

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, "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.