Hun Tae Kim

https://huntae.info

Research Interest

Large Language Models (LLMs), Synthetic Data Generation, Reinforcement Learning

Education

Sungkyunkwan University (SKKU) Seoul, South Korea

B.S. in Computer Science and Engineering expected in Feb 2025 Mar 2019 – Present

- Current Cumulative GPA: 4.09 / 4.50
- Relevant Coursework: Operating Systems, Reinforcement Learning, Computer Networks, System Programming

The University of Texas at Austin (UT Austin) Austin, TX, USA

Exchange Student, Electrical and Computer Engineering Aug 2022 – Jul 2023

- Cumulative GPA: 3.78 / 4.00
- Relevant Coursework: Machine Learning and Data Analytics for Edge AI (ECE 361E), Computer Architecture (ECE 460N), Algorithms (ECE 360C), Data Science Laboratory (ECE 460J)

Research Experience

Human Language Intelligence Lab, SKKU Suwon, South Korea

Undergraduate Research Assistant (Advisor: Prof. Jinyeong Bak) Jan 2024 – Aug 2024

- Engineered sentiment analysis, emotion classification, and self-relatedness modules for Mental Health App Service developed in conjunction with Seoul Metropolitan Government and Hanyang Digital Healthcare Center
- Leveraged fine-tuned XLM-RoBERTa and LLM prompting for module development, achieving 89%+ accuracy
- Spearheaded research on depression severity prediction using digital phenotyping and LLMs, exploring encoder-decoder architectures for PHQ-9 score estimation

System Level Design Group, UT Austin Austin, TX, USA

Undergraduate Research Assistant (Advisor: Prof. Radu Marculescu) May 2023 – Jul 2023

- Architected and optimized a Federated Learning framework, implementing multiple models (Conv5, MobileNetV1) on Raspberry Pi and MC1 devices
- Implemented model optimization techniques, including structural pruning and Top-k Sparsification, significantly improving accuracy and reducing communication bandwidth
- Engineered robust error handling mechanisms to address real-world challenges in federated learning scenarios, including device disconnections and communication failures
- Processed and analyzed 67,298 academic papers for research on low-power computing trends, contributing to an IEEE Access publication as 3rd author
- Implemented Graph Neural Networks (GNN) for node classification and link prediction on research networks

Publications

Three Decades of Low Power: From Watts to Wisdom Feb 2024

M. Munir, S. Modi, G. Cooper, H. Kim and R. Marculescu

- Analyzed the interdisciplinary evolution and impact of low power technologies across multiple engineering fields using network science to map research trends over 30 years
- Published in *IEEE Access*, vol. 12, pp. 19447-19458, 2024, doi: 10.1109/ACCESS.2024.3361484

Patents & Copyrights

Emotion Diary Sentiment Classification and Analysis System Jun 2024

- Developed a comprehensive system for analyzing and quantifying emotions in diary entries using LLMs, enhancing mental health monitoring and personalized psychological support
- Patent pending, registered by Seoul National University Research & Development Foundation

Data Analysis for Ministry of National Defense Mental Health Service Sep 2024

- Engineered a data preprocessing and analysis pipeline for diary entries of Korean military personnel, supported by the Ministry of Science and ICT and the National Research Foundation of Korea
- Successfully registered the analysis pipeline as a copyright at Korea Copyright Commission (Registration No. R-2024-0692-KR-1)

Projects

AI Assisted Mental Health Diary Analyzer Aug 2024 - Dec 2024

Graduation Project

- Implemented an web application using Nodejs that analyzes user's diary using sentiment analysis, subjectivity analysis, LLM feedback, and real time counseling using GPT-4o Realtime API

Edge AI Model Compression and Optimization Feb 2023 - Apr 2023

Course: ECE 361E at UT Austin, Supervisor: Prof. Radu Marculescu

- Implemented structural pruning and quantization techniques on MobileNet-v1 running on Raspberry Pi and MC1
- Experimented with static post-training quantization, dynamic quantization, and BatchNorm pruning, achieved 65% reduction in inference time
- Awarded *Best Project Award* for optimizing the model with the lowest energy consumption among competitors

Activities & Leadership

SungKyun English Debate Association Seoul, South Korea

Vice President Aug 2023 – Jun 2024

- Orchestrated weekly practice sessions in Asian/British parliamentary debate, enhancing critical thinking and public speaking skills
- Participated as debater and judge representing the university in multiple tournaments hosted by Korea Intervarsity Debate Association (KIDA)

Seoul Generative AI Explorers Society Seoul, South Korea

Discussion Leader Aug 2023 – Jun 2024

- Led bi-weekly AI discussions and trend analyses for across 4 universities, focusing on up to date generative AI trends
- Conducted in-depth studies on consumer applications, enterprise solutions, and technical aspects of generative AI in text, image, audio, and video domains

SKKU International Mentoring Suwon, South Korea

Team Mentor Mar 2024 – Jun 2024

- Spearheaded Computer Networks study session for a diverse group of international students, facilitating cross-cultural learning experiences
- Recognized with the *Outstanding Mentor Award* for exceptional performance

Honors & Awards

Sungkyun Software Scholarship, SKKU Spring 2019 - Fall 2022

Dean's List, SKKU Spring 2019

Best Project Award, ECE 361E Spring 2023

Outstanding Mentor Award, SKKU Spring 2024

Technical Skills

Programming Languages: Python (Advanced), C/C++, Java, SQL (Moderate)
Machine Learning & Data Science: PyTorch, Tensorfolw, ONNX, scikit-learn, matplotlib
AI & NLP: Prompt Engineering, Transformer models (BERT, RoBERTa), LLMs (GPT-4, Llama)
Other: LaTeX, Git, Shell