Lee Jihwan
Curriculum Vitae



Contact & Bio

- Nationality: Republic of Korea (South Korea)
- Birthdate: 1985.06.17
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- E-Mail: jihwan@pknu.ac.kr
- Address(US): 15443 Meadowlark Ct, Lake Oswego, OR
- Address(KOR): 104-202, 67, Banyeo-ro, Busan, South Korea
- Homepage: https://balab.paz.works
- Language: Korean, English

Current Position

- Title: Associate Professor
- Department: Division of Systems Management and Engineering
- Institution: Pukyong National University (South Korea)
- Address: B21-603, 45 Yongso-ro, Busan, South Korea
- Employment Period: 2017.09 – Present (2025.02)

Educational Background

- **Bachelor of Engineering @ Industrial Engineering | 2004.03 ~ 2008.02**
  Seoul National University (Top ranked University in South Korea)
  - Relevant Coursework: Introduction to Computer Science, Database, Datamining, Statistics, Linear Algebra, Operations Research, Business Analytics
- **Ph.D of Engineering @ Industrial Engineering | 2028.03 ~ 2015.08**
  Seoul National University (Advisor: Professor Yoo S. Hong)
  - Thesis title: Bayesian Network Approach to Engineering Change Management
  - Summary: Bayesian network-based framework to predict and mitigate the risk of change propagation by analyzing actual change records and dependency information from expert elicitation

Work Experience

- **Research Fellow | 2015.09 ~ 2016.02**
  Seoul National University, Sustainable Innovation Systems Research Institute
  - Collaborated on a national research project focused on uncertainty management in new product development.

- **Research Professor | 2016.02~2017.08**
  Hankuk University of Foreign Studies (South Korea), Department of Industrial and

Management Engineering

- While staying in short period as a research professor, I have trained my teaching skill by teaching 2 classes (engineering account, operations management regarding optimization)
- Extended my research into more machine learning oriented

- **Assistant Professor | 2017.09~2022.08**
  Pukyong National University, Division of Systems Management and Engineering
  - Hired in the field of Business Analytics, responsible for teaching programming languages and data science principles.
  - Developed a diverse teaching portfolio, covering Data Science, Deep Learning, Programming Language (Python, Java, Web Programming), Data Processing and visualization using python Algorithms, Databases, Introduction to computer science
  - Supervised graduate students and actively operated a research laboratory, fostering collaboration on data-driven projects.
  - Led several national research projects focusing on maritime data analytics.

- **Associate Professor | 2022.09~current**
  Pukyong National University, Division of Systems Management and Engineering
  - Introduced advanced courses in Deep Learning and Special Topics in Machine Learning, including up-to-date subjects like Explainable AI (XAI).
  - Conducted graduate courses in English, recruiting and mentoring international students, enhancing my proficiency in English communication.
  - Actively operating a research laboratory, overseeing interdisciplinary projects and mentoring students, including international researchers.
  - Actively researching Explainable AI to enhance the transparency, safety, and reliability of AI systems.
  - Research now focuses on the broad application of machine learning in industrial domains such as maritime, petroleum engineering, and customer review analytics.

- **Visiting Scholor | 2024.08~current**
  Portland State University, Department of Engineering Technology and Management
  - Engaged in research collaboration with faculty and scholars in engineering and technology management in PSU.
  - Volunteered for the PICMET conference, serving as a review board member and session chair.
  - Immersed in U.S. culture, strengthening cross-cultural collaboration and communication skills.

Advisory Activity

- **Technical Advisor | 2016.09~2020.09**
  Bringprice.com
  - Developed and managed flight ticket search algorithms, optimizing search efficiency and user experience.

- **Technical Advisor | 2021.09 ~ current**
  FutureConnect (LiivFarm)
  - Led the development of smart farm control algorithms, enhancing automation and efficiency in agricultural operations.
  - Designed data strategy solutions, leveraging AI and IoT to optimize smart farming technologies.

