Kangwook Lee

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RESEARCH INTERESTS

Natural Language Processing / Information Retrieval / Question Answering / Deep Learning / Human Computer Interaction / Data Mining / Information and Knowledge Sharing / Mobile Service / Knowledge Service

EDUCATION

Korea Advanced Institute of Science and Technology(KAIST), Daejeon, Korea
Doctor of Philosophy in Computer Science Feb 2012 – Feb 2018
  Dissertation: Deep Neural Networks Incorporating Discourse Information for
    Modeling Text
  Advisor : Sung-Hyon Myaeng

Korea Advanced Institute of Science and Technology(KAIST), Daejeon, Korea
Master of Engineering in Computer Science Feb 2010 – Jan 2012
  Thesis : Data Approximation with Ignorance of Error of Measurement in Data
    Aggregation of Wireless Sensor Networks
  Advisor : Dong-Ho Cho
Nominated in KAIST Best Paper Awards for Master Thesis

Handong Global University(HGU), Pohang, Korea
Bachelor of Engineering in Computer Science Mar 2006 – Feb 2010
Bachelor of Engineering in Electronic Engineering (double major)
Cum Laude, Tuition scholarship

Joongdong High School, Seoul, Korea Mar 2002 – Feb 2005

EXPERIENCE

Samsung Electronics, Seoul, Korea
Staff Engineer, AI Core team, AI Center, Samsung Research Mar 2018 – Present

Korea Advanced Institute of Science and Technology(KAIST), Daejeon, Korea
Research Assistant, Information Retrieval & Natural Language Processing Lab Feb 2012 – Feb 2018
Teaching Assistant, Computer Science Project Fall 2015
Teaching Assistant, Introduction to Computer Application Spring 2015
Teaching Assistant, Introduction to Computer Application Spring 2014
Teaching Assistant, Data Structure Spring 2013
Teaching Assistant, Semantic Web Spring 2012
Research Assistant, Communication and Information Systems Lab Feb 2010 – Jan 2012
Teaching Assistant, Problem Solving Fall 2011
Teaching Assistant, Programming Principle Spring 2011

KAIST Institute for Information Technology Convergence(KIITC), Daejeon, Korea
Research Engineer, Team of Knowledge Convergence Feb 2010 – Jan 2012

Handong Global University(HGU), Pohang, Korea
Undergraduate Research Engineer, Monolithic Microwave Integrated Circuit Lab Mar 2009 – Dec 2010
Teaching Assistant, Internet Application Mar 2007 – Dec 2010
Teaching Assistant, Circuit Theory Spring 2008
Teaching Assistant, Integrative Study on Learning and Faith Fall 2006 – Fall 2007
Teaching Assistant, Job and Calling Fall 2006 – Fall 2007
Teaching Assistant, Towards a Christian Worldview Fall 2006 – Fall 2007

PUBLICATIONS(19)

Journal Articles (International)

Kangwook Lee, Sanggyu Han, and Sung-Hyon Myaeng, "A Discourse-aware Neural Network-based Text Model for Document-level Text Classification", Journal of Information Science, 44(6), pp. 715--735, 2018.

Conference Proceedings (International)

Haejun Lee, Drew A. Hudson, Kangwook Lee, and Christopher D. Manning, "SLM: Learning a Discourse Language Representation with Sentence Unshuffling", in the proceedings of the 2020 Conference on Empirical

Methods in Natural Language Processing (EMNLP 2020), (accepted).

Hwon Ihm, Kyoungrok Jang, <u>Kangwook Lee</u>, Gwan Jang, Min-Gwan Seo, and Sung-Hyon Myaeng, "Multi-source Food Hazard Event Extraction for Public Health", in the proceedings of the 2nd International Workshop on Big Data Analytics for Healthcare and Well-being (BigData4Healthcare 2017), Jeju, Korea, Feb. 13, pp. 414--417.

Kyoungrok Jang, <u>Kangwook Lee</u>, Gwan Jang, Seungyong Jung, Min-Gwan Seo, and Sung-Hyon Myaeng, "Food Hazard Event Extraction based on News and Social Media: A Preliminary Work", in the proceedings of International Conference on Big Data and Smart Computing (BigComp 2016), Hong Kong, China, Jan 18-Jan 20, pp. 466--469.

