Proc. of the 16th IEEE International Symposium on Robot & Human Interactive Communication (RO-MAN 2007), pp.827-832, 2007.

Micellaneous Topics

31. Jieming Zhang, Yongho Lee, Tai-Myoung Chung, **Hogun Park**, Development of a Handwriting Drawings Assessment System for Early Parkinson's Disease Identification with Deep Learning Methods, Proc. of the 10th International Conference on Future Data and Security Engineering (FDSE 2023), pp. 484-499, 2023.
32. Myat Thet Khine, Srinivas Gandla, Changgyun Moon, Seungho Baek, **Hogun Park**, Sunkook Kim, Reconfigurable and Intrinsically Carbonized Physically Unclonable Functions by Ultrafast IR Pulsed Laser for Secure Low-Cost Authentication, Proc. of the 18th International Conference on Nano/Micro Engineered and Molecular System (IEEE-NEMS 2023), 2023.
33. Dongmahn Seo, Suhyun Kim, JaeWook Yoo, **Hogun Park**, Heedong Ko, Immersive Panorama TV Service System, Proc. of the 30th IEEE International Conference on Consumer Electronics (ICCE 2012), pp. 205-206, 2012.
34. Dongmahn Seo, Suhyun Kim, YoungTae Jo, **Hogun Park**, Heedong Ko, Personal Multi-angle Media Broadcasting Service System, Proc. of the 30th IEEE International Conference on Consumer Electronics (ICCE 2012), pp. 721-722, 2012.

35. Dongmahn Seo, Suhyun Kim, **Hogun Park**, Geun Young Lee, Heedong Ko, Panoramic Interface for Baseball Live with SNS, Proc. of the 30th IEEE International Conference on Consumer Electronics (ICCE 2012), pp. 588-589, 2012.
36. Dongmahn Seo, Suhyun Kim, **Hogun Park**, Geun Young Lee, Heedong Ko, Overlay SNS: Next Generation Social Network Service, Proc. of the 30th IEEE International Conference on Consumer Electronics (ICCE 2012), pp. 566-567, 2012.
37. Kyung-Mi Park, **Hogun Park**, Hyoung-Gon Kim, and Heedong Ko, Review Summarization Based on Linguistic Knowledge, Proc. of the SNSM workshop at the 17th International Conference on Database Systems for Advanced Applications (DASFAA 2012), pp. 105-114, 2012.
38. Kyung-Mi Park, **Hogun Park**, Hyoung-Gon Kim, Heedong Ko, Review Mining Using Lexical Knowledge and Modality Analysis, Proc. of the 5th International Universal Communication Symposium (IUCS 2011), pp. 215-219, 2011.
39. Kyoung-Won Park, **Hogun Park**, and Eric Fleury, Strain localization in annealed Cu50Zr50 metallic glass, *Materials Science and Engineering: A*, Volume 528, Issues 16-17, pp.5319-5326, 2011.

REFEREED PUBLICATION (KOREAN)

1. Soonwook Park, Donghoon Lee, **Hogun Park***, Concept Map-based Generative Model for Problem-Solving Data and Method for Evaluating Concept Dependency of Knowledge Tracing Models, Proc. of the Korea Software Congress, pp. 713-715, 2022. [**Outstanding Paper Award**, Top 10% of accepted papers]
2. Jiwon Jeong, Soyoung Lee, **Hogun Park***, Improving Commonsense-based QA Model through a Cycle-Encoder, Proc. of the Korea Software Congress, pp. 791-793, 2022. [**Outstanding Paper Award**, Top 10% of accepted papers]
3. Soyoung Lee, **Hogun Park***, Graph Federated Learning for Recommender System with Data Selection, Proc. of the Korea Software Congress, pp. 708-710, 2022.
4. Jongwon Park, **Hogun Park***, Arum Lee, Jong-Gyu Kim, Jong Kwan Lee, Classification of Contamination Patterns of Recyclable Paper through a Hierarchical Ensemble Model, Proc. of the Korea Software Congress, pp. 716-718, 2022.
5. Kyeongrock Park, **Hogun Park**, Orbit-based Explanation of Graph Neural Networks, Proc. of the Korea Software Congress, pp. 752-754, 2022.
6. Dongwon Jung, **Hogun Park***, Knowledge Graph-based Recommendation using Logical Query, Proc. of the KIIS Spring Conference 2022, 2022.
7. Hyunjoo Kang, **Hogun Park***, Providing Local Explanation for node2vec, Proc. of the Korea Software Congress, pp. 819-821, 2021.
   [**Outstanding Paper Award**, Top 10% of accepted papers]
8. Soyoung Lee, **Hogun Park***, Privacy-preserving Federated Learning for Graph Neural Network-based Recommender System, Proc. of the Korea Software Congress, pp. 750-752, 2021.
9. Hyung Joo Lee, **Hogun Park**, Kwangsoon Jung, Hyoung-Gon Kim, Heedong Ko, Level-of-Detail(LOD)-based Point-of-Interest Model and its Authoring Interface, Proc. of the 40th Korea Academic Society of Tourism Managment, pp. 230-238. 2013.
10. Dongmahn Seo, Suhyun Kim, **Hogun Park**, Heedong Ko, Real-time Text Scoreboard System using Social Media and Live Media, Proc. of the Korea Computer Congress 2012, Volume 39, Issue 1, pp. 193-195. 2012. **[Outstanding Paper Award]**