Research Area

- Machine Learning & Artificial Intelligence in Industrial Applications
- Enhancing Trustworthiness and Explainability of ML Algorithms using XAI Techniques
- Maritime Analytics
  - Fuel Consumption Prediction for large-scale vessels and route optimization.
  - XAI-based Main Engine Diagnosis using vessel operation data and system logs.
- Petroleum Data Analytics
  - Decision Support for Petroleum Exploration through analysis of lithofacies data.
  - Denoising lithofacies image data
- Business Information Analytics
  - Information Extraction from business corpus using Large Language Models (LLMs)
  - Corpus Includes customer review, medical error record analysis, 10-K report etc.
- Product Development & Management
  - Data-driven inverse design (engineering design automation)
  - Design Change Log Analysis to improve Product Development Management.

Proficient Programming Languages

- Machine Learning Programming (Python, Java, C++, Matlab, Jupyter Notebook, R)
- Web-based Programming (HTML/CSS/Bootstrap/Flask/Django)
- Databases (MySQL, MongoDB)
- GUI-based ML (Microsoft Azure Machine Learning Studio, SAS)
- SW development & deployment : Docker, Github
- Core python packages for Data Science
  - ML/DL Framework: Scikit-learn, Pytorch, Tensorflow, wandb,…
  - Data Processing: Pandas, Numpy, Eionops,…
  - Data Visualization: Matplotlib, Seaborn, Plotly, Streamlit, …
- Experienced in Actual SW development
  - Sensor Data Monitoring SW(GUI)
  - Agent-based Simulator for HPC (High-performance Computing)

Journal Articles

- Total Citation 506, h-index 12, i10-index15
  Source: https://scholar.google.com/citations?user=KkeYol8AAAAJ&hl=ko

1. (Under Review, CA) Nugraha A., Kwon, H., Park, G., & Lee, J.
Cooperative Neural Networks for Inverse Design: Integrating Denoising Autoencoder and Surrogate Model for Partial Design Variable Imputation, ***Engineering Applications of Artificial Intelligence***

2. (Under Review, co-CA) Park M., Lee, S., Kim D., & Lee, J.
Explainable AI-based Root-Cause Diagnosis of Maritime Engine Anomalies with External Factors, ***Computers in Industrial Engineering***

3. (Under Review, CA) Antariksa G., Koeshidayatullah, A., Das S., & Lee, J.
XAI-Driven Contamination for Self-Supervised Denoising with Pixel-Level Anomaly Detection in Seismic Data, ***Journal of Applied Geophysics***

4. (Under Review, CA) Yeshitla D., Kim, M., Kim, Y., & Lee, J.
WSim4ABM: Agent-based Modelling Simulation Web service with Message-Broker middleware and Annotation processing library, ***Software X***

5. (SCIE, CA) Handayani, M. P., Kim, D., Lee, S., & Lee, J. (2025).
Predictive analysis of fuel oil consumption in vessels: interpretable modelling with emphasis on load conditions. **Maritime Policy & Management**, 1-24.

6. (SCIE, CA) Kim, H., Lee, S., Lee, J., & Kim, D. (2024).
A Data-Driven Approach to Analyzing Fuel-Switching Behavior and Predictive Modeling of Liquefied Natural Gas and Low Sulfur Fuel Oil Consumption in Dual-Fuel Vessels. **Journal of Marine Science and Engineering**, 12(12), 2235.

7. (SCIE, CA) Jeong, N., & Lee, J. (2024).
An Aspect-Based Review Analysis Using ChatGPT for the Exploration of Hotel Service Failures. ***Sustainability***, 16(4), 1640.

8. (SCIE, CA) Handayani, M. P., Kim, H., Lee, S., & Lee, J. (2023).
Navigating Energy Efficiency: A Multifaceted Interpretability of Fuel Oil Consumption Prediction in Cargo Container Vessel Considering the Operational and Environmental Factors. ***Journal of Marine Science and Engineering***, 11(11), 2165.

9. (SCIE, CA) Antariksa, G., Muammar, R., Nugraha, A., & Lee, J. (2023).
Deep sequence model-based approach to well log data imputation and petrophysical analysis: A case study on the West Natuna Basin, Indonesia. ***Journal of Applied Geophysics***, 218, 105213.

10. (SCI, Coauthor) Oh, S., Lee, J., Hong, Y. S., & Kim, K. (2023).
Increased risk of cardiovascular disease associated with diabetes among adult cancer survivors: a population-based matched cohort study. ***European Journal of Preventive Cardiology***, 30(8), 670-679.

