Beomseok Seo

CONTACT INFORMATION

Statistical Research Team, Bank of Korea, bsseo@bok.or.kr
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Seoul, 04514, Rep. of KOREA

EDUCATION

Penn State University, University Park, PA — Aug 2016 - Aug 2021
Ph.D., Statistics (GPA 3.88/4.00)

- Advisor: Jia Li and Lynn Lin
- Thesis: Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks.

Korea University, Seoul, Korea — Mar 2005 - Feb 2011
B.S., Economics & Statistics
(GPA 4.23/4.50, STAT 4.46, ECON 4.22)

RESEARCH INTERESTS

My research interests include interpretable statistical modeling and machine learning for the better human understanding and human-machine interaction, developing validation tools for machine learning models in perspective of business and economics, various text-related economic and financial problems, etc.

PEER-REVIEWED JOURNAL ARTICLES

* Corresponding author

Beomseok Seo*, Younghwan Lee, Hyungbae Cho (2022+) "Machine-Learning-Based News Sentiment Index (NSI) of Korea." Submitted

Beomseok Seo*, Lynn Lin, Jia Li (2022+) "Mixture of Linear Models Co-supervised by Deep Neural Networks." Journal of Computational and Graphical Statistics Accepted

Beomseok Seo*, Lynn Lin, Jia Li (2021). "Block-wise Variable Selection for Clustering via Latent States of Mixture Models." Journal of Computational and Graphical Statistics, 1-13. Published

Jia Li, **Beomseok Seo**, Lynn Lin (2019) "Optimal Transport, Mean Partition, and Uncertainty Assessment in Cluster Analysis." Statistical Analysis and Data Mining: The ASA Data Science Journal 12.5: 359-377 Published

Beomseok Seo*, Jia Li (2022+) "SEE-Net: Synced and Explanation-Enhanced Neural Network." Will be submitted soon

Beomseok Seo (2022+) "Cohort Analysis for Homogeneous Consumption Behavior Using Explainable Neural Network" In progress

Beomseok Seo (2022+) "Information Extraction from Ubiquitous Text Data for Text-enhanced Now-casting." In progress

Beomseok Seo, Jia Li (2022+) "EM Algorithm for Parametric Approximation of Neural Networks." In progress

CONFERENCE PROCEEDINGS & WORKING PAPERS

Yuling Chang, **Beomseok Seo** (2022+) "Using Explainable AI to Envision the Future of Work, Workers, and Workplace." In progress

Beomseok Seo, (2022) "뉴스텍스트를 이용한 경기예측: 경제 부문별 텍스트 지표의 작성과 활용", Bank of Korea Issue Note, 2022(18). Seoul.

Beomseok Seo, Younghwan Lee, Hyungbae Cho (2022) "기계학습을 이용한 뉴스심리지수(NSI)의 작성과 활용", Bank of Korea National Account Review, 2022(1), 68-90. Seoul.

Younghwan Lee, **Beomseok Seo** (2022) "Extracting Economic Sentiment from News Articles: The Case of Korea.", Irving Fisher Committee on Central Bank Statistics (IFC) Conference 2022, Italy.

Beomseok Seo (2021) "Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks", Penn State University Ph.D Dissertation, State College, PA.

Seungjun Shin, **Beomseok Seo** (2022+) "빅데이터를 이용한 실시간 민간소비 추정", Bank of Korea Working Paper, Seoul. In progress

CONFERENCE & SEMINAR TALKS

Korea Information Society Development Institute (KISDI), Seoul June 2022
기계학습을 이용한 뉴스심리지수(NSI)의 작성과 부문별 텍스트 지표의 활용, Invited talk

The Korean Statistical Society Conference (TKSS) 2022, Seoul June 2022
Cohort Analysis for Homogeneous Consumption Behavior Using Explainable Neural Network, Invited talk

Korea University Dept. of Statistics, Seoul May 2022
Mixture of Linear Models Co-supervised by Deep Neural Networks, Invided talk

경제인문사회연구회 데이터 기반 미래예측 정책지원 모델연구 워크샵, Seoul May 2022
기계학습을 이용한 뉴스심리지수(NSI)의 작성과 활용, Invided talk

Bank of Korea Statistics Forum 2021, Seoul Nov 2021
Cohort Analysis for Homogeneous Consumption Behavior Using Explainable Neural Network, Invided talk

The Korean Statistical Society Conference (TKSS) 2021, Seoul Nov 2021
Mixture of Linear Models Co-supervised by Deep Neural Networks, Invited talk

Ewha Womans University Dept. of Statistics 2021, Seoul Oct 2021
Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks, Invited talk

