

Artificial Intelligence (AI) is often seen through two conflicting lenses: as a mechanical tool executing programmed instructions or as an ominous force capable of disrupting society. While programmers prioritize optimizing functionality for efficiency, the public increasingly fears AI systems may make decisions that conflict with human values or exacerbate societal biases. To bridge the gap between technical design and societal concerns, we must integrate ethics, human motivations, and social considerations into AI development—ensuring that systems are not only efficient but equitable and human-compatible. Motivated by these challenges, I am excited to create AI systems that inspire trust and address real-world challenges. My research experiences at Purdue University, Hanyang University, and applied projects at DIAL Ventures have reinforced my belief in incorporating human insights into AI decision-making processes. I am interested in addressing challenges such as hallucinations and biases in natural language processing (NLP).

One pivotal experience that shaped my commitment to building human-centric AI systems began in May 2023, when I had the opportunity to participate in Purdue's Summer Undergraduate Research Fellowship (SURF). At the Digital Agriculture Discovery Lab, under the guidance of Dr. Dharmendra Saraswat, I am developing an intelligent chatbot tailored for farmers, offering a customized alternative to traditional inquiry methods. A key challenge was preserving structural relationships during data extraction for a knowledge base. This revealed limitations in large language models (LLMs) such as misidentifying contextual hierarchies. To address these issues, I refined data extraction methods, applied prompt engineering techniques, and conducted extensive LLM experiments. This experience deepened my curiosity about contextual reasoning and knowledge representation in LLMs and introduced me to human-computer interaction, inspiring me to design interpretable AI systems. For this work, I was honored to receive the Best Poster Presentation Award and was invited to further contribute by enhancing domain adaptability and developing robust methods for information retrieval. Through this full-time research program, I learned to conduct thorough literature reviews, draft research papers, and technical reports, and deliver engaging poster presentations to large audiences.

Building on this foundation, I sought to deepen my expertise in AI and optimization techniques at the LRNING Lab at Hanyang University under Dr. Sungyoon Lee during the summer of 2024. During this time, I focused on parameter tuning to enhance output relevance and quality while maintaining efficiency. I tackled variability in the model's performance using a translation dataset, which presented inherent complexities in adapting to diverse data and unpredictable scenarios. These obstacles required optimizing the machine learning pipeline to ensure stability and adaptability. I exhibited strong resilience through this research by experimenting with new methods, consulting mentors, and conducting extensive external research to improve the model's robustness. Through these efforts, I not only refined my technical skills but also gained a deeper understanding of NLP applications and their practical challenges. Additionally, I participated in team discussions and analyses on trustworthy AI and transformer optimization, contributing to a collaborative research environment. This experience

reinforced my commitment to building trustworthy AI solutions and addressing biases and hallucinations in real-world contexts.

Concurrent with my work in AI and NLP, I explored the intersection of data engineering and actionable insights through my ongoing contributions at DIAL Ventures. I have been working there as a Data Analyst Intern under the mentorship of Dr. Lourival Monaco since August 2023, where I began by contributing to sentiment analysis in the agri-food industry. In this role, I converted unclear, tabular data into clear perspectives that decision-makers could use to strategize their businesses in alignment with market trends. I also built and utilized an ETL pipeline to streamline data processing and visualization to assist with sentiment analysis. This experience enhanced my ability to extract insights from raw data and develop tailored solutions to meet end-user needs—an essential skill for designing advanced data integration architectures. Currently, I am leading a project to refine data acquisition and feature engineering workflows, enabling accurate estimation of crop budget variations across the U.S. The work I have done and continue to do with DIAL Ventures strengthened my appreciation for interdisciplinary collaboration and its role in developing data-driven tools to support decision-making—a principle I will carry into my upcoming research.