

Tae Rim Kim

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EDUCATION

Purdue University - Main Campus

Bachelor of Science in **Data Science** | Department of Computer Science

West Lafayette, IN

May 2026

- **System & Infrastructure:** Relational Database Systems, Large Scale Data Analytics, Data Structures & Algorithms.
- **Machine Learning & Modeling:** Data Mining & Machine Learning, Applied Regression Analysis, Capstone (Robotics Reinforcement Learning).
- **Foundations:** Linear Algebra, Object-Oriented Programming, Statistics for Data Science, Probability, Discrete Mathematics.

PROJECT EXPERIENCE

Multimodal LLM Pipeline with Computer Vision for Construction Site Safety | Python, Alpaca-LoRA, YOLOv7, OpenCV | **SIMPLE Lab**

- Engineered a **YOLOv7** instance segmentation model trained on 1,008 site images to detect temporary fences and wind-prone attachments.
- Achieved **0.823 mAP**, utilizing pixel-level masks to calculate wind loads and overturning moments for automated stability analysis.
- Implemented a fine-tuned **Alpaca-LoRA LLM**, leveraging prompt engineering to interpret construction safety terminology and context.
- Orchestrated a pipeline fusing user weather inputs with stability metrics to output precise counterweight mitigation strategies.

Government Asset Management Database System | MySQL, Database Design, Streamlit, Python | **Jongno Self-support Center**

- Architected a normalized **MySQL** database schema to migrate 1,000+ government assets from legacy Excel files ensuring data integrity.
- Developed a **Streamlit** application to automate queries and entries, eliminating manual spreadsheet work, improving efficiency by **50%**.
- Deployed the application on a secure local network to strictly adhere to government data privacy regulations.

Indiana EV Charging Simulation & Demand Analysis | Java, Python, AnyLogic, ArcGIS, Pandas | **SIMPLE Lab**

- Built an **agent-based simulation** modeling the charging behavior of 80,000+ electric vehicles to inform a **\$100M Indiana DOT project**.
- Engineered EV charging station agents to simulate vehicle-to-infrastructure interaction for precise, multi-agent energy load estimation.
- Processed simulation outputs across 9 distinct cases using **Pandas** to quantify energy demand and pinpoint charging deserts in Indiana.
- Generated geospatial heatmaps in **ArcGIS** to visualize high-demand zones directly informing the state's investment plan for EV infrastructure.
- Provided the numerical foundation for strategic charging station site prioritization along federally designated Alternate Fuel Corridors.

Three-Tier Baseball Statistics Analytics Platform | MySQL, Google Cloud, Database Design | **Korebaps Baseball Club**

- Architected a **full-stack system** to centralize performance tracking, automating statistical queries and streamlining game data entry.
- Engineered a Node.js ETL pipeline to parse raw game statistics and transform unstructured data into a normalized **MySQL** database.
- Deployed **three-tier architecture** on **Google Cloud Platform** providing team members with real-time access to seasonal analytics data.

JustSwing AI: Generative AI Coaching Tool | Gemini API, Prompt Engineering, Google Cloud | **Personal Project**

- Engineered a **multimodal AI pipeline** using the **Gemini API** to analyze user swing videos and generate personalized mechanical corrections.
- Refined AI accuracy using **few-shot prompting** and JSON schemas to eliminate formatting errors and align feedback with baseball mechanics.
- Implemented a recommendation engine mapping unstructured **LLM** feedback to a structured drill library via keyword-based fuzzy matching.

WORK HISTORY

Data Science Research Assistant, Purdue SIMPLE Lab – West Lafayette, Indiana

Mar 2022 – **Present**

Social Service Agent, Jongno Self-Support Center (Alternative Military Service) – Seoul, South Korea

Aug 2023 – May 2025

Data Science Research Intern, Purdue SIMPLE Lab – West Lafayette, Indiana

May 2022 – Aug 2022

Software Engineering Intern, Koolsign – Seoul, South Korea

Jul 2021 – Aug 2021

Software QA Intern, Catenoid – Seoul, South Korea

Jul 2018 – Aug 2018

HONORS & CERTIFICATIONS

Certification: Fundamentals of Accelerated Data Science with RAPIDS

NVIDIA – Jun 2022

Certification: AWS Certified Cloud Practitioner

Amazon Web Services – Feb 2025

Manuscript in Preparation: "Multi-modal Large Language Model Development Framework for Construction..."

Co-Author – 2026

Under Review: "Computer Vision-based Temporary Fence Stability Inspection at Construction Site..."

Co-Author – 2025

Publication: "A strategic assessment of needs and opportunities for the wider adaptation of electric vehicles..."

Co-Author – 2023

TECHNICAL SKILLS

Programming & Frameworks: Python, Java, R, SQL, PyTorch, TensorFlow, Pandas, Streamlit, Matplotlib, Gemini API.

Data & Tools: AWS, Google Cloud Platform, Hadoop, Spark, BigQuery, Docker, ArcGIS, AnyLogic, PointCloud, Anaconda, Git.

AI & Machine Learning: Computer Vision, Prompt Engineering, Large Language Models, Simulation Modeling, Reinforcement Learning.