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강연제목: 알파폴드와 첨단 인공지능 기반 분자 생성 기법

AlphaFold and advanced AI-based molecular generation techniques

Abstract:

AlphaFold, a landmark achievement recognized by the Nobel Prize, represents a paradigm shift in structural biology through the integration of advanced AI-based generative modeling—particularly diffusion models. Originally developed for high-fidelity image synthesis, diffusion models have been rapidly adapted and extended to enable the generation of complex biomolecular structures, accelerating progress in protein folding and molecular design. This talk provides an overview of recent developments in AI-driven structural biology, highlighting key principles and application trends in generative modeling. We will also introduce original methodologies developed by our lab for high-resolution and controllable molecular generation based on diffusion-based architectures. These technologies exemplify how AI is increasingly shaping the future of biomedical innovation. The talk aims to reflect on the growing role of AI in structural biology and its potential to transform healthcare and everyday life through next-generation medical and biological engineering.

Brief Biosketch

김경수 교수는 서울대학교 전기컴퓨터공학부에서 학사 및 석사 학위를 취득하고, KAIST 에서 전기 및 전자공학 박사 학위를 받았다. 이후 KAIST AI 대학원에서 박사후연구원으로 근무했으며, 이후 삼성서울병원 AI 연구센터에서 PI 연구원으로 재직 및 성균관대학교 의과대학에서는 연구교수로 겸무 재직하였다. 하버드 의과대학 및 매사추세츠 종합병원에서는 AI 분야 박사후연구원으로 활동하였고, 2024 년부터는 서울대학교에서 조교수로 재직 중이다. 그의 연구는 통계적 추론 및 역추정 이론에 기반한 생성 및 복원 모델링의 이론 정립과 원천 기술 개발에 중점을 두며, 이를 다양한 의료 응용 분야로 확장하는 데 주력하고 있다. 최근 CVPR, NeurIPS, ICLR 등 AI 분야 최상위 학회에 30 편 이상의 논문을 발표하였다.

Professor Kyungsu Kim received his B.S. and M.S. degrees in Electrical and Computer Engineering from Seoul National University, and his Ph.D. in Electrical Engineering from KAIST. He subsequently worked as a postdoctoral researcher at the KAIST Graduate School of AI, served as a PI researcher at the Medical AI Research Center of Samsung Medical Center, and held a joint position as a Research Professor at the Sungkyunkwan University School of Medicine. He later conducted postdoctoral research in AI at Harvard Medical School and Massachusetts General Hospital. Since 2024, he has been serving as an Assistant Professor at Seoul National University. His research focuses on the theoretical foundations and core technologies of generative and reconstruction modeling based on statistical inference and inverse problem theory, with an emphasis on extending these approaches to a wide range of medical applications. He has recently published over 30 papers in top-tier AI conferences, including CVPR, NeurIPS, and ICLR.