

# Joongmin Shin

Senior Researcher / Research Scientist, Korea University · Founder & Lead, KUDoc

Seoul, Republic of Korea · Open to relocation (US/EU) and remote roles

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## Professional Summary

AI researcher with 5+ years of experience in multimodal LLM/LVLMs, structure-aware parsing, and retrieval-augmented generation for document-heavy settings. My current work focuses on structured evidence and reliable long-context reasoning over heterogeneous unstructured inputs. In addition to my individual research, I founded and lead KUDoc, the Document AI research team at Korea University, where I help shape collaborative directions across document understanding, multimodal RAG, evaluation, and applied AI. I aim to pursue a Ph.D. to extend this foundation toward structured memory, world models, and planning for future agents.

## Key Strengths

- **Parsing from sentence to document level:** Build neural dependency parsers for text and extend them to **document-level trees and graphs**, enabling consistent structure-aware chunking and retrieval for long, noisy PDFs.
- **Explainable hybrid architectures:** Design and implement systems that integrate symbolic rules and knowledge graphs with LLM/LVLM models, improving both performance and transparency.
- **Domain problem definition & Rapid prototyping:** Translate complex industrial requirements into structured tasks for RAG systems, managing cross-functional teams to deliver end-to-end prototypes and industry pilots.

## Education

### Pusan National University

Busan, Republic of Korea

M.S. IN ARTIFICIAL INTELLIGENCE

Mar 2021 – Feb 2023

- Thesis focused on parsing unstructured data and integrating syntactic/morphological analysis for Korean NLP; participated in national AI projects and filed related patents.

### Pusan National University

Busan, Republic of Korea

B.S. IN COMPUTER SCIENCE AND ENGINEERING

Mar 2016 – Feb 2021

- Completed coursework in software engineering and data analysis; engaged in multiple industry projects and hackathons, building teamwork and leadership skills.

## Selected Publications

\* First author

### HiKEY: Hierarchical Multimodal Retrieval for Open-Domain Document Question Answering

Joongmin Shin\*, Gvuh Shim, Jeongbae Park, Jaehyung Seo, Heuseok Lim

ACL 2026 - Association for Computational Linguistics Conference: Accepted

### M3DocDep: Multi-modal, Multi-page, Multi-document Dependency Chunking with Large Vision-Language Models

Joongmin Shin\*, Jeongbae Park, Jaehyung Seo, Heuseok Lim

CVPR 2026 - Computer Vision and Pattern Recognition Conference

### MultiDocFusion: Hierarchical and Multimodal Chunking Pipeline for Enhanced RAG on Long Industrial Documents

Joongmin Shin\*, Chanjun Park, Jeongbae Park, Jaehyung Seo, Heuseok Lim

EMNLP 2025 - Proceedings of the Conference on Empirical Methods in Natural Language Processing: Main

### Intelligent Predictive Maintenance RAG framework for Power Plants: Enhancing QA with StyleDFS and Domain Specific Instruction Tuning

Seongtae Hong\*, Joongmin Shin\*, Jaehyung Seo, Taemin Lee, Jeongbae Park, Heuseok Lim

EMNLP 2024 - Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing: Industry Track

## Professional Experience

## Human-Inspired AI Research, Korea University

Seoul, Republic of Korea

SENIOR RESEARCHER / RESEARCH SCIENTIST

Jun 2023 – Present

- **Multimodal Document Parsing & Chunking (CVPR 2026 / EMNLP 2025):** Designed an LVLM-based document parsing framework (*M3DocDep*) for noisy, large-scale industrial PDFs, building pipelines that produce document-level dependency trees. Developed *MultiDocFusion*, a structure-aware multimodal chunking methodology that preserves hierarchical layouts to improve RAG retrieval quality.
- **Domain-Specific LLM & RAG (EMNLP 2024):** Designed and implemented *StyleDFS*, a specialized Korean LLM and RAG pipeline for scientific literature with tailored preprocessing algorithms, completing technology transfer twice.
- **Industrial Pilots & Prototyping:** Led multimodal RAG projects and MVPs for Samsung Fire & Marine Insurance (reducing manual search time by **40%**), Hyundai Mobis (GPT-based PLC Programming Assistant), and Synapse (Multilingual Medical Consultation), successfully securing follow-up funding.
- **Hybrid QA Systems:** Architected QA systems combining knowledge graphs and LLMs, resulting in a **10% accuracy improvement** and a patent on adaptive rule-based filtering.

## AI Lab, Pusan National University

Busan, Republic of Korea

RESEARCHER (M.S.)

Sep 2020 – Feb 2023

- **Exobrain WiseQA National Project:** Led core research on **Korean text dependency parsing**, developing neural-symbolic parsers that integrate morphological and syntactic features as the backbone for sentence- and table-level QA.
- **Table QA Frameworks:** Designed a pipeline converting semi-structured financial/encyclopedic tables into structured representations, achieving state-of-the-art Korean Table QA performance and improving model explainability.
- **Applied AI Collaborations:** Collaborated with KT AI2XL on Korean TTS prosody prediction using syntactic parsing features; contributed to finance QA, sentiment-based marketing, and VR recommendation projects, earning an **Outstanding Paper Award**.

## Honors & Awards

2024	<b>Deputy Prime Minister and Minister of Education Award</b> , Competition for Best Practices in Academia-Industry Cooperation	National Research Foundation (NRF)
2023	<b>Outstanding Paper Presentation Award</b> , Korean Institute of Information Scientists and Engineers (KIISE)	KIISE
2023	<b>Grand Prize</b> , Samsung Fire & Marine Insurance LLM-based MVP Model Idea Competition	Samsung
2023	<b>Excellence Award (Technology Track)</b> , KU-Grant Program	Korea University
2022	<b>Outstanding Paper Presentation Award</b> , Korea Software Congress (KSC)	KSC
2022	<b>Excellence Award</b> , Student-led Research Project, Graduate School of AI	Pusan National University
2020	<b>Milestone Scholarship (Grade A)</b> , SW-centered University Milestone Scholarship Program	Pusan National University

## Technical Skills

<b>Programming</b>	Python, C/C++, Java, C#, Django, React, Unity
<b>Machine Learning</b>	LLM/LVLM fine tuning, hybrid rule-neural models, knowledge graphs
<b>Tools</b>	PyTorch, TensorFlow, NumPy, Pandas, Scikit-Learn, LangChain, SQL, Linux
<b>Project Management</b>	Team leadership, cross-functional collaboration, proposal writing
<b>Languages</b>	Korean (native), English (fluent reading/writing)

## Teaching & Mentoring

### Pusan National University

Busan, Republic of Korea

GRADUATE RESEARCH MENTOR

2021 – 2022

- Mentored undergraduate capstone projects on Korean dependency parsing and robust Table QA; guided students to achieve near state-of-the-art performance.
- Assisted in courses on web application programming and mobile app development, providing feedback and supporting team projects.