Sungil Kim

Email: sungil.kim@unist.ac.kr
Phone: 052.217.3195

RESEARCH INTEREST

Industrial Statistics and Data Analytics; Quality Engineering and Management; Response surface methodology; Demand forecasting; Machine learning and Data mining; Business Analytics

ACADEMIC APPOINTMENT

Ulsan National Institute of Science and Technology, Ulsan, Korea

Assistant Professor, School of Management Engineering	July 2016-present
Director, Center for Maritime Data Science	February 2019-present
Director, Center for Advanced Analytics	March 2018-February 2019

EDUCATION

Georgia Institute of Technology, Atlanta, Georgia, USA
H. Milton Stewart School of Industrial and Systems Engineering

Ph.D. in Industrial Engineering (with specialization in Statistics)	December 2011
Minor: Supply Chain Management	
M.S. in Statistics	December 2007
M.S. in Industrial Engineering	May 2007

Yonsei University, Seoul, Korea
Department of Computer Science and Industrial Systems Engineering

B.S. in Industrial Engineering, Magna Cum Laude	February 2005

Hansung Science High School, Seoul, Korea February 1998

EMPLOYMENT

Assistant Professor, **UNIST**	July 2016-present
Senior Engineer, **Samsung SDS**	January 2014-June 2016
Consultant, **Terra Technology**	September 2011-December 2013
Data Scientist Intern, **Predictix**	May 2009-December 2009, May 2008-August 2008
Research/Teaching Assistant, **Georgia Institute of Technology**	May 2006-August 2011

PUBLICATIONS

JOURNALS

1. Sungil Kim, Heeyoung Kim, and Jye-Chyi Lu (2019), A Practical Approach to Measuring the Impacts of Stockouts on Demand, *Journal of Business and Industrial Marketing*, 34(4), pp 891-901.

2. Sungil Kim (2019), Revealing household characteristics using connected home products, *Information Sciences*, 486, pp 52-61.
3. Heeyoung Kim, Rong Duan, Sungil Kim, Jaehwan Lee, and Guang-Qin Ma (2019), Spatial cluster detection in mobility networks: a copula approach, *Journal of the Royal Statistical Society: Series C*, 68(1), pp 99-120.
4. Heeyoung Kim, Justin T. Vastola, Sungil Kim, Jye-Chyi Lu, and Martha A. Grover (2017), Incorporation of engineering knowledge into the modeling process: a local approach, *International Journal of Production Research*, 55(20), pp 5865-5880.
5. Sungil Kim, Heeyoung Kim, and Yongro Park (2017), Early detection of vessel delays using combined historical and real-time information, *Journal of the Operational Research Society*, 68(2), pp 182-191.
6. Heeyoung Kim, Sungil Kim, Jian Deng, Jye-Chyi Lu, K. Wang, C. Zhang, Martha A. Grover, and B. Wang (2017), An integrated holistic model of a complex process, *International Journal of Advanced Manufacturing Technology*, 89(1), pp 1137-1147.
7. Heeyoung Kim, Justin T. Vastola, Sungil Kim, Jye-Chyi Lu, and Martha A. Grover (2017), Batch sequential minimum energy design with design region adaptation, *Journal of Quality Technology*, 49(1), pp 11-26.
8. Sungil Kim, Heeyoung Kim, and Younghwan Namkoong (2016), Ordinal classification of imbalanced data with application in emergency and disaster information services, *IEEE Intelligent Systems*, 31(5), pp 50-56.
9. Sungil Kim and Heeyoung Kim (2016), A new metric of absolute percentage error for intermittent demand forecasts, *International Journal of Forecasting*, 32(3), pp 669-679.
10. Sungil Kim, Heeyoung Kim, Richard W. Lu, Jye-Chyi Lu, Michael J. Casciato, and Martha A. Grover (2015), Adaptive combined space-filling and D-optimal designs, *International Journal of Production Research*, 53(17), pp 5354-5368.
11. Sungil Kim, Heeyoung Kim, Jye-Chyi Lu, Michael J. Casciato, Martha A. Grover, Dennis W. Hess, Richard W. Lu, and Xin Wang (2015), Layers of experiments with adaptive combined design, *Naval Research Logistics*, 62(2), pp 127-142.
12. Michael J. Casciato, Sungil Kim, Jye-Chyi Lu, Dennis W. Hess, Martha A. Grover (2012), Optimization of a carbon dioxide-assisted nanoparticle deposition process using sequential experimental design with adaptive design space, *Industrial & Engineering Chemistry Research*, 51(11), pp 4363-4370.
13. Seung-Kweon Hong, Sungil Kim (2005), A time prediction model of cursor movement with path constraints, *Journal of the Korean Institute of Industrial Engineers*, 31(4), pp 334-340.

