Minsu Sun

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Education

POSTECH (Pohang University of Science and Technology) *Feb 2022 – (Expected)Feb 2024*
B.S. in Computer Science and Engineering
- Awarded CSE Global Leadership Program scholarship(Sep 2023)

Skills

Programming Languages	C/C++, C#, Python, Java
Frameworks	Flask, FastAPI, BeautifulSoup4, Selenium
Tools	Git/Github, Docker, AWS, Kubernetes, Helm
Natural Languages	Korean(Native), English(Intermediate)

Experience

OMNIA Lab, POSTECH *Dec 2024 – Ongoing*
Undergraduate Intern Researcher
- Advisor: Prof. Myeongjae Jeon

SHIFT UP *Jun 2024 – Aug 2024*
Intern Backend Engineer, NIKKE
- Worked on:
  - Server side contents of collaborate minigame
  - Deploying and managing internal purposed infrastructures
- Skills: C#, Kubernetes, Helm

UnitCompany Inc. *Jun 2022 – Jun 2024*
Part-time Backend Engineer
- Worked on educational service backend development
- Skills: Python, AWS, Docker

UnitCompany Inc. *May 2022 – Jun 2024*
Intern Researcher
- Worked on research about recommendation system and LLM
- Topics:
  - BERT based contents recommendation system
  - LLM Fine-Tuning
  - LLM Prompt Engineering

Projects

Boosting RECOMP with DSLR *Oct 2024 – Dec 2024*
Adapting DSLR(Document Refinement with Sentence-Level Re-Ranking and Reconstruction to Enhance Retrieval-Augmented Generation) on RECOMP
- Individual research project adapting DSLR contextual reconstruction method in RECOMP(link)
- Achievement:
  - Baseline Method(RECOMP) - EM: 0.163(NQ) / 0.300(TQA) / 0.186(HotpotQA)

    - Proposed Method(RECOMP + DSLR) - EM: *0.172*(NQ) / *0.312*(TQA) / *0.194*(HotpotQA)
- Advisor: Prof. Hwanjo Yu
- Topics: NLP, LLM, RAG(Retrieval Augmented Generation), RECOMP, DSLR

VC-GNN *Oct 2024 – Dec 2024*

Graph Neural Network for Solving Decision Variant of Vertex Cover Problem

- Team project adapting GNN on solving the decision variant of NP-Hard Problem, Vertex Cover Problem
- Achieved *92.76%* of accuracy with 0.2002 of loss
- Topics: Deep Learning, Graph Neural Network

Distributed Arduino Calculator *Aug 2024*

Simple Distributed Computing Cluster with Arduinos via I^2C protocol

- Individual project simulating distributed 32bit floating point calculation(link)
- Distributed 32bit floating point(fp32) addition operations with 4 workers(Arduino Uno)
- Approximately took 10 seconds on 400K fp32 addition operations

Sponge *Mar 2024 – Jun 2024*

Educational TCP/IP Development Project Sponge

- Individual project implementing TCP/IP stack on Linux(link)
- Skills: C++
- Additionally implemented SHA256 hash calculation of every frame for debugging and verify purpose

BLARE *Mar 2024 – Jun 2024*

Blended FLARE(Forward-Looking Active Retrieval Augmented Generation)

- Individual research project proposing and implementing blended query formulation method in FLARE(link)
- Advisor: Prof. Hwanjo Yu
- Topics: NLP, LLM, RAG(Retreival Augmented Generation), FLARE

RISC-V CPU *Mar 2024 – Jun 2024*

RISC-V 5-Stage Pipelined CPU with Configurable Cache

- Team project implementing RISC-V 5-Stage Pipelined CPU with Verilog(link)
- Features:
    - Pipelined 5-Stage Execution
    - 2-Bit Saturation Counter Branch Predictor with PHT(Prediction History Table) and BTB(Branch Target Buffer)
    - Multi-way configurable cache based on LRU

CUDA Based Parallel KNN Calculation *Dec 2023*

Optimizing naive KNN(K Nearest Neighbors) operation executed on CUDA

- Individual research project optimizing naive KNN operation on CUDA device
- Composed KNN operation as a combination of belows
    - Build euclidean distance matrix of given points in the manner of matrix multiplication using tiling
    - Sort distances of neighbors using thrust::sort and select K neighbors
- Achievement compared to naive baseline code:
    - Calculating distances: about *28 times faster* execution time
    - Sorting distances: about 11 times faster execution time

B-CARAFE *Nov 2023 – Dec 2023*

Better CARAFE(Content-Aware ReAssembly of FEatures)

- Individual research project proposing and implementing better reassembly methods
- Proposed new reassembly methods with activation functions attached on original reassembly module
- Achievement:

  - Original CARAFE++(Faster R-CNN, ResNet-50) - AP: 22.5 fps: 12.54
  - Proposed B-CARAFE(Faster R-CNN + GELU, ResNet-50) - AP: *23.7* fps: *13.25*
- Full report about the research(link)
- Topics: Computer Vision, Image Segmentation, CARAFE(Content-Aware ReAssembly of FEatures)

MDEditor *Oct 2023 – Dec 2023*

IntelliJ Real-time Markdown Editor Plugin

- Team project developing IntelliJ plugin(link)
- Developed based on Agile Software Development and Test Driven-Development
- Skills: Java, Git/GitHub
- Main Role: Developer, QA

PintOS *Sep 2023 – Dec 2023*

Educational OS From Stanford CS140

- Individual project developing PintOS(link)
- Skills: C
- Worked on Threading, User Program, Virtual Memory

BaroKey *Oct 2023*

Barokey, Direct Local Keyword for Our Safety

- Team project developing web service(link) introduced at 3rd UniThon Hackathon Track
- Web service supplying user real-time emergency-related issue keywords near user's location
- Skills: Python(FastAPI, BeautifulSoup4, Selenium), AWS EC2
- Main Role: Backend Developer

Arduino MIDI Controller *May 2023 – Jun 2023*

Arduino MIDI Controller for Musical Keyboard

- Individual project implementing MIDI controller for musical keyboard
- MIDI Controller based on Arduino Leonardo with shift registers and matrix-ed switches

RISC-V SRNPU *Mar 2023 – Jun 2023*

RISC-V Based Super Resolution Neural Processing Unit

- Individual project implementing SRNPU with Verilog
- Hardware accelerator dedicated to generate super resolution image based on CNN model
- Processed 128x128 image *under 4ms* with 3 layers Sim-ESPCN CNN model
- Processed 128x128 image *under 10ms* with 8 layers SSAI 2021 CNN model

Online Judge Backend *Jul 2022*

Dedicated Online Judge System

- Individual project supplying online judge system application to a company
- Online judge system backend based on Qingdao University's seccomp judger library
- Skills: Python, Docker, AWS SQS