11. Dongmahn Seo, Suhyun Kim, **Hogun Park**, Heedong Ko, Social Network Service based on Temporal, Spatial, and Social Models, Proc. of the Korea Computer Congress 2012, Volume 39, Issue 1, pp. 257-259. 2012.
12. Kyung-Mi Park, **Hogun Park**, Hyoung-Gon Kim, and Heedong Ko, Opinion Mining on Social Media Text, *Communications of the Korean Institute of Information Scientists and Engineers*, Volume 29, Issue 11, pp. 54-60, 2011.
13. Geun-Young Lee, **Hogun Park**, Sum-Bum Youn, Dongmahn Seo, Suhyun Kim, Heedong Ko, Virtual Shared Space-based N-Screen Baseball Watching Platform, Proc. of the 22nd Conference of Human and Computer Interaction (KHCI 2011), pp. 89-91, 2011.
14. Chara Park, Sang-Yun Cha, Hanju Cho, Inseong Lee, **Hogun Park**, Donghun Kang, Heedong Ko, Jinwoo Kim, How Tangible Interaction affects Users in Social Media Service : Group-based Cheering System using Nintendo Wii, Proc. of the Domestic Conference on KMlS (KMIS 2009, Fall), pp. 811-816, 2009.
15. Kyoung-won Park, **Hogun Park**, Eric Fleury, Jae-Chul Lee, Permanent Deformation of Amorphous Alloys: Energy Absorption View Point Study, Proc. of the Korean Society for Technology of Plasticity Conference, pp. 424, 2009.
16. **Hogun Park**, Sung-Hyon Myaeng, Kyung-Min Kim, Gwan Jang, Jong-wook Choi, Cognitive Knowledge Structure and Information Seeking Framework to Reduce Cognitive Burden, *Korean Journal of Cognitive Science*, Volume 19, Issue 4, pp. 419-441, 2008.
17. Eun-Jung Choi, Jongho Won, Changseok Bae, Jin-Tae Kim, **Hogun Park**, Real-World Web Service, *Weekly Tech Trend*, Volume 1360, pp. 7-17, 2008.

PATENT

US Patent Pending

1. **Hogun Park**, Kyungrok Park, Method And Apparatus For Generating Both Local-Level And Global-Level Explanations Of Graph Neural Networks, 18/507,276, Nov. 13th, 2023.
2. **Hogun Park**, Soyoung Lee, Method And Apparatus For Training Graph Federated Learning Models Using Reinforcement Learning-Based Data Augmentation , 18/507,289, Nov. 13th, 2023.
3. **Hogun Park**, Heesoo Jung, Apparatus, Method, and Method for Determining the Number of Layers of a Graph Neural Network using a Reinforcement Learning Model, 18/090,685, Dec. 29th, 2022.

US Patent Registered

4. **Hogun Park**, Peifeng Yin, Aly Megahed, Resolving Conflicts between Experts' Intuition and Data-Driven Artificial Intelligence Models, US 11,556,848 A1, Jan. 17th , 2023.
5. Heiko H. Ludwig, **Hogun Park**, Mu Qiao, Peifeng Yin, Shubhi Asthana, Shun Jiang, Sunhwan Lee, Diagnosis of Neural Network, US 11,341,394 A1, May. 24th, 2022.
6. **Hogun Park**, Sun-Bum Youn, and Heedong Ko, Highlight Providing System and Method based on Hot Topic Event Detection, US 8,738,697 B2 , May 27th 2014.

PCT Patent Pending

7. **Hogun Park**, Sookyung Kim, Gayoung Kim, Ko Keun Kim, Suchan Park, Heesoo Jung, A Method for Knowledge Graph Embedding to Enhance Reasoning Performance with Numeric Attributes, PCT/KR2023/010997, July. 27th, 2023.