Computational and Financial Econometrics (CFE) 2019, London Dec 2019
Optimal transport, mean partition, and uncertainty assessment in cluster analysis, Invited talk

Joint Statistical Meetings(JSM) 2019, Denver Jul 2019
Variable Selection via Semi-Clusters for Mixture-Model-Based Clustering, Contributed talk

Joint Statistical Meetings(JSM) 2018, Vancouver Jul 2018
Optimal transport, mean partition, and uncertainty assessment in cluster analysis, Contributed talk

50th Anniversary Conference of the Statistics Dept., State College May 2018
Optimal transport, mean partition, and uncertainty assessment in cluster analysis, Contributed talk

5th National Statistics Development Forum, Seoul May 2015
Fitting the Gross Domestic Expenditure (GDP), Contributed talk

TEACHING EXPERIENCE

Penn State University, State College, PA

- *Instructor, Dept. of Statistics*
  - STAT200, Elementary Statistics, Summer 2019, Summer 2021
  - STAT418, Introduction to Probability and Stochastic Processes, Spring 2020

- *Teaching Assistant, Dept. of Statistics*
  - STAT557, Data Mining, Fall 2018
  - STAT561, Statistical Inference, Spring 2019
  - STAT511, Regression analysis, Spring 2017
  - STAT510, Applied time Series analysis, Fall 2019, Fall 2020
  - STAT485, Intermediate topics in R statistical language, Fall, Summer 2017
  - STAT418, Introduction to probability and Stochastic Process, Fall 2016, Spring 2017
  - STAT401, Experimental methods, Spring 2018

WORK EXPERIENCE

The Bank of Korea, Seoul, Korea

- *Statistics Research Team, Economist* *Jun. 2021 - Present*
  - Modeling of text data and developing new statistical indices: news sentiment index, economic policy uncertainty index, etc.; Modeling real time consumption
- *Economic Statistics Department, Junior Economist* *Feb 2013 - Jun 2016*
  - Time series modeling and forecasting gross domestic products (GDP); Automatizing and programming the compilation of goods and services of exports and imports in GDP.
- *Financial Markets Department, Junior Economist* *Jan 2011 - Feb 2013*
  - Time series modeling and volatility analysis of short term financial markets

Pennsylvania State University, State College, PA

- *Dept. of Statistics, Research Assistant* *June 2018, June 2020, & January 2021*
  - High-dimensional Unsupervised Learning Problems, Supervised by Jia Li
  - Interpretable Neural Network Models, Supervised by Lynn Lin

- *Smeal College of Business, Research Assistant* *July 2020*
  - Neural Networks for Longitudinal Data, Supervised by Lei Wang
- *Dept. of Political Science, Research Assistant* *June 2017*
  - Misclassified Event-Failure Models, Supervised by Bumba Mukherjee

Korea Army, Paju, Korea Aug 2006 - Jul 2008

TRAINING

- *Advanced Mathematics Program of The Bank of Korea Academy*, Seoul
  Stochastic Process, Real Analysis, Differential Equations Mar 2012 - Dec 2015
- *Summer School, Barcelona Graduate School of Economics*, Barcelona
  Time Series Vector Auto Regressive Models Jul 2014
- *Singapore Regional Training Institute, IMF*, Singapore
  Modeling for Financial Markets and Instruments Dec 2012

LANGUAGES

Python/Tensorflow/Konlpy, R, SQL, SAS (comfortable), C/C++, Flutter (limited)

AWARDS

2018, *The Best Poster Award* of The Statistics Dept. at Penn State Univ.

2016, *Graduate Study Fellowships* of The Bank of Korea

2010, *Best Honors Scholarship* in Korea University

2006-2010, *Honors Scholarship* in Korea University

SELECTED COURSEWORK

Penn State University
Data Mining I, II (STAT557, IST558), Hierarchical Algorithm and Deep Learning (MATH597), Foundations of Deep Learning (IST597), Statistical Computing (STAT540), Probability Theory (STAT517), Theory of Statistics I, II (STAT513, 514), Asymptotic Tools (STAT553), Stochastic Processes and Monte Carlo Methods (STAT515), Regression Analysis and Modeling (STAT511), Design and Analysis of Experiments (STAT512), Spatial Models (STAT597), Linear Models (STAT580).

Korea University
Topics in Mathematical Statistics (STAT 412), Multivariate Statistical Analysis (STAT401), Computational Statistics (STAT321), Time series Analysis (STAT302), Regression Analysis (STAT342), Sampling Theory (STAT311), Econometrics I, II (ECON301, 242), Financial Economics (ECON354), Economics of Strategy and Information (ECON 324), Micro and Macro Economics (ECON201, 202).