JOONHO BAE

Room 221
914 Hill Street, Ann Arbor
Michigan, U.S.A

1-734-881-4852
baejh@umich.edu
joonhobae.github.io

EDUCATION

University of Michigan-Ann Arbor, U.S.A 2019-Current

- Ph.D. in Technology & Operations, Ross School of Business

Korea Advanced Institute of Science and Technology (KAIST), South Korea 2017-2019

- M.S. in Industrial & Systems Engineering
  Thesis: "Multi-Output Log Gaussian Processes for Change Point Detection"

Seoul National University (SNU), South Korea 2009-2016

- B.S. in Statistics and Financial Economics

RESEARCH INTERESTS

System Identification

- Development of data-driven, probabilistic models for complex dynamic systems
- Bayesian nonparametric methods (e.g., sparse & multi-output Gaussian Process regression)
- Sparse & low-rank tensor reconstruction (e.g., recommender systems for mobile applications)

System Monitoring & Prognostics

- Metamodeling of dynamic systems based on multi-sensors (e.g., degradation process modeling)
- Real-time system monitoring and anomaly/change-point detection

System Control & Optimization

- Stochastic optimization and model predictive control (e.g., optimal operations for Energy Storage System)
- Operations management and management science

RESEARCH IN PROGRESS

1. **J. Bae,** S. Soh, J. Choi, J. Park. "Uncovering Dynamic Preferences and Recommending Game Applications" (will be submitted by October*)*
2. **J. Bae,** J. Park. "Count-based Change-Point Detection via Multi-Output Log-Gaussian Cox Processes," *IISE Transactions*, forthcoming.
3. **J. Bae** (with S. Lee, H. Sim, and J. Park). "Optimal Management of Energy Storage Systems for Wind Turbines" (will be submitted)

RESEARCH EXPERIENCE

***Research Assistant*, KAIST** (Advisor: Prof. Jinkyoo Park, Sponsor: **LG CNS**) 2018-2019

- Prediction of State of Health (SOH) for Energy Storage Systems (ESS)
  - Developed a data-driven, nonparametric approach to estimate SOH
  - Implemented a hierarchical/multi-task strategy exploiting correlations between multi-sensors
- Suggestion of a new criterion of operations management for ESS
  - Optimized the operations of variables (e.g., C-rate, DoD) to maximize cost-efficiency for battery lifecycle
- Real-time system monitoring for ESS

- Examined real-time prognosis models for monitoring fault of an ESS battery

***Research Assistant*, KAIST** (Advisor: Prof. Jeonghye Choi, Sponsor: **Kantar TNS**) 2017-2019

- Prediction of future usage for mobile applications from log data
  - Developed a nonparametric time series model to estimate a user-specific usage for mobile applications
  - Recommended personalized lists of mobile applications based on the estimated future usage
- Development of a targeting strategy
  - Proposed a new segmenting and targeting strategy to maximize the hitting ratio
  - Conducted statistical analysis to estimate the suggested strategy

***Research Assistant*, Seoul National University** (Advisor: Prof. Sinsup Cho, **Time Series Lab.**) 2012-2013

- Revised the Korean Educational Statistics Software (KESS) to enable statistical analysis on Excel
- Predicted Altman Z-score by extracting features based on companies' financial figures

CONFERENCE PRESENTATIONS & INVITED TALKS

1. "The Recommender System for Mobile Applications", *2018 Global Marketing Conference*, Tokyo, Japan, July 26-29, 2018
2. "Frequency-based Anomaly Detection via Multi-Output Log Gaussian Cox Processes", *2018 Stochastic Processes and their Applications*, Gothenburg, Sweden, June 11-15, 2018.
3. "An Application of Doubly Stochastic Poisson Process for Detecting Abnormalities", *INFORMS Annual Meeting 2018*, Phoenix, AZ, U.S., November 4-7, 2018
4. "The Recommender System for Mobile Applications", Department of Business Graduate Seminar, Yonsei University, South Korea, May 29, 2018

AWARDS & HONORS

- National Science & Technology Scholarship, KOSAF, 2009-2015
- Social Venture Idea ($3,000), Ministry of Employment & Labor, South Korea, 2014
- Enactus National Competition, Enactus, 2014
- Hope Advertisement, Seoul Metropolitan Government, 2014
- SCH Social Venture Idea ($1,000), Soonchunhyang University, 2013
- SK Social Enterprise ($10,000), SK Happiness Foundation, 2013
- Army Commendation Medal, 8th U.S. ARMY, 2012

WORK EXPERIENCE

***Marketing Manager*, SK TELECOM** 2015-2017

- Managed more than 40 stores in Seoul
- Developed optimizing tools for distribution of the cell phones to maximize the profits

***Co-Founder & Team Leader*, CHAM SON GIL Cooperative** 2013-2015

- Established a healing center for blind masseurs and developed a unique B2B service and products targeting 20-30s, who were not the main customers of the original market
- Expanded branches to nationwide and opened six stores, ensuring $3,000 monthly income for each masseur on average

***Sergeant*, HHC, 8th U.S. ARMY** 2010-2012

- Served in the U.S. Army as a Korean Augmentation to the United States Army

TEACHING EXPERIENCE

***Teaching Assistant*, KAIST** 2018-2019

- Data-Driven Decision Making and Control (Fall 2018)
- Engineering Statistics I (Spring 2018)

TECHNICAL STRENGTHS

- Programming Languages: C, Python, MATLAB
- Statistical Languages: R, SAS, Stata, SPSS, SQL, Excel VBA
- Machine Learning Modules: GPy, GPyOpt, gpflow, tensorflow, keras, PyMC3, GPML, gpstuff

SELECTED COURSEWORK

Operations Research/Management Science

- Stochastic Modeling I — Dr. Kyoung-Kuk Kim
- Stochastic Modeling II — Dr. Kyoung-Kuk Kim
- Convex Optimization — Dr. Woo-Chang Kim
- Game Theory with Engineering Applications — Dr. Jinkyoo Park

Machine Learning/Statistical Learning

- Applications of AI/Data Mining Technology — Dr. Il-Chul Moon
- Statistical Learning Theory — Dr. Changdong Yoo
- Deep Learning for Computer Vision — Dr. Junmo Kim
- Mathematical Foundation of Reinforcement Learning — Dr. Song Chong
- Bayesian Estimation and its Application — Dr. Joohwan Chun

Graduate & Advanced Undergraduate Level from Seoul National University

- Time Series Analysis
- Mathematical Statistics I / II
- Data Mining Methods
- Experimental Design & Survey Practice
- Discrete Data Analysis
- Statistical Computing

REFERENCES

Jinkyoo Park (M.S. Advisor)
Assistant Professor
Department of Industrial & Systems Engineering
KAIST, Daejeon, South Korea
Phone: +82-42-350-3133
E-mail: jinkyoo.park@kaist.ac.kr

Jeonghye Choi (Research Co-Advisor)
Associate Professor
Department of Marketing
Yonsei University, Seoul, South Korea
Phone: +82-2-2123-6575
E-mail: jeonghye@yonsei.ac.kr

Kyoung-Kuk Kim (M.S. Thesis Committee Member)
Associate Professor
Department of Industrial & Systems Engineering
Department of Mathematical Sciences (Affiliate)
KAIST, Daejeon, South Korea
Phone: +82-42-350-3128
E-mail: catenoid@kaist.ac.kr

Seung Bum Soh (Co-Researcher)
Assistant Professor
Department of Operations, Decisions and Information
Yonsei University, Seoul, South Korea
Phone: +82-2-2123-6562
E-mail: sbsoh@yonsei.ac.kr