<u>Kangwook Lee</u>, Sangtae Kim, and Sung-Hyon Myaeng, "Measuring Touch Bias of One Thumb Posture on Direct Touch-based Mobile Devices," in the ACM SIGCHI Extended Abstracts on Human Factors in Computing Systems (CHI 2013), Paris, France, Apr 27-May 2, pp. 241--246.

<u>Kangwook Lee</u>, Myungwon Ham, Howon Lee, and Dong-Ho Cho, "STAT: Energy-Efficient Statistical Threshold Arrangement Scheme for Unmanned Surveillance System," in the Proceedings of IEEE Communication Society and the 2nd International Conference on ICT Convergence(ICTC 2011), Seoul, Korea, Sep 28-30, 2011, pp. 142--143.

<u>Kangwook Lee</u>, Myungwon Ham, Howon Lee, and Dong-Ho Cho, "ECOS: Energy-Efficient Camera Operating Scheme for Large Scale Surveillance Systems," in the Proceedings of IEEE Communication Society and the 1st International Conference on ICT Convergence(ICTC 2010), Jeju, Korea, Nov 17-19, 2010, pp. 448--449.

Journal Articles (Domestic)
<u>Kangwook Lee</u>, Sanggyu Han, and Sung-Hyon Myaeng, "A Discourse-based Compositional Approach to Overcome Drawbacks of Sequence-based Composition in Text Modeling via Neural Networks", KIISE Transactions on Computing Practices, 23(12), pp. 698--702, 2017.

Kyoungrok Jang, <u>Kangwook Lee</u>, and Sung-Hyon Myaeng, "Extracting Implicit Customer Viewpoints from Product Review Text," Journal of KIISE: Software and Applications, vol. 41, no. 4, pp. 375--385, Apr 2014.

<u>Kangwook Lee</u>, Soobin Lee, Howon Lee, and Dong-Ho Cho, "An Energy-Efficient System Operating Scheme by Predicting the Location of Targets," The Journal of Korea Information and Communication Society, Vol. 38C, No. 02, pp. 172--180, Feb 2013.

Conference Proceedings (Domestic)
<u>Kangwook Lee</u>, Haejun Lee, Jaewon Kim, Huiwon Yun, and Wonho Ryu, "Exploration on Tokenization Method of Language Model for Korean Machine Reading Comprehension", in the Proceedings of the 31st Annual Conference on Human & Cognitive Language Technology, Daejeon, Korea, Oct 11-12, 2019, pp. 197--202.

Dongil Yang, Jina Ham, <u>Kangwook Lee</u>, and Jiyeon Lee, "Jointly learning class coincidence classification for FAQ classification", in the Proceedings of the 31st Annual Conference on Human & Cognitive Language Technology, Daejeon, Korea, Oct 11-12, 2019, pp. 12--17.

Yewon Park, Dongil Yang, Soofeel Kim, and <u>Kangwook Lee</u>, "Loss-adjusted Regularization based on Prediction for Improving Robustness in Less Reliable FAQ datasets", in the Proceedings of the 31st Annual Conference on Human & Cognitive Language Technology, Daejeon, Korea, Oct 11-12, 2019, pp. 18--22.

<u>Kangwook Lee</u>, Sanggyu Han, and Sung-Hyon Myaeng, "Towards a discourse-based compositional approach for text modelling drawbacks of sequence-based neural models", in the Proceedings of Korea Computer Congress 2017 (KCC 2017), Jeju, Korea, Jun. 18-20, 2017, pp. 654--656. (**Best Presentation**)

Kyoungrok Jang, <u>Kangwook Lee</u>, and Sung-Hyon Myaeng, "Extracting Implicit Customer Viewpoints from Product Review Text," in the Proceedings of the 25th Annual Conference on Human & Cognitive Language Technology, Seoul, Korea, Oct 11-12, 2013, pp. 61--66.

