

Keeheon Lee

Yonsei University

Big Data-based Future Model of Knowledge Service
Team

Department of Library and Information Science
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Updated: February 2015

RESEARCH INTEREST

- Developing a foundation for “Science & Technology Engineering” based on data mining and social simulation (especially, focused on biomedicine and public health).
- Detecting and classifying factors that affect the behavior of scientific social interactions.
- Designing mechanism for a scientific improvement by applying social simulation based on rules of factors.

EDUCATION

YONSEI UNIVERSITY

Ph.D. in Industrial Information Engineering

Seoul, Korea

August 2014

Thesis: Technology Analysis and Forecasting Using Data Mining and Simulation

Advisor: Professor Chang Ouk Kim

Relevant courses: Advanced Intelligent Information Engineering, Applied Deterministic Models in Industrial Engineering, U-city Convergence Service Seminar, Meta-Heuristics, Healthcare Operation Management, Dynamic Programming, Introduction to Stochastic Processes and Applications, Mathematical Modeling and Numerical Analysis, Mathematical Statistics

YONSEI UNIVERSITY

M.S. in Industrial System Engineering

Seoul, Korea

August 2009

Thesis: New Product Demand Forecast Using Computational Diffusion Model Based on Personality

Advisor: Professor Chang Ouk Kim

Relevant courses: Computer Simulation Technique, Logistics Information Engineering, Service Management Science, Innovation Engineering, High-Tech Industry Policy, Natural Resource Economics, Research in Social Network

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

Exchange Student in Computer Science

Santa Cruz, CA

September 2004 -May 2005

Relevant courses: Algorithm, Database Management System, Object-Oriented Programming, Data Structure, Econometrics, Game Theory, Probabilistic Model

YONSEI UNIVERSITY

B.S. in Computer Science and Industrial System Engineering

Seoul, Korea

August 2007

B.A. in Economics

FIELDS

Text Mining, Informetrics, Technology Management, Science & Technology Policy, Social Simulation, Artificial Intelligence

AREA OF SPECIALIZATION

- **Artificial intelligence including data mining and machine learning:** event detection and classification, knowledge structure construction out of literature, semantic relation between terms, scientific research space are the main areas.
- **Social simulation (Agent-based modeling and simulation):** modeling the behavior of an agent and the social structure and rules of agents, simulating the systematic evolution of a society, and the analysis of the impact of factors (e.g., individual behavior, social network structure, and circumstance) based on generated data are the main areas.
- **Network analysis:** constructing a knowledge structure out of literature in a network format, inducing centralities that represent the whole network, finding paths from one node to another node, and detecting patterns. As a result, generating hypotheses are the main areas.

RECENT EMPLOYMENT

YONSEI UNIVERSITY

BK PLUS Post-Doctoral Research Fellow

Seoul, Korea

September 2014 – Present

Positioned as a research fellow in Big Data-based Future Model of Knowledge Service Team, Department of Library and Information Science. Actively participated in research on medical literature-based knowledge discovery, social media mining. Performed individual research as well.

Supervisor: Professor Min Song

RESEARCH EXPERIENCE

YONSEI UNIVERSITY

Research Assistant

Seoul, Korea
November 2014 – February 2015

Opiniomics: Analysis and Prediction on Dynamic Public Opinion in Smart Society

Funded by *Yonsei University Future-leading Research Initiative of 2014*. Developed a big data based model for public opinion evolution. Raised the main idea that opinion evolves such as biological evolution in gene level. Developing this model as a new perspective of public opinion research.

YONSEI UNIVERSITY

Research Assistant

Seoul, Korea
July 2014 – August 2015

Acropolis 3.0: Big Data Public Opinion Analysis Framework

Funded by *National Research Foundation of Korea*. Developed a new big data analytics framework for public opinion.