REFEREED CONFERENCES

1. Michael J. Casciato, Sungil Kim, Jye-Chyi Lu, Dennis W. Hess, Martha A. Grover (2012), Optimization of carbon dioxide-assisted nanoparticle deposition process with uncertain design space, *Proceedings of the 11th International Symposium on Process Systems Engineering*, pp 1191-1195.

2. Juhui Lee, Sungil Kim (2019), Ordinal-imbalanced Data Classification through Noise Reduction by Singular Value Decomposing Truncation, *In Proceedings of the IISE Annual Conference,(AC'19), IISE, Orlando.*

TEACHING EXPERIENCE

Ulsan National Institute of Science and Technology, Ulsan, Korea
School of Management Engineering
Instructor

- MGE 502: Statistical Programming — Fall, 2018-2019
- TIM 713: Industrial Innovation Seminar — Fall, 2018
- MGE 553: Advanced Quality Control — Fall, 2017-2019
- MGE 362: Statistical Quality Management — Spring, 2017-2019
- MGE 301: Operations Research I — Fall, 2016-2017
- MGT 209: Operations Management — Fall, 2016

Georgia Institute of Technology, Atlanta, Georgia, USA
H. Milton Stewart School of Industrial and Systems Engineering
Teaching Assistant

- ISyE 4031: Regression and Forecasting — Spring, 2011
- ISyE 3770: Probability and Statistics — Fall, 2010
- ISyE 2027: Probability with Applications — Spring, 2010
- ISyE 4803: Advanced Supply Chain Logistics — Fall, 2007
- ISyE 6739: Statistical Methods — Summer, 2007

PRESENTATIONS

1. Exploiting Logistics Anomaly Detection using Maritime Big Data, KIIE, November 2019.
2. Maximum Feasibility Estimation, INFORMS Annual Meeting, October 2019.
3. Revealing household characteristics using connected home products, ICISE, June 2019.
4. Exploiting logistics anomaly detection using maritime bigdata, IISE Annual Conference & Expo, May 2019.
5. Ordinal-imbalanced data classification by singular value decomposing truncation, IISE Annual Conference & Expo, May 2019.
6. Ordinal-imbalanced Data Classification through Noise Reduction by Singular Value Decomposing Truncation, KIIE, April 2019.
7. Data Analytics in Logistics Systems: Monitoring, Classification, and Assessment, Yonsei University, May 2018.
8. Big data analytics in logistics, 4th UNIST Big Data Symposium, November 2017.
9. Early detection of vessel delays using combined historical and real-time information, INFORMS Annual Meeting, October 2017.

10. Layers of experiments with adaptive combined design, INFORMS Annual Meeting, November 2014.
11. Prediction & inference using hierarchical spatio-temporal varying coefficient model: applied to detailed sales forecasting for retail providers, Georgia Tech Research and Innovation Conference, February 2010.
12. Detailed sales forecasting & promotion analysis for retail providers, Joint Statistical Meetings, August 2009.