KR Patent Pending

8. **Hogun Park**, Jeonghoon Kim, A Method for Query Embedding in Multi-hop Reasoning, 10-2023-0193517, Dec. 27th, 2023.
9. **Hogun Park**, Soyoung Lee, Graph Federated Learning for Recommender System with Data Selection, 10-2022-0174584, Dec. 14th, 2022.
10. **Hogun Park**, Kyeongrock Park, Orbit-based Explanation of Graph Neural Networks, 10-2022-0175115, Dec. 14th, 2022.
11. **Hogun Park**, Heesoo Jung, Apparatus, Method, and Method for Determining the Number of Layers of a Graph Neural Network using a Reinforcement Learning Model, 10-2022-0129721, Oct. 11th, 2022.
12. **Hogun Park**, Dongwon Jung, Method and Apparatus for Explainable Item Recommendation based on Probability by using Logical Query, 10-2021-0188009, Dec. 27th, 2021.

KR Patent Registered

13. **Hogun Park**, Geun-Young Lee, Daeil Seo, Sangchul Ahn, Hyong-Gon Kim, and Heedong Ko, Panoramic Video-based Object Management System and Method, 10-1476800, Dec. 2014.
14. Dongmahn Seo, Suhyun Kim, and **Hogun Park**, Apparatus and Method for Managing Information related with Content, 10-1427711, Aug. 2014.
15. Kyung-Mi Park, **Hogun Park**, Hyoung-Gon Kim, and Heedong Ko, Review Summarization Syetem and Method, 10-1319413, Oct. 2013.
16. Dongmahn Seo, Suhyun Kim, **Hogun Park**, and Heedong Ko, Panoramic Interface for Baseball Live with Social Network Service , 10-1295002 , Aug. 2013.
17. Dongmahn Seo, Suhyun Kim, Jaewook Yoo, **Hogun Park**, Heedong Ko, Yong-Tae Jo, Han-Min Bang, Geun-Young Lee, and Sun-Bum Youn, Real-time High Resolution Panorama Video Streaming & Broadcasting System, 10-1282955, July 2013.
18. Dongmahn Seo, Suhyun Kim, **Hogun Park**, and Heedong Ko, Real-time Multi-Angle Personal Media Broadcasting System for Media Jockey, 10-1242478 , Mar. 2013.
19. **Hogun Park**, Sun-Bum Youn, and Heedong Ko, Highlight Providing System-based on Hot Topic Event Extraction and Highlight Service Providing Method using the Same, 10-1169377, July 2011.
20. Sung-Hyon Myaeng, Heungseon Oh, Kyung-min Kim, Jihee Ryu, Yoonjung Choi, **Hogun Park**, and Yuchul Jung, System and Method for Advertising based on Context, 10-1110022, Dec. 2011.
21. Heedong Ko, **Hogun Park**, Donghoon Kang, Jinwoo Kim, Chala Park, Seongtaek Lim, Sangyun Cha, and Hanju Cho, System for Tangible Broadcasting and Control Method using the Same, 10-1076691, Oct. 2011.
22. **Hogun Park** and Heedong Ko, A Interactive Remote Controller for IPTV Supporting Multi-angle and Panoramic Video Broadcasting, 10-1070274, Sept. 2011.

23. Sung-Hyon Myaeng, **Hogun Park**, Gwan Jang, and Yuchul Jung, Personalized Visualization Method for Supporting User's Information Search, Korea, 10-1054050, Aug. 2011.

RESEARCH PROJECTS

AT SUNGKYUNKWAN UNIVERSITY (SKKU)

1. LLM-augmented Knowledge Graph Reasoning — *PI*, *Mar. 2024 ~ Nov. 2024*
   - Funded by LG Electronics
   - Role: Develop a reasoning method in knowledge graphs with the capability of LLMs

2. Knowledge·Information Structure Technology for the Multiple Variations of Digital Assets — *Co-PI*, *April 2023 ~ Dec. 2025*
   Funded by IITP
   Role: Develop a reasoning method in knowledge graphs for reusing the massive 3D assets

3. Developing Intelligent Prompting Method for Sound AI Models — *PI*, *Sept. 2023 ~ Mar. 2024*
   - Funded by NCSoft
   - Role: Develop a intelligent prompting method for sound-text representation models

4. Development of Stress Visualization and Quantization based on Strain Sensitive Smart Polymer for Building Structure Durability Examination Platform — *Co-PI*, *April 2021 ~ Dec. 2025*
   - Funded by National Research Foundation of Korea
   - Role: Develop a classification model for multi-sensor data using multi-modal constrastive learning