SCIENCE AND TECHNOLOGY POLICY INSTITUTE (STEPI)

Visiting Scholar

Seoul, Korea
September 22, 2014

Agent-based Modeling of Korean Economy

Consulted, as an expert, the agent-based modeling of Korean economy built by IIASA and STEPI.

KOREA INSTITUTE OF SCIENCE AND TECHNOLOGY EVALUATION AND PLANNING (KISTEP)

Visiting Scholar

Seoul, Korea
August 2014

Satellite Information Application Industry of Korea

Built scenarios for satellite information application industry of Korea.

YONSEI UNIVERSITY

Research Assistant

Seoul, Korea
July 2014- September 2014

Science and Technology Classification for Advisory Support

Funded by *Korea Institute of Science and Technology Information (KISTI)*. Developed a new method for science and technology classification.

YONSEI UNIVERSITY

Research Assistant

Seoul, Korea
July 2013-January 2014

Big Data Policy Foundation Construction

Funded by *Ministry of Trade, Industry and Energy of Korea*. Developed big data mining service for logistics and supply chain management.

YONSEI UNIVERSITY

Research Assistant

Seoul, Korea
September 2012
– August 2014

Modeling Virtual Markets with Consumers: Socio-Demographic Properties and Social Network: Application to Product Portfolio Optimization

Funded by *National Research Foundation of Korea*. Raised the core idea and proposed the idea as a research proposal. Developed heterogeneous agent-based simulation for product portfolio optimization.

YONSEI UNIVERSITY

Research Assistant

**Social Scientometrics: Social and Psychological Research
Dynamics Simulation**

Funded by *National Research Foundation of Korea*. Raised the whole idea and proposed the idea as a research proposal. Developed agent-based simulation for forecasting a new research area.

Seoul, Korea
September 2012
-February 2015

YONSEI UNIVERSITY

Research Assistant

**Large-scale Agent-based Distributed Simulation for Product
Diffusion and Optimization**

Funded by *National Research Foundation of Korea*. Raised the core idea and proposed the idea as a research proposal. Developed a system that has many computers to run agent-based product diffusion models in distributed manner.

Seoul, Korea
May 2010-April 2013

YONSEI UNIVERSITY

Research Assistant

**A study on Analytical Hierarchical Process and Analytical
Network Process**

Funded by *Korea Institute of Science and Technology Evaluation and Planning (KISTEP)*. Developed an analytical network process for an administrative preliminary assessment.

Seoul, Korea
September 2012
-November 2012

YONSEI UNIVERSITY

Research Assistant

**Product Diffusion Simulation and Optimal Product Design
Based on Consumer Social Network**

Funded by *Korea Foundation for the Advancement of Science & Creativity*. Developed an agent-based product diffusion model to simulate behavioral consumers and optimize product attributes for the consumers. Guide/assist undergraduate students to participate in a research on product diffusion simulation.

Seoul, Korea
May 2012-October 2012

YONSEI UNIVERSITY

Research Assistant

**Heterogeneous Consumer-Agent Network Simulation Model for
New Product Diffusion: Application to Price and Supply
Volume Strategy**

Funded by *Korea Sanhak Foundation*. Developed an agent-based product diffusion model and determine the price and the supply volume that maximizes the expected profit.

Seoul, Korea
June 2008-July 2009

TEACHING EXPERIENCE

YONSEI UNIVERSITY

Seoul, Korea

Lecturer, “**R&D and New Product Development and Management**”

March 2015 – June 2015

Teaches the theories of convergence technology and the practical applications of convergence technology to R&D and new product development and management. Supports big data cases for convergence technology.

YONSEI UNIVERSITY

Seoul, Korea

Teaching Assistant and Lecturer, “**Humanities Engineering**”

March 2015 – June 2015

Provides students in humanities with theoretical foundations for engineering. Gives cases how Engineering completes humanities and how humanities complement Engineering in perspective of big data.

