Daeun Kyung

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Objective

I'm a Ph.D. student in the Graduate School of AI at Korea Advanced Institute of Science and Technology (KAIST), advised by Prof. Edward Choi. I am passionate about building and evaluating AI systems for real-world impact. My research focuses on large language models (LLMs) and multimodal learning, especially in healthcare applications. I have extensive experience in both model development and dataset construction to advance robust and trustworthy AI.

Keywords

Large Language Models (LLMs), LLM-based User Simulation, Conversational Agents, Multimodal Learning, Generative Models, Diffusion Models, Visual Question Answering, Multimodal Question Answering, Healthcare AI

Publications C=Conference, J=Journal, P=Preprint

Conference

[C.7] Jiho Kim, Junseong Choi, Woosog Chay, **Daeun Kyung**, Yeonsu Kwon, Yohan Jo, Edward Choi (2026). **ProPerSim: Developing Proactive and Personalized AI Assistants through User-Assistant Simulation**. In *Proc. of International Conference on Learning Representations (ICLR) 2026*.

[C.6] Hyunseung Chung, Jungwoo Oh, **Daeun Kyung**, Jiho Kim, Yeonsu Kwon, Min-Gyu Kim, Edward Choi (2026). **ECG-Agent: On-Device Tool-Calling Agent for ECG Multi-Turn Dialogue**. In *ICASSP 2026*.

[C.5] **Daeun Kyung**, Hyunseung Chung, Seongsu Bae, Jiho Kim, Jae Ho Sohn, Taerim Kim, Soo Kyung Kim, Edward Choi (2025). **PatientSim: A Persona-Driven Simulator for Realistic Doctor-Patient Interactions**. In *Proc. of Neural Information Processing Systems (NeurIPS) 2025 Datasets and Benchmarks (**Spotlight**, **2.8%** acceptance rate for spotlight papers)*.

[C.4] **Daeun Kyung**, Junu Kim, Tackeun Kim, Edward Choi (2025). **Towards Predicting Temporal Changes in a Patient's Chest X-ray Images based on Electronic Health Records**. In *Proc. of Conference on Health, Inference, and Learning (CHIL) 2025*.

[C.3] Yeonsu Kwon*, Jiho Kim*, Gyubok Lee, Seongsu Bae, **Daeun Kyung**, Wonchul Cha, Tom Pollard, Alistair Johnson, Edward Choi (2024). **EHRCon: Dataset for Checking Consistency between Unstructured Notes and Structured Tables in Electronic Health Records**. In *Proc. of Neural Information Processing Systems (NeurIPS) 2024 Datasets and Benchmarks (**Spotlight**, **2.0%** acceptance rate for spotlight papers)*

[C.2] Seongsu Bae*, **Daeun Kyung***, Jaehee Ryu, Eunbyeol Cho, Gyubok Lee, Sunjun Kweon, Jungwoo Oh, Lei Ji, Eric I-Chao Chang, Tackeun Kim, Edward Choi (2023). **EHRXQA: A Multi-Modal Question Answering Dataset for Electronic Health Records with Chest X-ray Images**. In *Proc. of Neural Information Processing Systems (NeurIPS) 2023 Datasets and Benchmarks* (32.7% acceptance rate)

[C.1] **Daeun Kyung***, Kyungmin Jo*, Jaegul Choo, Joonseok Lee, Edward Choi (2023), **Perspective Projection-Based 3D CT Reconstruction from Biplanar X-rays**, In *ICASSP 2023* (Oral Presentation, **Best Student Paper Award**, **Top 0.08%** of all submissions), DOI: 10.1109/ICASSP49357.2023.10096296

Journal

[J.2] Jongseong Jang*, **Daeun Kyung***, Seung Hwan Kim, Honglak Lee, Kyunghoon Bae, Edward Choi (2024), **Significantly improving zero-shot X-ray pathology classification via fine-tuning pre-trained image-text encoders**. *Scientific Reports*, 14, 23199. DOI: 10.1038/s41598-024-73695-z

[J.1] Dongmin Kang, Yeongwoo Nam, **Daeun Kyung**, Jonghyun Choi (2022). **Unsupervised Domain Adaptation for 3D Point Clouds by Searched Transformations**. *IEEE Access*, Vol. 10, pp. 56901-56913. DOI: 10.1109/ACCESS.2022.3176719

Workshop & Preprint

[P.2] Jiho Kim, Woosog Chay, Hyeonji Hwang, **Daeun Kyung**, Hyunseung Chung, Eunbyeol Cho, Yohan Jo, Edward Choi (2026). **DialSim: A Real-Time Simulator for Evaluating Long-Term Dialogue Understanding of Conversational Agents**. In *Workshop on Memory for LLM-Based Agentic Systems @ ICLR 2026*.

