Sewon Kim

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RESEARCH INTERESTS

Natural Language Processing, Large Language Models, Embodied AI, Knowledge-Augmented Generation, Multi-Modal AI Systems

EDUCATION

Jeonbuk National University, Jeonju, South Korea — B.Eng. in Computer Science and Engineering June 2025 (Expected)

- GPA: 3.74/4.0
- Relevant Coursework: Machine Learning, Data Mining, Natural Language Processing, Computer Vision, Deep Learning

University of Malaya, Kuala Lumpur, Malaysia — Exchange Student Feb 2023 – Aug 2023

- Grade: 3.5/4.0 | Focus: Advanced Computer Engineering and Cross-Cultural Research Collaboration

RESEARCH EXPERIENCE

Undergraduate Researcher — Natural Language Learning Lab (Advisor: Prof. Hyun-je Song) Feb 2025 – Present
Jeonbuk National University, Dept. of Computer Engineering Jeonju, South Korea

- Investigating knowledge graph-enhanced retrieval-augmented generation (RAG) architectures for improving factual accuracy and reasoning capabilities in large language models

Developing graph-based retrieval pipelines integrating structured knowledge with neural embedding spaces using PyTorch and LangChain frameworks

Implementing multi-hop reasoning mechanisms over knowledge graphs to enable complex query answering in domain-specific applications

Conducting ablation studies on embedding integration techniques (e.g., entity linking, relation extraction) to optimize retrieval precision and model grounding

International Research Scholar — Smart Sensor & IoT Project (IITP-Funded) Jun 2025 – Aug 2025
Purdue University, College of Engineering West Lafayette, Indiana, United States

- Designed and deployed LoRa-based distributed IoT sensor network for real-time environmental monitoring in agricultural settings

Developed multi-agent coordination protocols for autonomous data collection across geographically distributed sensor nodes

Analyzed energy-reliability trade-offs in low-power wireless networks, contributing to scalable edge computing architectures for embodied sensing systems

Collaborated with interdisciplinary team on integrating physical sensors with intelligent decision-making frameworks

SELECTED PROJECTS

IoT-Enabled Smart Beehive Monitoring with Multi-Modal Sensor Fusion 2025

- Architected end-to-end IoT system using WiFi LoRa 32 (V3), MQTT protocol, and Raspberry Pi for real-time hive condition monitoring

Implemented sensor fusion algorithms combining temperature, humidity, and acoustic data for predictive analytics

Deployed and validated system in field conditions at Purdue University research site, demonstrating robustness and scalability

Cultural Heritage Damage Detection using Vision Transformers 2024 – 2025

- Developed mobile application with Flutter frontend and FastAPI backend for AI-powered damage assessment of cultural heritage sites

Fine-tuned DETR (DEtection TRansformer) model on custom dataset for multi-class structural degradation detection

Deployed cloud-based inference pipeline with Firebase integration, achieving real-time detection with 89% mAP

Hybrid Deep Learning for Urban Air Quality Prediction 2025

- Designed Gaussian Diffusion + LSTM-CNN hybrid architecture for spatiotemporal emission forecasting in industrial zones

Built scalable data pipeline with AWS streaming architecture for real-time environmental analytics

Validated model predictions against AERMOD physical simulations, demonstrating improved accuracy in complex dispersion scenarios

TECHNICAL SKILLS

Programming: Python, C/C++, Java, SQL

AI/ML Frameworks:
PyTorch, TensorFlow, LangChain, Hugging Face Transformers, OpenCV, scikit-learn

Tools & Platforms:
FastAPI, Flask, Firebase, AWS, Git, Docker, Linux

Research Areas:
Natural Language Processing, Knowledge Graphs, Retrieval-Augmented Generation, Computer Vision, IoT Systems

TEACHING EXPERIENCE

Teaching Assistant — Algorithms & Linux Programming Sep 2025 – Present
Jeonbuk National University, Dept. of Computer Engineering Jeonju, South Korea

- Mentored 80+ undergraduate students in algorithm design, complexity analysis, and systems programming

Designed and evaluated programming assignments; held weekly office hours for individualized student support

HONORS & AWARDS

University President's Award — 6 Core Competencies Outstanding Student (Cultural Talent) 2026

University President's Award — "Keun-Saram" Black Belt Scholarship Program (KRW 5M+ awarded) 2025

University President's Award — Honors Residential College (HRC) Representative 2025

Capstone Design Excellence Award, College of Engineering, JBNU Feb 2025

President's Award, Jeonbuk National University (Top 1% Academic Achievement) Dec 2024

SW-Centered University Project Competition — Excellence Award Dec 2024

Big Data Supporters Recognition, Ministry of Science and ICT, Korea Dec 2023

LEADERSHIP & SERVICE

Student Representative, Honors Residential College (HRC), JBNU — University President's Award 2022 – Present

Lead Student Representative, Big Data Supporters, Big Data Innovation College, JBNU Mar 2024 – Mar 2025

President, SHARK Swimming Club (Official University Organization), JBNU 2024

CERTIFICATIONS

Data Architecture Semi-Professional (DAsP), Korea Data Agency Oct 2025

TOEIC Score: 890 (Business English Proficiency) Feb 2024