HANSUNG UNIVERSITY

Seoul, Korea

Guest Lecturer, “**A Special Lecture on Big Data**”

December 18, 2014

Made an introduction of big data in context of digital library.

SOONGSIL UNIVERSITY

Seoul, Korea

Guest Lecturer, “**Data Science for Business**”

November 15, 2014

Provided the possible applications of data science to business.

YONSEI UNIVERSITY

Seoul, Korea

Teaching Assistant, “**Big Data Intelligence Program**”

November 15, 17, 2013

Supported the students who were selected as members of big data intelligence program with statistical regression models that can be applied to big data.

YONSEI UNIVERSITY

Seoul, Korea

Teaching Assistant, “**Technology Management**”

Fall 2010

Assisted undergraduate students to understand what technology management is and why it is important as well as to analyze technology management cases.

YONSEI UNIVERSITY

Seoul, Korea

Teaching Assistant, “**Design and Management of Industrial Applications**”

Spring & Fall 2011,
Spring 2012

Provided students who are to design and to manage a solution for a problem with creative problem-solving, project management, and technical writing and presentation (Selected as an outstanding T.A. for an extra scholarship).

YONSEI UNIVERSITY

Seoul, Korea

Teaching Assistant, “**Future Industry and Standardization**”

Fall 2007, Spring 2008

Funded by *Korean Standards Association*. Guided students to learn what standards are and why they are important.

OTHER WORK EXPERIENCE

CHEIL INDUSTRIES Seoul, Korea
Translator June 2010 – December 2010
Prepared presentation contents for Pyeong-Chang Winter Olympics hosting.

SAMSUNG FACTORY AUTOMATION (SFA) Seoul, Korea
Presenter July 2010
Prepared contents for RFP from Adidas group. Presented SFA's proposal to Adidas group (CFO and Head manager of Korea). Won the order.

**KOREA RESEARCH INSTITUTE FOR VOCATIONAL
EDUCATION & TRAINING (KRIVET)** Seoul, Korea
Assistant Secretariat Fall 2007, Spring 2008
Contact speakers and arrange schedules for *Global Human Resource Forum 2006*

SKILLS

Computer Experienced in UNIX/LINUX environments as well as in IBM compatible PCs
Experienced in assembly language, C/C++, Visual C++, Java, PHP, PERL, R, PYTHON, PostgreSQL, Repast, Netlogo, XML, XHTML.
Experienced in natural language processing applied to text mining, bioinformatics, social media mining.

Language Korean (Fluent), English (Fluent), French (Introductory)

AWARDS

YONSEI UNIVERSITY Seoul, Korea
May 15, 2014
Certificate of Merit for Excellent Paper

HYUNDAI MOBIS Seoul, Korea
August 13, 2013
2nd Prize, Hyundai Mobis Automobile A/S Part Demand Forecasting

FELLOWSHIP AND SCHOLARSHIP

BK PLUS Post-Doctoral fellowship	<i>Fall 2014, Spring 2015</i>
Teaching assistantship	<i>Fall 2007, Spring 2008</i>
Research scholarship	<i>Spring 2011</i>
External scholarship	<i>Spring 2008, Fall 2008</i>
Internal scholarship	<i>Spring 2008, Fall 2010, Spring 2011, Fall 2012</i>
Administrative assistantship	<i>Fall 2008, Spring 2009, Fall 2009, Spring 2010</i>