[P.1] Seongsu Bae*, **Daeun Kyung***, Jaehee Ryu, Eunbyeol Cho, Gyubok Lee, Sunjun Kweon, Jungwoo Oh, Lei Ji, Eric I-Chao Chang, Tackeun Kim, Edward Choi (2024). **MIMIC-Ext-MIMIC-CXR-VQA: A Complex, Diverse, And Large-Scale Visual Question Answering Dataset for Chest X-ray Images**. *PhysioNet*. DOI: 10.13026/deqx-d943

Working Experiences

- **LG AI Research [🌐]** *Seoul, Republic of Korea*
  Research Intern Oct 2022 - Apr 2023
  - Developed a multimodal imagetext framework for chest X-ray/report alignment, introducing a fine-tuning strategy with random sentence sampling and loss relaxation to improve zero-shot pathology classification.
  - Achieved a 4.3% average increase in macro AUROC across four diverse datasets and three pre-trained models, yielding performance that surpassed board-certified radiologists and was published in *Scientific Reports* ([J.2]).

Projects

- **Realistic Hospital Simulation with LLM** *Aug 2024 – Present*
  LLM, Role-playing, User Simulation, Persona, Medical Records [GitHub]
  - Developed PatientSim, a clinically grounded framework for simulating realistic doctor-patient interactions, constructed from MIMIC-IV and MIMIC-ED and supporting 37 patient persona combinations.
  - Validated the simulator through LLM-based evaluation and expert clinician review, and packaged and released the framework as an open-source library (`patientsim`).
  - Leading collaboration with a major Korean hospital to build specialized simulator agents for obstetric patients and nursing staff to optimize clinical workflows (ongoing).

- **EHR Conditional CXR Prediction** *Oct 2023 - Aug 2024*
  CXR generation, Medical records, Diffusion model, Image-Table multi-modal learning [GitHub]
  - Proposed EHRXDiff, the first latent diffusion-based framework designed to predict future chest X-ray images by integrating longitudinal EHR data with previous clinical findings.
  - Modeled the temporal relationship between structured medical events and radiological changes to provide longitudinal insights into potential patient health outcomes.

- **Multi-Modal Question Answering Dataset for Electronic Health Records with Chest X-ray** *Sep 2021 - Oct 2023*
  Multi-modal Question Answering, Visual Question Answering (VQA), CXR images, EHR Data [GitHub]
  - Constructed EHRXQA, the first multi-modal QA dataset integrating structured Electronic Health Records (EHR) with chest X-ray images, requiring both uni-modal and cross-modal reasoning.
  - Proposed a NeuralSQL-based strategy augmented with an external VQA API to execute joint reasoning across tabular data and medical images, effectively addressing multi-modal clinical question challenges.

- **Perspective Projection-Based 3D CT Reconstruction from Biplanar X-rays** *Jan 2022 - Oct. 2022*
  3D CT Reconstruction, Chest X-rays, Biplanar X-rays, Perspective Projection [GitHub]
  - Proposed PerX2CT, a novel 3D CT reconstruction framework that utilizes a perspective projection scheme to align 2D X-ray features with 3D spatial coordinates.
  - Achieved state-of-the-art reconstruction quality, improving PSNR by 5.5%, SSIM by 9.9%, and LPIPS by 39.0% over the baseline, while simultaneously delivering a 6.8× reduction in FLOPs and 33.5× faster inference.

Education

- **Korea Advanced Institute of Science and Technology (KAIST)** *Daejeon, Republic of Korea*
  Ph.D. in Kim Jaechul Graduate School of AI (Integrated masters/doctoral program) Aug 2021 - Present (Expected Aug 2026)
  - Advisor: Prof. Edward Choi
- **Gwangju Institute of Science and Technology (GIST)** *Gwangju, Republic of Korea*
  Department of Electrical Engineering and Computer Science Mar 2017 - Aug 2021

Honors and Awards

- **Best Student Paper Award [🌐]** *June 2023*
  ICASSP 2023
- **EECS Outstanding Bachelor's Research Award** *Nov 2020*
  Gwangju Institute of Science and Technology (GIST)

Skills

- **Programming Languages:** Python
- **Frameworks and Tools:** Python, PyTorch, vLLM, HuggingFace Transformers, Docker, Wandb, Git

Academic Activities

- **Reviewer:** ICASSP (2023-2025), NeurIPS 2024 Datasets and Benchmarks Track (2024), ML4H (2024-2025), CHIL (2024-2025), ICLR (2025), ARR (2025 Feb), COLM (2025)