

Keywoong Bae

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<https://www.kwoongbae.github.io>

RESERACH INTEREST

My research interests include **Risk Management** and **Deep Learning**.

Risk Management: Application of systemic cyber risk on Solvency II Regulatory Framework, using the actuarial methodologies such as scenario analysis and copula approaches.

Deep Learning: Observing the vulnerabilities on internal mechanism of Deep generative models, especially Diffusion models, using the adversarial corrupting attacks.

EDUCATION

- **POSTECH** Pohang, Republic of Korea
M.S. in Industrial and Management Engineering. Sep. 2023 - **Present.**
- **Osaka Gakuin University** Osaka, Japan
Visiting student in short-term. Feb. 2023
- **Inha University** Incheon, Republic of Korea
B.S. in Industrial Engineering. May. 2019 - Aug. 2023

EXPERIENCE

- **Actuarial modeling, Insurance and Risk Management Lab** Pohang, Republic of Korea
Graduate student(Supervisor: Prof. Kwangmin Jung). Sep. 2023 - **Present.**
 - Researched the application of actuarial methodologies for estimating the capital requirements based on the statistical properties of systemic cyber risk.
 - Worked as a Teaching Assistant on Financial Accounting(2024-1) course.
- **Informatics and Deep Learning Lab** Incheon, Republic of Korea
Undergraduate Intern(Supervisor: Prof. Wookey Lee). Apr. 2021 - Jun. 2023
 - Researched the impact of corruptions on diffusion generative models by examining how corrupting on images affects the models' learning process and performance.

PUBLICATIONS

- **Keywoong Bae**, Suan Lee, Wookey Lee, "Diffusion-C: Unveiling the Generative Challenges of Diffusion Models through Corrupted Data", *Advances in Neural Information Processing Systems (NeurIPS), Workshop on Diffusion Models*, Dec, 2023. [arXiv]
- **Keywoong Bae**, Suan Lee, Wookey Lee, "Robustness Analysis of Diffusion Generation model Using Noises and Corruptions", *Korea Software Congress (KSC)*, pp.1,091 - 1,093, Dec, 2022.
- **Keywoong Bae**, Suan Lee, Wookey Lee, "Robust Multimodal Classification Model Using Homogeneous Features", *Korea Computer Congress (KCC)*, pp.1,776 - 1,778, Jun, 2022.
- **Keywoong Bae**, Suan Lee, Wookey Lee, "Transformer networks for trajectory classification", *IEEE International Conference on Big Data and Smart Computing (BigComp)*, pp.331-333, Jan, 2022.

PROJECTS

- **Classification and statistical analysis on systemic cyber risk.**
Korean Insurance Academic Society(KIAS) Jul. 2024 - Mar. 2025
 - Proposed a definition of systemic cyber risk based on main five pillars(motivation, infrastructure, cyber incidents, risk amplification, affected ecosystem) and analyzed the statistical properties of the cases based on the proposed definition.
 - Estimated the frequency and severity distributions and, using the LDA(Loss Distribution Approach), calculated the risk measure of the loss distribution.

- **Data-driven evaluation for safety assessment of the KFPA and its future strategy.**

Korean Fire Protection Association(KFPA)

Mar. 2024 - Jul. 2024

- Analyzed the efficiency of strategies implemented in KFPA and estimated objective Man-Day(MD) indicators using data-driven scientific methods.
- Trained a random forest model using a real inspecting-time dataset and employed SHAP(SHapley Additive exPlanations) to explain the model's outcomes.