SERVICE

Campus Contributions

1. The Fourth Industrial Revolution Working Committee, UNIST (2018-2020)
2. UNIST Visibility Committee, UNIST (2018-2020)
3. Space Planning and Allocation Committee for Industry-University Convergence Campus, UNIST (2018-2019)
4. Faculty Recruitment Committee, School of Management Engineering (2017-2019)
5. Undergraduate Admissions Committee, UNIST (2017)
6. Committee for the Preparation of the Movement to Complex Campus, School of Management Engineering (2017)

Professional Membership

1. The Institute of Industrial & Systems Engineers (2019-present)
2. The Korean Institute of Industrial Engineers (2014-present)
3. The Institute for Operations Research and the Management Sciences (2006-present)

Professional Leadership

1. Member, Logistics Policy Committee, Ulsan Metropolitan City Hall (2019-2021)
2. Director, Center for Maritime Data Science, UNIST (2019-present)
3. Director, Center for Advanced Analytics, UNIST (2018)
4. Student Organizer of Statistics Seminar, Georgia Institute of Technology (2008-2009)

Professional Activities

1. Session chair of the Fifth International Conference on the Interface between Statistics and Engineering(ICISE), Statistics and Analytics, Seoul, June, 2019.
2. Session chair of the KIIE Annual Conference, Industrial AI, Gwangju, April, 2019.

GRANTS & CONTRACTS

1. Development of data analytics methods to identify the sources of odor
    - Role: PI
    - Organization: Ulsan Industry-University Convergence Campus

- Contract Period: October 1, 2017-March 31, 2018
- Amount Awarded: ₩38,500,000

2. A Constraint satisfaction problem with attribute data: an application to connected home products
   - Role: PI
   - Organization: UNIST
   - Contract Period: September 1, 2016-August 31, 2019
   - Amount Awarded: ₩20,000,000
3. Incorporation of domain knowledge into the modeling process for quality Improvement in smart manufacturing
   - Role: PI
   - Organization: National Research Foundation of Korea (NRF)
   - Contract Period: March 1, 2017-February 28, 2022
   - Amount Awarded: ₩250,000,000
4. Development and application of methods and an intelligent platform system for industry 4.0
   - Role: Participant
   - Organization: UNIST
   - Contract Period: February 1, 2017-December 31, 2017
   - Amount Awarded: ₩40,000,000
5. Blockchain-based system engineering
   - Role: co-PI
   - Organization: UNIST
   - Contract Period: March 1, 2018-December 31, 2018
   - Amount Awarded: ₩45,000,000
6. Structural analysis on the processes of technological innovation in the fourth industrial revolution: focusing on open innovation and concurrent transformation of regional innovation system
   - Role: co-PI
   - Organization: National Research Foundation of Korea (NRF)
   - Contract Period: July 1, 2018-June 30, 2021
   - Amount Awarded: ₩180,000,000
7. Development of data analytics methods for gas mixture classification
   - Role: PI
   - Organization: UNIST-Taesung Environmental Research Institute
   - Contract Period: August 1, 2018-December 31, 2018

- Amount Awarded: ₩10,000,000

8. Data mining project lab
   - Role: Participant
   - Organization: UNIST-Taesung Environmental Research Institute
   - Contract Period: October 1, 2018-December 31, 2018
   - Amount Awarded: ₩15,000,000
9. Development of stowage optimization engine solver using reinforcement learning
   - Role: PI
   - Organization: Cyberlogitec
   - Contract Period: November 1, 2018-July 31, 2019
   - Amount Awarded: ₩90,000,000
10. Smart Port Logistics Support Center
    - Role: PI
    - Organization: Ulsan Port Authority
    - Contract Period: January 1, 2019-December 31, 2019
    - Amount Awarded: ₩1,801,756,000
11. Development of AI Based Reactor Core Diagnostics System
    - Role: Participant
    - Organization: Korea Hydro & Nuclear Power Co.,Ltd.
    - Contract Period: June 1, 2019-May 31, 2021
    - Amount Awarded: ₩435,508,000

PROFESSIONAL EXPERIENCE

Samsung SDS, Seoul, Korea
Data Analytics Lab, Algorithm Research Team, R&D Center
Senior Engineer/Data Scientist January 2014-June 2016

- Developed risk assessment and scoring algorithm using text mining for SDS Smart Logistics portal solution, Cello Square.
- Developed a data-driven method for early detection of vessel delays combining with real-time vessel tracking information. The proposed approach is validated by applying to real data-sets extracted from the logistics platform of Samsung SDS, Cello.
- Analyzed global IT trends and disruptive technologies in the fields of big data analytics, Internet of Things(IoT), and video analytics.
- Collaborated with SDS R&D center in San Jose to research new technologies in data analytics for SDS mid/long term business in global markets.