<u>Kangwook Lee</u>, Howon Lee, and Dong-Ho Cho, "Energy-Efficient Surveillance System Operating Scheme with Collaboration among Surveillance Cameras", in the Proceedings of Summer Korean Conference on Information and Communication (KICS Summer 2011), Jeju, Korea, Jun 20-22, 2011, pp. 402--403.

Kangwook Lee, Sangtae Kim, Yohaan Yoon, Jaejeung Kim, Dongwon Lee, Howon Lee, and Dong-Ho Cho, "A Multi-Modal User Interface using Voice Recognition and Multi Touch," in the Proceedings of the 20th Korean Conference on Human Computer Interaction(HCI Korea 2011), Pyeongchang, Korea, Jan 26-28, 2011, pp. 257--260.

Jaejeung Kim, Kangwook Lee, Dongwon Lee, Sangtae Kim, and Howon Lee, "Cloud Projector: Projecting Personal Content on Public Displays Using Smartphones," in the Proceedings of the 20th Korean Conference on Human Computer Interaction(HCI Korea 2011), Pyeongchang, Korea, Jan 26-28, 2011, pp. 215--217.

Dongwon Lee, Jaejeung Kim, Kangwook Lee, and Howon Lee, "A Study on Technology Valuation Method considering UX," in the Proceedings of the 20th Korean Conference on Human Computer Interaction(HCI Korea 2011), Pyeongchang, Korea, Jan 26-28, 2011, pp. 1146--1149.

PATENTS (19)   Kangwook Lee, "Cross-modal language model by aligning textual and acoustic information", Filed in Korea and WO Patent.

Kangwook Lee, Jaewon Kim, Ji-In Nam, Huiwon Yun, Hojin Jung, Kunal Chawla, Akhil Kedia, "Co-reference understanding electronic apparatus and controlling method thereof", Filed in Korea, US and WO Patent.

Jina Ham, Kangwook Lee, Soofeel Kim, Yewon Park, Wonjong Choi, "Electronic apparatus and method for providing conversation service", Filed in Korea, US and WO Patent.

Sung-Hyon Myaeng, Kangwook Lee, "A method for improving the quality of entity embeddings by utilizing definition-document embeddings", Published in Korean Patent, 10-2024300, Sep 24, 2019.

Sung-Hyon Myaeng, Kangwook Lee, Gwan Jang, Kyung-ah Han, Mingwan Seo, Seungyong Jung, Kyoungrok Jang, "Method of automatically extracting food safety event in real time from news and social networking service data", Published in Korean Patent, 10-1780377, Sep 21, 2017.

Dong-ho Cho, Dongwon Lee, Jaejung Kim, Myungwon Ham, Kangwook Lee, Youngtae Seok, Howon Lee, "Method and System for Social Network", Published in Korean Patent, 10-1738688, May 16, 2017.

Sung-Hyon Myaeng, Kyungmin Kim, Heungsun Oh, Eunyoung Kim, Heedong Go, Kangwook Lee, "Method for Eliminating Ambiguity of POI Extraction, Method for Extracting POI from Document, and Apparatus for Extracting POI", Published in Korean Patent, 10-1571316, Nov 18, 2015.

Kangwook Lee, Soobin Lee, Myungwon Ham, and Juneyoung Park, "System for Video Monitoring based on Mobile Device and Method for Broadcasting Recoded Video Thereof", Published in Korean Patent, 10-1380501, Apr 16, 2014.

Kangwook Lee, Myungwon Ham, Soobin Lee, and Howon Lee, "Method and System Prioritizing Event of Surveillance Camera", Published in Korean Patent, 10-1356846, Jan 22, 2014.

Myungwon Ham, Kangwook Lee, Howon Lee, and Dong-Ho Cho, "Adaptive Method and System for Operating Surveillance Camera System Based upon Statistics", Published in Korean Patent, 10-1261135, Apr 29, 2013.

Hoon Kim, Yunbum Choi, Yongho Kim, Myungwon Ham, Kangwook Lee, Howon Lee, and Dong-Ho Cho, "Efficient Sensor Deployment Method in Wireless Sensor Network, Wireless Sensor Network System Using the Same and Recording Medium for the Same", Published in Korean Patent, 10-1250696, Mar 28, 2013.