PUBLICATIONS

- Journal Articles*
2016
- Keeheon Lee, Hosang Jung (2016). Inducing Logistic Values of Unmanned Vehicle from Meta-Analysis Using Probabilistic Topic Model Over Time, *Technological Forecasting and Social Change*, **will be submitted at 2016-01-10**
- Keeheon Lee, Hyo Jung Jung, Min Song (2015). Subject-Methodology Topic Network Analysis on Communication Studies, *New Media and Society*, **will be submitted at 2016-01-10**
- Min Song, Suyeon Kim, Keeheon Lee (2016). Ensemble trajectory analysis of topical Journal Ranking in Bioinformatics, *Journal of the Association for Information Science and Technology*, **will be submitted at 2016-01-09**
- Keeheon Lee, Suyeon Kim, Erin Heajin Kim, Min Song (2016). Comparative Evaluation on Various Bibliometric Networks by Tomographic Content Analysis: An Application to Parkinson's Disease, *Journal of the Association for Information Science and Technology*, **under review**
- 2015
- Keeheon Lee, Hyo Jung Jung, Min Song (2015). Weighted Subject-Method Network Analysis of Library and Information Science Studies, *Journal of the Korean Library and Information Science Society*, 49(3), 457-488. (Korean)
- Keeheon Lee, Go Eun Heo, Min Song (2015). Biomedical text mining: A trend in Biomedical Knowledge Discovery Based on Text Mining, *The Korean Institute of Information Scientists and Engineers*, 33(4), 30-38. (Korean)
- 2014
- Keeheon Lee**, Ho Yeop Lee, Chang Ouk Kim (2014). Pricing and timing strategies for new product using agent-based simulation of behavioural consumers, *Journal of Artificial Societies and Social Simulation*, 17(2),1.
- 2013
- Keeheon Lee**, Shintae Kim, Chang Ouk Kim, Taeho Park (2013). An agent-based competitive product diffusion model for the estimation and sensitivity analysis of social network structure and purchase time distribution, *Journal of Artificial Societies and Social Simulation*, 16(1),3.
- 2012
- Keeheon Lee**, Chang Ouk Kim (2012). Artificial Disaster: a trend of agent-based simulation models for disaster response, *Information and Communications Magazine*, 29(5), 27-36. (Korean)
- 2011
- Shintae Kim, **Keeheon Lee**, Jangkyun Cho, Chang Ouk Kim (2011). Agent-based diffusion model for an automobile market with fuzzy TOPSIS-based product adoption process, *Expert Systems with Applications*, 38(6), 7270-7276.
- 2009
- Jong-Myung Ko, Jihoon Sohn, Young-Duk Ahn, **Keeheon Lee**, Seung-Hwan Yang, Seung-Ho Kim, Yu-Suk Park, Young Hoon Lee (2009). The development of customized overcrowding index for an emergency department, *Journal of Korean Society of Emergency Medicine*, 20(4), 435-444. (Korean)

SEMINARS, CONFERENCE PRESENTATIONS

Conference

- 2015
- Keeheon Lee** (2015). Science & Technology Analysis CODEC: A Study on the Framework of Data-driven Futurology, Korea Institute of Industrial Engineering Conference.
- Keeheon Lee** (2015). Subject-Method Relational Network Community Analysis: An Application to Communication Studies, Korea Institute of Industrial Engineering Conference.
- Keeheon Lee** (2015). Multidisciplinary Research Space Model as A Venue for Research Dynamics Analysis, Korea Institute of Industrial Engineering Conference.
- Keeheon Lee** (2015). Research Map in A Network Representation: the Linked World of OR/MS in Biomedicine, Korea Institute of Industrial Engineering Conference.
- Keeheon Lee**, Heejune Lim (2015). Event-driven Feature Selection for Technology Road Map: An Application to Automobile Industry, Korea Institute of Industrial Engineering Conference.
- Keeheon Lee** (2015). Comparing Network Structures of Different Versions of a Book: A Case Study of the Bible. In: ICADL 2015: 17th International Conference on Asian Digital Library, Seoul (Korea).
- Keeheon Lee**, Yong Hwan Kim, Seung Han Baek, Min Song (2015). Analyzing Subject-Method Network of Bioinformatics and Biology. In: ACM CIKM 2015: 24th International Conference on Information and Knowledge Management, Melbourne (Australia).
- Hosang Jung, Seungbae Sim, **Keeheon Lee**, Myeongki Kim (2015). Unmanned Aerial Vehicle Utilization for Addressing a Logistical Dead-Zone Problem in Remote Areas. In: FAIM 2015: 25th The International Conference on Flexible Automation and Intelligent Manufacturing, Wolverhampton, (United Kingdom).
- 2014
- Hoyeop Lee, Jongsoo Lim, **Keeheon Lee**, Chang Ouk Kim (2014). A framework for product design by applying ordinal optimization to multi-agent simulation, Korea Institute of Industrial Engineering Conference.
- Go Eun Heo, **Keeheon Lee**, Min Song (2014). Inferring undiscovered public knowledge by using text mining-driven graph model. In: ACM CIKM 2014: 23rd International Conference on Information and Knowledge Management, Shanghai (China).
- Keeheon Lee**, Chang Ouk Kim (2014). The biasedness in a group decision caused from social network structure. Korean Operations Research and Management Science Conference.