11. (SCIE, CA) Ahmed, H. A., & Lee, J. (2023).
FCP2Vec: Deep Learning-Based Approach to Software Change Prediction by Learning Co-Changing Patterns from Changelogs. ***Applied Sciences***, 13(11), 6453.

12. (SCIE, CA) Kim, D., Handayani, M. P., Lee, S., & Lee, J. (2023).
Feature Attribution Analysis to Quantify the Impact of Oceanographic and Maneuverability Factors on Vessel Shaft Power Using Explainable Tree-Based Model. ***Sensors***, 23(3), 1072.

13. (SCIE, CA) 2021, G. Antariksa, R. Muammar, J. Lee.
“Performance evaluation of machine learning-based classification with rock-physics

analysis of geological lithofacies in Tarakan Basin, Indonesia". ***Journal of Petroleum Science and Engineering***.

14. (SCIE, CA) 2021, D. Kim, G. Antariksa, M.P. Handayani, J. Lee. Explainable Anomaly Detection Framework for Maritime Main Engine Sensor Data. ***Sensors***. 21(5).
15. (SCOPUS, CA) 2021, A.H. Abdurhman, J. Lee, "FE2VEC: Prediction of Software Change Propagation using a Deep Learning Model". ***ICIC Express Letters***. 15(5).
16. (SCIE, CA) 2020, D. Kim, S. Lee, and J. Lee. An Ensemble-Based Approach to Anomaly Detection in Marine Engine Sensor Streams for Efficient Condition Monitoring and Analysis., ***Sensors****,* 24
17. (SCIE, Coauthor) *2020,* K. Oh, H.W. Kim, D, Kim, J, Lee, J. Lee, Y,S Hong, Product Interface Design for Complexity Management in Assembly Systems*,* ***IEEE Access****, 8.*
18. (SCIE, CA) 2020, D. Kim, S. Lee, and J. Lee. Data-Driven Prediction of Vessel Propulsion Power Using Support Vector Regression with Onboard Measurement and Ocean Data.", ***Sensors****,* 20*.*
19. (SSCI, CA) 2019, M.K. Kwon, Y.S. Hong, J. Lee Product-Service System Business Modelling Methodology Using Morphological Analysis, ***Sustainability****,* 11(5).**(I.F. 3.251, Rank 52.4 (Q2),**
20. (SCIE, FA) 2018, J. Lee, Y.S. Hong, Data-driven prediction of change propagation using Dependency Network ***Engineering Applications of Artificial Intelligence***, 7.
21. (SCOPUS, CA) 2018, J. Lee & Y.S. Hong, 2018 Improving Flight Search Engine by Learning Consumer Preference Function from Choice Data, ***ICIC Express Letters***, 12(10).
22. (SCIE, FA) 2017, J. Lee & Y.S. Hong, Bayesian network approach to change propagation analysis, ***Research in Engineering Design,*** 28(4)***.***
23. (SCIE, FA) 2016, Jihwan Lee & N.W. Cho, Fast Outlier Detection using a Grid-based Algorithm, ***PLOS one,*** 11.
24. (SCIE, FA) 2016, Jihwan Lee & Y.S. Hong, 2015, Extraction and visualization of industrial service portfolios by text mining of 10-K annual reports, ***Flexible Service and Manufacturing,*** 28(4)***.***
25. (SCIE, FA) 2015, Jihwan Lee & Y.S. Hong, Design Freeze Sequencing using Bayesian Network Framework, ***Industrial Management & Data Systems***, 115(7).
26. (SCOPUS, FA) 2014, Jihwan Lee & Y.S. Hong, Business Model Mining: Analyzing a Firm's Business Model with Text Mining of Annual Report, ***Industrial Engineering and Management Systems***, 13(4).

Conference

1. J.H. Lee, & Y.S. Hong, 2015, A Bayesian Network approach to improve change propagation analysis, The 20th International Conference on Engineering Design (ICED 2015).
2. J.H. Lee, & Y.S. Hong, 2014, Derivation of design freeze sequence using Bayesian network framework, Asia Pacific Industrial Engineering and Management Systems Conference (APIEMS 2014).