5. Development of Brain-Body interface technology using AI-based multi-sensing — *PI*, *Aug. 2022 ~ Dec. 2024*
   - Funded by NIPA
   - Role: Develop a AI-based multi-sensing method using graph-based multi-modal encoders

6. Developing Explainable AI Methods for Unsupervised Node Representation Learning Models — *PI*, *Mar. 2021 ~ Feb. 2024*
   - Funded by National Research Foundation of Korea
   - Role: Develop a new XAI method for knowledge graph embedding using reinforcement learning and conformal prediction

7. Multi-Modal Recommender System for E-Commerce Shopping Data — *Co-PI*, *Sept. 2021 ~ Aug. 2022*
   - Funded by NAVER
   - Role: Devise a self-supervised learning method for multi-modal recommender system

8. Multi-Modal Recommender System for E-Commerce Shopping Data — *PI*, *Sept., 2021 ~ July 2022*
   - Funded by LG Electronics
   - Role: Propose a numerical reasoning method for knowledge graph embedding with numeric attributes

AT PURDUE UNIVERSITY

1. **Towards Better Modeling of Communication Activity Dynamics in Large-Scale Online Social Networks** — *Research Assistant*, Aug. 2013 ~ Aug. 2020
   - Funded by US National Science Foundation (NSF) and Defense Advanced Research Projects Agency (DARPA)
   - Role: Research on Relational Machine Learning for Graph
     - Develop a node classification method on temporal graphs
     - Devise a new graph neural network architecture for label propagation
     - Propose an interpretation method for providing explanations on representation learning

AT IBM RESEARCH – ALMADEN

1. **A Framework for Constraint-based Machine Learning** — *Research Intern*, May 2018 ~ Aug. 2018

   Funded by IBM Research
   - Role: Research on Developing a Framework for Constraint-based Machine Learning
     - Develop a framework to detect potential conflicts with given constraints and resolve them to provide new predictions.

2. **Learning Procedural Knowledge from Text** — *Research Intern*, May 2017 ~ Aug. 2017

   Funded by IBM Research
   - Role: Research on Learning Procedural Knowledge through Neural Network
     - Propose a Deep Neural Network model for learning procedural knowledge was newly proposed and achieved 0.878 in accuracy for identifying procedure-specific relationship between tasks. The work was published in WWW 2018.

AT IBM WATSON

1. **Modeling and Predicting Student Behavior** — *Research Intern*, June 2016 ~ Aug. 2016

   Funded by IBM Watson
   - Role: Research on Modeling and Predicting Customers' Behavior with RNN (Recurrent Neural Network)
     - Develop a Deep Knowledge Tracing model using RNN, which is newly proposed and gets better gain in RMSE (Root Mean Square Error) than the state-of-the-art to predict the best intervention time.

AT KOREA INSTITUTUE OF SCIENCE AND TECHNOLOGY (KIST)

1. **TourCloud: Intelligent Social Tour Contents Cloud Platform** *Technical Lead*

May 2012 ~ July 2013

Funded by Korean Ministry of Culture, Sports, and Tourism

- Role: Research on Contents Crawling and Aggregation
  - Develop a Geospatial Data CMS (Contents Management System) Server.
  - Lead a team to design and implement Front/back-end servers with MongoDB, Node.js, OpenLayers, Lucene, and Nutch under Drupal framework.
- Role: Standardization on Destination Travel Information Process
  - Standardize a data model of destination travel information at **UN/CEFACT**

2. **Development of Tangible Social Media Platform** *Technical Lead*

Jan. 2011 ~ July 2013

- Funded by KIST
- Role: Research on Emerging Social Media Aggregation and Broadcasting
  - **Review Mining** on Korean Text
  - Develop Panoramic Video-based **Social Networking Interface**
    : a Panoramic Video Player on Android
  - Exhibit our work in ***International Consumer Electronics Show (CES* 2011)** at *Las Vegas, NV*

3. **Augmented Reality Application Framework for Tourism** *Researcher*

Mar. 2009 ~ Feb. 2012

- Funded by Korean Ministry of Culture, Sports, and Tourism
- Role: Research on Mobile Context-Aware Tour Guide Platform
  - Design and implement a **semantic contents management system**
    : Web-based Mobile Tour Planning System
    : On-Site Guided Tour and Logging System for iPhone and Android

4. **Performance-Oriented Virtual Machine** *Researcher*

Mar. 2009 ~ Feb. 2012

- Funded by Korean Ministry of Knowledge Economy
- Role: Project Coordination for Midterm /Final Drafts and Evaluation
- Role: Survey on Virtual Machine Technology and Project Coordination
  - Microsoft CLR and LLVM
  - Virtual Machine Standard & Patent Analysis

