

Juseong Jin

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 Homepage

Introduction

I'm Juseong Jin, an AI Research Engineer. With a broad background in AI research and data engineering, I'm passionate about applying technology to solve real-world problems. I am driven by the goal of creating innovative value through data and am eager to contribute to innovation.

Research Interests

- **Multi-modality:** Large language and vision models (LLaVA), CLIP
- **Efficient Representation:** Contrastive learning, Domain adaptation, Ranking objective
- **AI agent:** Multi-Agent system, Agent optimization

Engineering Skill Sets

- **Data Engineering:** Python, Airflow, SQL
- **MLOps:** Docker, FastAPI, MLflow, AWS, CI/CD, Git

Work Experiences

Research Engineer

Mar 2024 – Present

Seoul National University Hospital

Seoul, Korea

- **AI Research**
 - Researched medical AI models (VLM, ranking loss, multi-agent system).
 - Utilized Docker and MLflow for model development and experiment tracking.
- **Data Engineering**
 - Designed integration APIs and built Airflow-based ETL pipelines for clinical data flow.
 - Applied QC logic and automated outlier detection to maintain data integrity.

Education

Seoul National University

Mar 2022 – Feb 2024

M.S in Interdisciplinary Program in Bio-engineering (Advisor: Prof. C.W. Jeong)

Seoul, Korea

Inha University

Mar 2015 – Feb 2022

B.S in Mechanical Engineering and Software Engineering

Incheon, Korea

Projects

- **Self-Organizing Multi-Agent Optimization for Medical Vision-Language Models**
 - Developed a self-organizing multi-agent framework to enhance reasoning in medical vision-language models.
 - Applied proximal policy optimization to dynamically optimize multi-agent collaboration.

- **Surgical scenario understanding via large language and vision assistant**
 - Fine-tuned LLaVA on GPT-3.5-generated instruction data for surgical VQA and reasoning tasks.
 - Utilized contrastive learning to align visual and temporal features from surgical images and videos.
 - Achieved +4% VQA and +14% video reasoning accuracy, setting new SOTA in the domain.
- **Urology Data Mart Construction**
 - Designed APIs and built Airflow-based ETL pipelines for automated data collection and preprocessing.
 - Implemented quality control and outlier detection logic to ensure data reliability.
 - Developed an MVP dashboard for monitoring key clinical and operational metrics.
- **Multi-modal survival scoring system of clear cell renal cell carcinoma**
 - Developed a personalized survival prediction model integrating clinical data and pathology images.
 - Improved risk ranking performance using attention-based MIL and margin ranking loss (+4%p C-index, +7%p IBS).
- **Self-supervised domain adaptation in 6DoF pose estimation**
 - Built a vision module for robotic grasping with ETRI using synthetic data to overcome annotation scarcity.
 - Applied contrastive and adversarial learning for self-supervised domain adaptation.
 - Boosted ADD-S score by +16%, achieving SOTA among self-supervised 6DoF methods.

Publications

- [1] **J. Jin**, C.W. Jeong. "Surgical-LLaVA: Toward Surgical Scenario Understanding via Large Language and Vision Models", *NeurIPS 2024 AIM-FM*
- [2] **J. Jin***, E. Jeong*, J. Cho, Y.G Kim, "Self-supervised Domain Adaptation for 6DoF Pose Estimations", 2024, *IEEE ACCESS*
- [3] **J. Jin**, J.H. Han, K.C. Moon, S.S. Moon, Y.G Kim, C.W. Jeong "Development and Validation of Multi-modal Survival Prediction Model Using Clinical Information and Pathology Images in Renal Cell Carcinoma Patients", 2024, *Korean Society of Medical Informatics (KOSMI)*
- [4] **J. Jin***, E. Jeong*, J. Cho, J.H. Park, Y.G. Kim. "DAPO: Self-supervised Domain Adaptation for 6DoF Pose Estimation," *NeurIPS 2023 SSLTheoryPractice*.
- [5] **J. Jin**, Y.J. Kim, Y. Shin, C.H. Koo, S.B. Lee, H.S. Kim and Y.G. Kim. "Deep Learning Models and Index Predicting Postoperative Desaturation using Spirometry Signal," 2023, *Korean Society of Medical Informatics (KOSMI)*. ***Best Oral Presentation**
- [6] Y. Shin, Y.J. Kim, **J. Jin**, C.H. Koo, S.B. Lee, H.S. Kim and Y.G. Kim. "Machine Learning Model for Predicting Immediate Postoperative Desaturation Using Spirometry Signal Data," 2023, *Scientific Reports*.
- [7] **J. Jin**, J.H. Han, K.C. Moon, S.S. Byun, Y.G. Kim, C.W. Jeong. "Development of Large-scale digital pathology images-based Deep Learning model for Fuhrman Nuclear Grading Aid in Clear cell Renal Cell Carcinoma," 2023, *Korean Urological Association (KUA)*.

Under review papers

- [1] **J. Jin***, J.H. Han*, K.C. Moon, S.S. Moon, Y.G Kim, C.W. Jeong "Development and Validation of Multi-modal Survival Scoring Model of Clear Cell Renal Cell Carcinoma", *Under review*
- [2] J. Kim, A. Jeong, **J. Jin**, H.W. Woo, S. Lee, D. Yoon, G. Lee, S. Kim, "Temporal correlation between Internet search volumes for diarrhea and its synonym using Chat Generative Pre-Trained Transformer and emergency department.", *Under review*
- [3] Y.J. Kim*, **J. Jin***, Y. Shin, C.H. Koo, S.B. Lee, H.S. Kim and Y.G. Kim. "Deep Learning-Based Postoperative Desaturation Prediction Using Spirometry Image Data.", *Under review*

Patents

"Method and apparatus for self-supervised 6D object pose estimation", Y. G. Kim, E. J. Jeong, **J. S. Jin**, J. H. Park, J. M. Cho, US Patent, 2024.04.25, US 18491051

"Real-time hypoxemia prediction system using spirometry signal during surgery", H. S. Kim, Y. G. Kim, Y. M. Shin, Y. J. Kim, **J. S. Jin**, S. B. Lee, KR Patent, 2023.03.03, KR 10-2023-0028285