Jihyung Kook

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Seoul, South Korea

Research Interests

My research focuses on **privacy-preserving machine learning**, with an emphasis on applying **cryptographic techniques** such as homomorphic encryption to develop **secure and practical learning and unlearning systems**. I am also interested in **multimodal and time-series data security and privacy analysis**, aiming to design methods that enable the detection and interpretation of underlying states while preserving data confidentiality. My goal is to advance approaches that ensure both **trustworthiness and usability** in future AI systems.

Keywords: Privacy-Preserving Machine Learning (PPML), Cryptography, Data Privacy

Education

- **Georgia Institute of Technology** *Jan 2021 - Dec 2024*
  M.S. in Computer Science GA, USA
  - Specialization: Computational Perception Robotics (OMSCS Program)
- **Sookmyung Women's University** *Mar 2014 - Feb 2017*
  B.S in Statistics and Computer Science (Double Major) Seoul, South Korea

Publications

C=Conference, J=Journal, P=Patent, S=In Submission, T=Thesis

[J.1] Tae-jung Oh, **Ji-hyung Kook**, Se Young Jung, et al. (2021). **A standardized glucose-insulin-potassium infusion protocol in surgical patients: Use of real clinical data from a clinical data warehouse**. *Diabetes Research and Clinical Practice*, 174, 108756. DOI: 10.1016/j.diabres.2021.108756

[C.1] Hyesung Yoon, **Jihyung Kook**, Junho Shim. (2015). **IOT-based Mailbox system using Android and Arduino**. In *Proceedings of the 2015 Spring Conference of KIPS (Korea Information Processing Society)*, pp. 1080–1081. Korea Information Processing Society. April 22, 2015, Seoul, South Korea.

Research Experience

- **Privacy-Preserving Machine Learning and Cryptography Lab** *Jul 2025 - Present*
  Researcher Seoul, South Korea
  - Preparing research on combining homomorphic encryption with federated learning to develop secure and practical AI systems
  - Participating in weekly lab meetings and literature reviews on homomorphic encryption and federated learning
  - Building foundational expertise in cryptographic techniques for privacy-preserving machine learning
  - Supervisor: Prof. Eunsang Lee
- **Research Project** *May 2025 - Jul 2025*
  Georgia Institute of Technology Atlanta, GA, USA
  - Designed and wrote a full research proposal: "A Systematic Review of Practical Challenges in Applying Homomorphic Encryption to Privacy-Preserving Machine Learning"
  - Conducted a group project using a Systematic Literature Review (SLR) methodology, gaining experience in defining research questions, applying inclusion/exclusion criteria, and synthesizing findings
  - Participated in a structured peer review process, giving and receiving feedback that improved clarity, feasibility, and academic rigor
  - Learned collaborative academic writing with LaTeX (Overleaf) and research planning under realistic semester constraints
- **Seoul National University Bundang Hospital** *Mar 2018 - Mar 2021*
  Part-time Research Assistant Gyeonggi-do, South Korea
  - Contributed to a paper in *Diabetes Research and Clinical Practice* on a standardized glucose–insulin–potassium infusion protocol
  - Conducted a pilot study using continuous glucose monitoring data to discover predictors of glycemic control
  - Preprocessed and analyzed large-scale clinical datasets (7,000+ patients) for endocrinology research projects
  - Supervisor: Prof. Tae-jung Oh

Work Experience

- **KB Kookmin Bank (concurrent with KB Financial Group)** *Jul 2020 - Sep 2023*
  Data Analyst, Department of Data Planning Seoul, South Korea
  - Standardized and organized inconsistent customer data across subsidiaries, enabling unified data access
  - Trained staff from seven subsidiaries on Customer Journey Maps (CJM) to improve retention in digital services
  - Provided one-on-one training on dashboard design and automation using Tableau
- **Croquis Inc. (Kakao Style / Zigzag)** *Mar 2018 - Apr 2020*
  Junior Data Analyst, Department of Data Seoul, South Korea
  - Automated 17 ETL workflows with Python, enhancing data accuracy by 15% and improving reporting reliability
  - Analyzed purchase and browsing data to optimize product recommendations and marketing strategies
  - Built custom dashboards in Tableau and R-Shiny to enable data-driven decisions for business teams
  - Conducted internal training in Python, R, and Tableau to improve organizational data literacy

Certificates & Training

- **Seoul National University 4th Industrial Revolution Academy - Big Data Platform Technology** *Jun 2017 - Feb 2018*
  Seoul National University Big Data Institute Seoul, South Korea
  - Completed courses in Python Programming, SQL/DBMS, Distributed Systems, Data Mining, Unstructured Data Mining, Machine Learning, and Deep Learning
  - Preceding Research Training at Seoul National University Bundang Hospital: Exploratory study on predictive factors from Continuous Glucose Monitoring System (CGM) data

Skills

- **Programming & Tools:** Python, R, SQL, PySpark, C/C++, Git, Docker, LaTeX
- **Machine Learning & Data Science:** Privacy-Preserving Machine Learning (Federated Learning, Differential Privacy, Homomorphic Encryption), Deep Learning, Statistical Modeling, Data Analysis
- **Security & Cryptography:** Coursework: Introduction to Information Security (OMSCS CS6035), Homomorphic Encryption, Cryptographic Applications to Federated Learning
- **Data Visualization:** Tableau, R-Shiny, Matplotlib, ggplot2