3. 3. J.H. Won, Y.S. Kim, J.H. Lee, & Y.S. Hong, 2014, Association of Product-Service Systems design concepts with business models and their evaluation method. International Conference on Engineering, Technology and Innovation (ICE 2014).
4. 4. J.H. Lee, & Y.S. Hong, 2013, Servitization analysis throughout text-mining of 10-K annual report, Design Engineering Workshop (DEWS 2013).
5. 5. J.H. Lee, & Y.S. Hong, 2013, Servitization analysis throughout text-mining of 10-K annual report, The 19th International Conference on Engineering Design (ICED 2013).
6. 6. Y.S. Kim, S.W. Lee, J.H. Kim, J.H. Jeong, J.H. Lee, & Y.S. Hong, 2012
7. 7. Product-Service Systems Design With Business Model Strategy Integrated: A Case Study of Urban Umbrella Rental Service System. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC & CIE 2012).
8. 8. J.H. Lee, D.I. Shin, & Y.S. Hong, 2011, A Structured Approach to Business Modeling for Strategic Planning of Innovative Product-Service System. The 41st International Conference on Computers and Industrial Engineering (C&IE 2011).
9. 9. J.H. Lee, & Y.S. Hong, 2011, A Morphological Approach to Business Model Generation using Case-based Reasoning, The 18th International Conference on Engineering Design (ICED 11).
10. 10. J.H. Lee, D.I. Shin, Y.S. Hong, & Y.S. Kim, 2011, Business Model Design Methodology for Innovative Product-service Systems: a Strategic and Structured Approach, The 18th International Conference on Engineering Design (ICED 11).
11. 11. J.H. Lee, D.I. Shin, Y.S. Hong, & Y.S. Kim, 2011, Business Model Design Methodology for Innovative Product-service Systems: a Strategic and Structured Approach. In SRII Global Conference (SRII 2011).
12. 12. J.H. Lee, Y.S. Hong, & Y.S. Kim, 2010, Business modeling for innovative product-service systems: A structured approach, Design Engineering Workshop (DEWS 2011)
13. 13. J.H. Lee, & Y.S. Hong, 2010, A business Model Architecture for Product-service System Strategy Innovation. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC & CIE 2010).

Projects

- Simreal Co., Ltd. (Industry Project) | 2020.09~2021.03
  Development of Agent-Based Dynamic Models for Urban Mobility
  (Project Leader)
- Simreal Co., Ltd. (Industry Project) | 2022.01~2022.05
  Development of API and Deployment Package for Cloud-Based Execution of Simulation Engine
  (Project Participant)
- Surromind Co. Ltd., (Industry Project) | 2024.01 ~ 2024.02
  Explainable AI Algorithm for Enhancing the Reliability of Manufacturing Data Recognition Models
  (Project Leader)
- Surromind Co. Ltd., (Industry Project) | 2023.06~2023.12
  Development of AI Model for Instrument Image Recognition and Training Materials for Digital Transformation in Manufacturing Sites
  (Project Leader)

- Korean Maritime Equipment Research Institute (Industry Project) | 2021.09~2021.12
  Development of Software for Attitude Measurement and Formula Application of Capsized Ships
  (Project Leader)
- Busan Institute of Science & Technology and higher Education Promotion (National Research Project) | 2023.07 ~ 2024.12
  Development of a Web Service for Automated Calculation of CII Rating based on Maritime Logistics Transport Vessel Tracks for Environmental Regulatory Compliance (Project Participant)
- Korea Industrial Technology Association (National Research Project) | 2023.04 ~ 2024.12
  Development of AI-Based Energy Measurement System Technology for Electric Propulsion Ships (Project Leader)
- Ministry of Industry, Trade, and Resources (National Research Project) | 2020.10 ~ 2022.12, National Innovation Cluster R&D Phase 2
  Enhancement of Open Cloud Platforms for Smart Maritime Convergence Services, (Project Leader, Funding: KRW 150,000,000).
- Ministry of Industry, Trade, and Resources (National Research Project) | 2018.10 ~ 2020.12, National Innovation Cluster R&D Phase 1
  Development of a Blockchain-Based Spare Parts Trading Recommendation
  (Project Leader, Funding: KRW 236,000,000).
- Korea Electric Power Research Institute (Industry Project) | 2019.12 ~ 2020.02
  Economic Evaluation Technology Enhancement for the Comprehensive Power Distribution System
  (Collaborating Researcher, KRW 15,000,000).
- Korea Research Foundation (National Research Project) | 2017.06 ~ 2019.03
  Development of Platform Architecture for Open Product Development
  (Project Leader, KRW 60,000,000).
- Bringprice.com (Industry Project) | 2015. 12 ~ 2016.02
  Development of Optimization Technology for the Bringprice.com Search Engine through Customer Preference Learning
  (Project Leader, KRW 20,000,000).
- Hyundai Motor Company (Industry Project) | 2016.06 ~ 2017.03
  Development of a Methodology for Identifying Critical Points to Maximize Commonality Effects
  (Participating Researcher).