Howon Lee, Kyungsub Shin, Myungwon Ham, Kangwook Lee, and Dong-Ho Cho, "Relay-Count Based Backoff Counter Selection Algorithm in Wireless Mesh Networks", Published in Korean Patent, 10-1238577, Feb 22, 2013.

Hoon Kim, Yunbum Choi, Myungwon Ham, Kangwook Lee, Howon Lee, and Dong-Ho Cho, "Efficient Sensor Deployment Method in Wireless Sensor Network, Wireless Sensor Network System Using the Same and Recording Medium for the Same", Published in Korean Patent, 10-1225897, Jan 17, 2013.

Munji Lee, Kangwook Lee, Myungwon Ham, Howon Lee, and Dong-Ho Cho, "Method for Operating Human-Assisted Surveillance Camera System and System for the Same", Published in Korean Patent, 10-1225271, Jan 16, 2013.

Jaejeung Kim, Dongwon Lee, <u>Kangwook Lee</u>, Howon Lee, and Dong-Ho Cho, "Method and System for controlling display," Published in Korean Patent, 10-1224245, Jan 14, 2013.

<u>Kangwook Lee</u>, Myungwon Ham, Howon Lee, and Dong-Ho Cho, "Method for Operating Surveillance Camera System in Cooperative Ways, System and Camera for the Same", Published in Korean Patent, 10-1223528, Jan 11, 2013.

Jaejeung Kim, Dongwon Lee, <u>Kangwook Lee</u>, Howon Lee, and Dong-Ho Cho, "Advertising Method and System Using Public Display," Published in Korean Patent, 10-1142743, Apr 26, 2012.

Howon Lee, Myungwon Ham, <u>Kangwook Lee</u>, Jaejeung Kim, Dongwon Lee, and Dong-Ho Cho, "Unmanned Monitoring Method and System", Published in Korean Patent, 10-1125275, Mar 2, 2012.

Bangchul Jung, Woojae Lee, Sung-geun Jeon, Howon Lee, Myungwon Ham, <u>Kangwook Lee</u>, and Dong-Ho Cho, "An Apparatus and a Method for Cooperative Relaying, and a Wireless Network System based on Cooperative Relaying", Published in Korean Patent 10-1102084, Dec 27, 2011.

RESEARCH PROJECTS (22)	Research Staff, Neuro-Symbolic AI, for knowledge-aware service, Samsung Research, Mar 2020-Present.

Research Staff in Charge, Open-domain QA for Bixby, Samsung Research, Mar 2018-Feb 2020.

Research Staff in Charge, Robot QA, Samsung Research, Feb 2019-Dec 2019.

Research Staff, Compliance Management System, Samsung Electronics, Mar 2019-Aug 2019.

Research Staff in Charge, Development of Core Technology for Human-like Self-taught Learning based on a Symbolic Approach, Korea Ministry of Science, ICT & Future Planning, May 2013-Feb 2018.

Research Staff, Development of Agro-livestock Cloud and Application Service for Balanced Production, Transparent Distribution and Safe Consumption based on GS1 (Global Standard #1), Korea Ministry of Science, ICT and Future Planning, March 2015-Feb 2018.

Research Staff in Charge, Analytics of User-generated Big Data for Early Warnings of Disasters, Korea Ministry of Science, ICT and Future Planning, May 2015-April 2017.

Research Staff, Enhancement of Resilience based on Situation Awareness for Compound Disasters, KAIST Institute of Disaster Studies, February 2015-January 2016.

Research Staff, Development of Question Understanding Technology for olleh.com, Korea Telecom, August 2013-December 2013.

Research Staff, Research to Analyze Relationships between Context Aspects (Objects, Events, Activities and Environment), Korea Agency for Defense Development (ADD), Oct 2012-Sep 2014.

Research Staff in Charge, Development of Core Technology for Future Mobile Commerce Service Platform, Samsung Electronics, Jul 2012-Jun 2014.

