JUNIK BAE

(+82)10-7360-5241

heatz123@snu.ac.kr ⋄ https://github.com/heatz123

EDUCATION

Bachelor of Computer Science and Engineering, Seoul National University 2019 - Present
GPA: 4.08 / 4.30
Leave of absence for military service: Feb 2021 - Nov 2022

EXPERIENCE

Research Intern Jan 2024 - Current
Robot Learning Lab (Advisor: Prof. Youngwoon Lee)

- Working on some projects about Reinforcement Learning.

Research Intern July 2023 - Nov 2023
SNU Vision Lab (Advisor: Prof. Gunhee Kim)

- MBC projects [Gone PD]. Created a demo 3D meshed face animation using face generation models, and developed scene boundary classification and scene summary generation pipeline using visual video scene segmentation model and ChatGPT.
- Ideated and developed a lifelong evaluation pipeline for Retrieval-Augmented Generation models with frequently updating text data stream.

Research Intern Jan 2023 - Feb 2023
Naver Cloud (Formerly Naver Clova) Speech Synthesis & Voice Conversion Team

- Presented a 5-week seminar series titled "Denoising Diffusion Generative Models and its applications to TTS," to the research team members.
- Implemented a SOTA TTS model and adapted it for use with proprietary Korean speech data.

Specialty in Software Development Feb 2021 - Nov 2022
Republic of Korea Air Force

- Focused on developing vision-based detection and segmentation models.

AWARDS AND HONORS

- **1st Place**, 2022 Military AI Competition Nov 2022 - Dec 2022
  Awarded by Korean Minister of Science and Technology (과기부장관상), 20,000,000₩
  Preliminary Task: Change detection on buildings in aerial image data
  Final Task: Image denoising for all-weather operations

- **2nd Place**, 2022 Korean AI Competition Aug 2022 - Sep 2022
  Awarded by Korean Minsiter of Science and Technology (과기부장관상), 10,000,000₩
  Task: Speech recognition on free, dialect Korean speech datasets

- **2nd Prize**, Product Recognition Challenge on Self-service Stand Sep 2021 - Oct 2021
  Awarded by Chairman of Electrical and Computer Engineering Department at SNU
  Task: High-precision-and-speed object detection on self-service stand images

- **10th Place**, 2020 Seoul National University Programming Contest Div. 2 Sep 2020

- **Samhwa Jibong Scholarship** March 2023 - Current
  Scholarship from Samhwa Jibong Scholarship Foundation

- **Academic Excellence Scholarship** Aug 2019, Feb 2020, Dec 2020
  Scholarship from Seoul National Univ.

- **Jeju Talent Cultivation Scholarship** March 2019 - Feb 2021
  Scholarship from Jeju Institute for Lifelong Education and Scholarship

PROJECTS

Mitigating Hallucinations in Vision-Language Models via Reinforcement Learning. Working on fine-grained RLAIF for Vision Language Models using PPO aimed at reducing hallucinations. Utilizing SDXL and CLIP for the reward model to apply fine-grained penalties to hallucinating tokens. Employed LAVIS and trlx for base libraries. Collaboratively working with my colleagues at Deep Learning Club, since Sep 2023.

TTS Model Implementation. (350+ stars) Implemented Microsoft's NaturalSpeech: End-to-End Text to Speech Synthesis with Human-Level Quality, which is a SOTA model in the LJ Speech Dataset. This is the first and the only public implementation to the best of my knowledge. (github)

Goal Conditioned Trajectory Generation With Autoregressive Transformer. Implemented goal conditioned learning to transformer world-model-based agents, and tested with Atari Breakout. Final project for *Data Science and Reinforcement Learning* Course (2023-1). (github)

Engaging in CS285 course. Actively participating in CS285 course at UC Berkeley online, including completion of lectures and homework assignments. Anticipated completion date: December 24, 2023.

Speech-To-Text Beam Search Implementation and Optimization. Implemented transformer LM beam search logits decoding on speech-to-text model. Optimized performance using batched beam inference, beam pruning and caching. (github)
Also contributed to huggingface/transformers by fixing errors in the script that converts pytorch model weights to huggingface-compatible binary files: PR #19508.

Object Detection Model Implementations. Personal implementation of vision models from scratch using pytorch.
Currently implemented: YOLO, YOLOv2, YOLOv4, DeiT, Swin Transformer (github)

AlphaZero Gomoku Implementation. Implemented AlphaZero model which can teach itself to play Gomoku (5 in a row) from scratch. (github)

CERTIFICATES AND SKILLS

Programming Languages	Python, C/C++, Javascript
Deep Learning	Pytorch, Tensorflow
Coursera Courses	Deep Learning: [1], MLOps: [2] [3] [4]

EX-CURRICULAR ACITIVITIES

Deepest (SNU Deep Learning Research Group)

- Joined as a member of the 13th cohort. (2023-1)

- Hosted a presentation titled 'Understanding RLHF in Detail,' providing an in-depth exploration of Proximal Policy Optimization (PPO) with a preferences dataset and Direct Policy Optimization (DPO).

- Hosted a presentation titled 'A Path Towards Autonomous AI,' which explains motivations for Joint-Embedding Predictive Archiecture proposed by Yann Lecun, and some recent works utilizing this architecture.

SNUPS (Algorithm and Problem Solving Club)

- Participated in competitive programming techniques intro study by gratus907 and coffeetea99 (2019-1)

- Participated in 2020 ACM-ICPC Seoul Regional Preliminary as 26th place over 334 teams.

Guardian (Computer Security Research Club)

- In charge of the seminars for Linux OS and computer security techniques to new club members. (2020-1, 2020-2)

LANGUAGES

Korean (Native), **English** (Fluent)