Lecture Experience (Undergraduate)

- Pukyong National University (Department of Systems Management & Engineering)
  - Deep Learning and Artificial Intelligence (3 credits | 2024, 2023, 2022, 2021).
  - Data Science (3 credits | 2024, 2023, 2022, 2021,2020, 2019, 2018).
  - Introduction to Computer Science (3 credits | 2024, 2023, 2022)
  - Data Processing I, II (1 credit each | 2023, 2022, 2021)
  - Product Development Process (3 credits | 2023, 2021)
  - Web Programming (3 Credits | 2021, 2020, 2018)
  - Practical Computing with Java (2 Credits | 2017, 2018, 2019)
  - Business Analytics (3 credits | 2020, 2018)

- Big Data Processing (3 credits | 2019)
- Object-Oriented Programming (3 credits | 2019).
- Systems Analysis and Design (3 credits | 2019, 2018, 2017)
- Database Theory and Practice (3 credits, 2019)
- Computational Thinking (2 credits | 2020).
- Introduction to Artificial Intelligence (3 credits | 2018, 2019, 2020)
- Enterprise Information Systems (3 credits | 2017)

- Hankuk University of Foreign Studies (Department of Industrial and Management Engineering)
  - Introduction to Quantitative Analysis (3 credits | 2017)
  - Engineering Accounting (3 credits| 2016)

- Soongsil University (Department of Industrial and Information Systems Engineering)
  - Supply Chain Network Analysis (3 credits | 2012)

Lecture Experience (Graduate)

- Pukyong National University (Department of Systems Management & Engineering)
  - Special Topics in Machine Learning (in English, 3 credits | 2024).
  - Machine Learning (in English, 3 credits | 2022, 2020)
  - Deep Learning (in English, 3 credits | 2024, 2020).
  - AI/ES (in English, 3 credits | 2019)

- Hankuk University of Foreign Studies (Department of Industrial and Management Engineering)
  - Industrial Management Seminar 1 (in English, 3 credits | 2016)

Special Lecture

- 2021, 2022, 2023: Digital Transformation for Manufacturing Companies, DRB.
- 2021: Introduction to Deep Learning and Case Studies, Non-degree Program at the Graduate School of Technology Management, Pukyong National University.
- 2020: Python-based Machine Learning Workshop (6 hours), Invited by the Cooperative Program in Science and Technology Policy, Pukyong National University.
- 2020: Machine Learning and Deep Learning in Smart Manufacturing (9 hours), Invited by the Smart Factory Operation and Design Professional Training Team, Dong-A University.
- 2020: Introduction to Machine Learning with Microsoft Azure ML Studio, Invited by the Graduate School of Technology Management, Pukyong National University.
- 2020: Meeting Smart City Enterprises, Invited by the Busan Metropolitan Area LINC+ Program.
- 2020: Fourth Industrial Revolution and Strategic Business Models, Invited by the

Korea Hydro & Nuclear Power Co., Ltd.

- 2019: Basic and Applied Data Analysis Using Python, Pukyong National University ICT Convergence Program.
- 2013: Introduction to Business Modeling Methodology for Product-Service Integration Systems, Invited by the Convergence Management Research Society.

Awards

- Best Paper Award (November 2014)
  Conference: Design Engineering Workshop 2014
  Paper Title: "Servitization Analysis throughout Text-mining of 10-K Annual Report"
- Best Paper Award (February 2018)
  Conference: Third International Symposium on Information and Knowledge Management (ISIKM 2018)
  Paper Title: "Improving Flight Search Engine by Learning Consumer Preference Function from Choice Data"