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- Keeheon Lee**, Chang Ouk Kim (2014). Topic recipe based Social Simulation for Research Dynamics Analysis. In: ESSA'14: Tenth Conference of the European Social Simulation Association, Barcelona (Spain).
- 2013 **Keeheon Lee**, Hoyeop Lee, Chang Ouk Kim (2013). Extracting paper quality features by sequencing and mining paper, Korea Institute of Industrial Engineering Conference
- 2012 Hoyeop Lee, **Keeheon Lee**, Chang Ouk Kim (2012). New product diffusion forecasting model with consideration of quasi-rationality, heterogeneity, and social influence of consumer, Korea Institute of Industrial Engineering Conference
- 2011 Jisun Kang, **Keeheon Lee**, Chang Ouk Kim (2011). A method for determination of competitive/complementary product and network externality for effective IT product release strategy, Korea Institute of Industrial Engineering Conference.
- 2011 **Keeheon Lee**, Seong Rok Hong, Chang Ouk Kim (2011). A growth model of new product demand forecast: structural difference evaluation between mathematical model and agent-based model, Korea Institute of Industrial Engineering Conference.
- 2010 **Keeheon Lee**, Chang Ouk Kim (2010). New product diffusion dynamics forecasting: multi-agent based simulation with psychological bias and dynamic threshold, Korea Institute of Industrial Engineering Conference.
- 2008 **Keeheon Lee**, Sang-Min Lee, Hee-Suk Park (2008). Sharing Wealth: CCL based Collective Intelligence on Web 2.0 of cultural diversity, 3rd Complexity Conference, Complexity Research and Education Network.
- 2008 **Keeheon Lee**, Chang Ouk Kim (2008). New product diffusion in uncertain market: multi-behavioral consumer network simulation model, Korea Institute of Industrial Engineering Conference.

Seminar

- 19.12.2014 “Technology analysis and forecasting using data mining and social simulation” at Department of Library and Information Science, Yonsei University
- Data mining: guessing from the traces
 - Social simulation: guessing from the rules
 - The roles of data mining and social simulation in technology analysis and forecasting
- 29.11.2013 “Scientometric mining & simulation for new research discovery” at Department of Information and Industrial Engineering, Yonsei University
- Systematic evolution of scientific research
 - Scientometric vector space
 - Scientometric simulation

Talk

31.10.2014

“The role of data mining and social simulation for analyzing and forecasting science and technology” in the 20th Anniversary of the Department of Information and Industrial Engineering, Yonsei University.

CITIZENSHIP

United States

REFERENCE

Chang Ouk Kim

Professor (Associate Dean, College of Engineering)
Department of Information and Industrial Engineering
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Yonsei University
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Republic of Korea (South)
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Young Hoon Lee

Professor (Dean, Yonsei Graduate School of Engineering)
Department of Information and Industrial Engineering
C423 Engineering Building 3
Yonsei University
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Republic of Korea (South)
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Min Song

Associate Professor (Underwood Distinguished Professor)
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