Terra Technology, Norwalk, Connecticut, USA
Supply Chain Management Consultant September 2011-December 2013

- Applied data mining techniques (e.g., pattern recognition, regression analysis, clustering) to real business problems.
- Collected/identified big data from existing internal databases and external/public data sources.
- Cooperated with the client's DBA team and tested the performance of forecasts.
- Developed technical solutions, including writing and testing SQL procedures and/or UNIX/Windows shell scripts to meet customer integration requirements.
- Participated in demand planning projects for Procter & Gamble, Unilever, Kraft Foods Inc., ConAgra Foods, Kellogg's etc.
- Analyzed data to identify demand volatility and changing consumer preferences.
- Created data validation templates using Qlikview reports by adding new functionalities: multiple selection, high dimensional search.

Predictix, Atlanta, Georgia, USA
Data Scientist Intern May-December 2009 & May-August 2008

- Participated in pre-sales projects for Target Corporation.
- Developed a synthetic sales data generator for studying promotion effects.
- Analyzed retail sales transaction data for the promotion planning.
- Developed spatial-temporal data mining techniques for retail sales transaction data from Shopko.
- Collected/identified big data from existing internal databases and external/public data sources.

Georgia Institute of Technology, Atlanta, Georgia, USA
H. Milton Stewart School of Industrial and Systems Engineering
Research Assistant May 2006-August 2011

- Developed statistical methodologies for a data collection plan with uncertain design space.
- Developed a new approach, *Layers of Experiments*, for the robust optimization of nanoparticle synthesis.
- Explored a new statistical methodology in a multi-level, multi-scale framework in the context of supply chain logistics systems.
- Performed inventory system analysis on stocked items and participated in a warehousing design for Enraf Fluid Technology.

PATENTS

1. Kim, Sungil (primary inventor), Method and Apparatus for Determining Delay Possibility of Shipment. KR 10-2019-0158913, issued December 3, 2019.
2. Kim, Sungil (primary inventor), Apparatus and method for sensor based realtime odor classification. (KR 10-2018-0037408, issued March 30, 2018), (China 201910234530.5, issued March 26, 2019).
3. Kim, Sungil (primary inventor), Method for risk scoring in logistics system. KR 10-2015-0150296, issued October 28, 2015.

4. Kim, Sungil (primary inventor), System and method for grid-based geofencing service, KR 10-2015-0090396, issued June 25, 2015.
5. Kim, Sungil (co-inventor), System and method for detecting and predicting anomalies based on analysis of text data, KR 10-2014-0142784, issued October 21, 2014.
6. Kim, Sungil (co-inventor), System and method for detecting and predicting anomalies based on analysis of time-series data. KR 10-2014-0136765, issued October 10, 2014.
7. Kim, Sungil (primary inventor), Apparatus and method for calculating standard route of moving body. KR 10-2014-0127859, issued September 24, 2014.
8. Kim, Sungil (primary inventor), Apparatus and method for early detection of abnormality. KR 10-2014-0112321, issued August 27, 2014.

TECHNICAL SKILLS

R, Python, MATLAB, Hadoop, Spark, Perl, C/C++, Visual Basic, HTML, Korn Shell, Unix/Linux, Java, SQL, MS Access, PL/SQL, XML, MySQL, LINDO/LINGO, GAMS, Arena, Qlikview

AWARDS & HONORS

2019 IISE Best Paper Award, Quality Control & Reliability Engineering Division, *The Institute of Industrial and Systems Engineers*
2015 SDSers of the Quarter, *Samsung SDS*
2010 Honorable mentions, *The Business and Economics Statistics Section at the Joint Statistical Meetings*
2006 Global Logistics Scholar, *The Logistics Institute*
2005 Graduate Research Scholarship, *Korea Research Foundation*