Research Staff, Development of Technology for Extracting Sentiment/Episode in Intelligent Tour Content, Korea Ministry of Culture, Sports and Tourism, May 2012-Feb 2015.

Research Staff, Development of Mobile Software Platform for User Experience, Korea Ministry of Knowledge & Economy, Feb 2012-Nov 2012.

Research Staff, Augmentation and Categorization of Patterns to Discovery Potential Industrializing Items, Korea Institute of Science and Technology Information, Mar 2012-Sep 2012.

Research Staff, Development of Automatic Medical Trend Analysis Technique with Text Mining Methods, National Research Foundation of Korea, Feb 2012-Aug 2012.

Research Staff, Operation Framework Development of Large-Scale Intelligent and Cooperative Surveillance Systems, Korea Ministry of Knowledge & Economy, Feb 2010-May 2012.

Research Staff, Development of Inter-screen Collaboration Service using Dynamic Reconfiguration of Web Converged Contents, Korea Communications Commission (KCC), Mar 2011-Jan 2012.

Research Staff, Development of Open E-book Platform, KAIST Institute Brand Project, Jan 2011-Jan 2012.

Research Staff, Development of Intelligent Tutoring System for Nursing Creative Human Resources, Korea Ministry of Knowledge & Economy, Apr 2010-Jan 2012.

Research Staff, A Study on 4G Autonomous Communication System and Converged System of Mobile & Nomadic System, Samsung Advanced Institute of Technology (SAIT), Feb 2010-Dec 2010.

Research Staff, A Study on Cognitive and Autonomous Beyond-4G Systems and Development of the Simulator, Samsung Advanced Institute of Technology (SAIT), Feb 2010-Nov 2010.

Undergraduate Researcher, Design a Transceiver Microchip Supporting for 27MHz and 448MHz bandwidths, Handong Global University & Postech, Jun 2008-Dec 2008.

PROFESSIONAL ACTIVITIES		
Participated in Forecasting Technical Needs for Future Korea, Korea Evaluation Institute of Industrial Technology (KEIT)		Jan 2012
Participated in the R&D Strategy Roadmap Planning, Korea Communications Commission (KCC)		Jun 2011
Demonstration of Gesture Based e-Learning Application using Social Network Services on the 7th WTA Deajeon High-tech Fair, KOTRA Exhibition Center (KOTREX), Daejeon, Korea		Oct 10-12 2010
Participated in 2030 IT Convergence Technology Forecast, Korea Evaluation Institute of Industrial Technology (KEIT)		Aug 2010
Participated in the Mobile Service Medium-Long Term Roadmap Committee and Mobile Service Strategy Planning, Korea Communications Commission (KCC)		Apr 2010
Member, Korea Information and Communications Society		2011, 2013
Member, Human-Computer Interaction (HCI) Society of Korea		2010 – 2011

HONORS AND AWARDS		
Samsung Best Paper Award (Artificial Intelligence section), Silver prize, Samsung		Oct 2020
National Academic Scholarship (Ph.D.), KAIST		Feb 2012 – Feb 2018
KAIST International Discovery Program, KAIST		Dec 2016
National Academic Scholarship (M.S.), KAIST		Feb 2010 – Jan 2012
Academic Excellence Scholarship by New University for Regional Innovation Project, Korea Ministry of Education, Science & Technology		Spring 2007 – Fall 2009
Academic Excellence Scholarship, Handong Global University		Fall 2006, Fall 2007 – Fall 2008
Research Funding, Hanium IT mentoring, Korea Ministry of Knowledge & Economy		Fall 2008
President Prize for Leadership, Handong Global University		Sep 2008
Seoul Superintendent of Education Award for Seoul Science Competition		Nov 1998

SKILLS	
	Deep learning, Distributed computing (Familiar Environment: TensorFlow, PyTorch, Horovod) Language: Korean, English, Japanese(a little)

REFEREES		
	Sung-Hyon Myaeng	**Dong-Ho Cho**
	Professor	Chair Professor
	School of Computing,	Department of Electrical Engineering,
	Korea Advanced Institute of Science and Technology	Korea Advanced Institute of Science and Technology
	Daejeon, Korea	Daejeon, Korea