

# Juseong Jin

Seoul, Korea

jinjs0704@gmail.com

 LinkedIn

+82-10-4948-1894

 Homepage

## Introduction

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I am an AI researcher with a strong background in working with real-world data and developing models aimed at practical applications. I am eager to contribute my skills to a dynamic team dedicated to solving cutting-edge challenges.

## Work Experiences

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### Research Engineer

Mar 2022 – Present

Seoul National University Hospital

Seoul, Korea

- **Data Analytics and AI Research**
  - Conducted research on AI-driven solutions with a focus on developing prognostic models to improve patient outcomes.
  - Collaborated with clinical teams to design and implement AI models.
- **Database Management and Infrastructure Development**
  - Built and managed a database of urology, ensuring data integrity and regulations.
  - Developed and deployed dashboard website for real-time data visualization and clinical research.

## Education

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### 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

## Research Interests

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

## Publications

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- [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*

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- [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*
- [4] **J. Jin\***, Y.H Kim\*, S.B. Hong and Y.G. Kim. “Machine Learning Model for Predicting ADHD Using Brain Volume via Structure MRI.“, *Under review*

#### *Projects*

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- **Surgical scenario understanding via large language and vision assistant**
  - Constructed instruction-following data for surgical VQA captions using GPT-3.5, and fine-tuned a vision-language model based on LLaVA to specialize in surgical image understanding.
- **Multi-modal survival scoring system of clear cell renal cell carcinoma**
  - Developed a multi-modal survival prediction model for kidney cancer patients on clinical information and pathology images. The model integrates clinical and pathology data using self-attention mechanisms to enhance prognostic accuracy, suggesting the possibility of personalized treatment.
- **Data responsive dashboard website development**
  - Developed and deployed a responsive dashboard website to visualize data collection and distribution processes, enhancing user accessibility and data transparency.
  - Tech stack: Client (javascript, streamlit), Server (Django, AWS), Database (SQLite, MariaDB)
- **Self-supervised domain adaptation in 6DoF pose estimation**
  - Applied contrastive learning and adversarial training to bridge the domain gap between real and synthetic environments, improving 6DoF pose estimation for robotic arm object grasping.
- **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. Extracted significant morphological features using Grad-CAM and proposed a novel PHP index based on these insights.

## *Patents*

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"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

## *Skills*

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### **Scientific Skills**

**Advanced:** Deep learning / Multi-modal

**Basic:** Statistics / Linear algebra

### **Computer skills**

**Advanced:** Python (pytorch) / Linux / Docker

**Basic:** Client (Javascript / Streamlit) / Server (Django / AWS) / DB (SQLite / MariaDB)