5. **Development of Tangible Web Platform** *Technical Lead*

Jan. 2009 ~ Dec. 2010

Funded by KIST

- Role: Research on **Social TV Project** and Project Management
  - Implement Web (flex) and Android-based Social TV System Designs
  - Provide a semantic VOD retrieval service UX design and implement the interface using hot topic extraction on social media text
  - Implement a Head-End Message Server
  - Run **User Tests** during World Baseball Classics 2009 and Korean Baseball League Final 2008-2010 for **460 users**

AT ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE (ETRI)

1. **Real-World Web Service** *Research Intern*
   Mar. 2008 ~ Dec. 2008
   - Funded by ETRI
   - Role: Survey on **Real-World Web** Service
     - Provide a technical report about real-world web services

AT KOREA ADVANCED INSTITUTUE OF SCIENCE AND TECHNOLOGY (KAIST)

1. **Achieving Commonsense-based Context-Awareness through Development of Korean ConceptNet** *Research Assistant*
   May 2005 ~ Apr. 2008
   - Funded by Korea Science and Engineering Foundation (KOSEF)
   - Co-project with **MIT Media Lab (Dr. Henry Lieberman)**
   - Role: Research on **Commonsense Reasoning** and its Applications
     - Design and implement a **document classification** algorithm
     - Develop a reasoning engine for ConceptNet
     - Construct and develop a large-scale knowledge graph: Korean ConceptNet

2. **Cognitive Robotics for Human-Robot Interaction** *Research Assistant*
   Apr. 2006 ~ Apr. 2009
   - Funded by KIST
   - Role: Research on **Cognitive Architecture** for Human-Robot Interaction
     - Design and implement a mixed-initiative interaction system
     - Propose a script-based cognitive task reasoning system: architecture and script scheme

3. **Metadata Extraction for Semantic Web** *Research Assistant*
   Nov. 2007 ~ Jan. 2008
   - Funded by Korea Telecom (KT)
   - Role: Survey on **Text Mining** Techniques
     - Provide a technical report for state-of-the-art text mining techniques (150 pages)

4. **Exploiting a Large-Scale Commonsense Knowledge Base for Context-Driven Ad Placement** *Technical Lead*
   Mar. 2008 ~ Dec. 2008
   - Funded by Microsoft Research (MSR)
   - Role: Research on **Contextual Advertising System** based on Commonsense
     - Design and evaluate a Commonsense-based Advertising System
     - Propose an actionable knowledge detection algorithm

TEACHING EXPERIENCE (IN ENGLISH)

1. CS 47300: Web Information Search and Management as a *Teaching Assistant* at *Purdue University*
2. Introduction to Artificial Intelligence, Spring 2022/Spring 2023/ Spring 2024.
3. Artificial Intelligence Project, Spring 2022/Spring 2023/Fall 2023/Spring 2024/ Fall 2024.
4. AIM5056-41: Machine Learning with Graph, Fall 2021/Fall 2022/Fall 2023/Fall 2024.
5. SWE3052-41: Introduction to Deep Neural Networks, Fall 2021/Spring 2023/ Spring 2024.
6. SKKU 3049-41: Introduction to Big Data Analytics, Spring 2021/ Fall 2020 / Spring 2022

7. AIM5002-41: Theory of Machine Learning (Graduate Course), Spring 2021.
at *Sungkyunkwan University (SKKU)*

HONORS AND AWARDS

1. Three Outstanding Paper Awards, Korea Software Congress, 2021 and 2022.
   - The largest Korean Conference in Artificial Intelligence.
2. *Fulbright* Fellowship, the U.S. Department of State, 2013 ~ 2018.
3. Outstanding Paper Award, Korea Computer Congress 2012, 2012.
4. Best Undergraduate Student Award: ICA (International Cooperation Agency for Korea IT) President Award at the Commencement, 2006.
5. Government Fellowship, Korea Ministry of Science and Technology, 2003 ~ 2006.
6. *4th* Place, International Robot Olympiad, International Robot Olympiad Committee (IROC), 2000.

ADVISORY COMMITTEE

1. Advisory Professor in Statistics, Bank of Korea, 2024 ~ Present.
2. AI Technology Advisory Committee Member, POSCO Holdings, 2022 ~ 2023.
3. Advisory Member, Association of Korean Marketplace Landing, 2023 ~ Present.

SERVICE

PC Members/Reviewer: IJCAI 2024, KDD 2024, WSDM 2024, WWW 2024, KDD 2023, WWW 2023, AAAI 2021, KDD 2022, WSDM 2023, WWW 2022, BigComp 2022, TNNLS 2022-2021, SAC 2021, WWW 2021, AAAI 2020