


Juseong Jin

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Introduction

I am a research engineer with a strong background in working with real-world data aimed at practical applications. I am eager to contribute my skills to a dynamic team dedicated to solving cutting-edge challenges.

Research Interests

- **Multi-modality:** Large language and vision models (LLaVA), CLIP
- **Cost-effective learning:** Self-supervised learning, Domain adaptation
- **AI agent:** Multi-Agent system, Agent optimization with PPO

Engineering Skill Sets

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

Work Experiences

Research Engineer

Seoul National University Hospital

Mar 2024 – Present

Seoul, Korea

- **AI Research**
 - Conducted research on AI models and data analytics for medical data.
 - ML development with Docker and deployment and optimization with MLflow.
- **Data Engineering**
 - Built and optimized data mart for department of urology.
 - Developed and deployed dashboard website for data visualization.
 - ETL automation with Airflow and implemented CI/CD process.

Education

Seoul National University

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

Mar 2022 – Feb 2024

Seoul, Korea

Inha University

B.S in Mechanical Engineering and Software Engineering

Mar 2015 – Feb 2022

Incheon, Korea

Projects

- **Self-Organizing Multi-Agent Optimization for Medical Vision-Language Models**
 - Developed a self-organizing multi-agent framework for LLaVA-Med, integrating mixture of experts.
 - Applied proximal policy optimization to dynamically optimize agent roles

- **Surgical scenario understanding via large language and vision assistant**
 - Constructed instruction-following data for surgical VQA captions using GPT-3.5.
 - Fine-tuned a vision-language model based on LLaVA to specialize in surgical scenario understanding.
- **Urology Data Mart Construction and Dashboard Website Development**
 - Implemented and optimized data mart which collect department of urology data.
 - Developed a dashboard website to visualize data.
 - Skill sets: SQL, Airflow, Python, flask, Streamlit, Dash
- **Multi-modal survival scoring system of clear cell renal cell carcinoma**
 - Developed a multi-modal survival prediction model for kidney cancer patients.
 - The model integrates clinical data and pathology images using text conditioning to enhance prognostic accuracy.
- **Self-supervised domain adaptation in 6DoF pose estimation**
 - Collaborated with ETRI, developed vision module for robotic arm object grasping.
 - Applied contrastive learning and adversarial training to bridge the domain gap between real and synthetic environments, improving 6DoF pose estimation performance.
- **Predicting postoperative hypoxia through Spirometry signals**
 - Developed a CNN model that processes airway pressure and lung volume signals, as captured in operating room monitors, to analyze morphological features in surgical patients.

Publications

- [1] **J. Jin**, C.W. Jeong. "Surgical-LLaVA: Toward Surgical Video 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