Jiayu Zheng

401-447-9534 | jiayu_zheng@brown.edu | Academic Homepage | github.com/JiayuZheng

Education

Brown University — Providence, RI
Sc.M. in Data Science — *Sep 2022 – Present*

- GPA 4.0
- Machine Learning, Deep Learning, Reinforcement Learning, Computer Visions, Operating Systems, Parallel Computing

Zhengjiang University — Zhejiang, China
Sc.B. in Chemistry with Honors (Specialization in Computational Chemistry) — *Sep 2018 – May 2022*

- Ranking 2%
- Graduated from the Cho Kochen Honors College
- Certificate in **Computer Science**
- C&C++, Java, Mathematical Modeling, Digital Logic Design, Linux application, Advanced Data Structure and Algorithm Analysis

Publications

A Molecular Stereostructure Descriptor Based On Spherical Projection — 2020

- Licheng Xu, Xin Li, Miaojiong Tang, Luotian Yuan, **Jiayu Zheng**, Shuoqing Zhang, Xin Hong

Experience

Teaching Assistant — Providence, RI
CS1410: Artificial Intelligence*, Brown University* — *Sep 2023 – Dec 2023*

- Instructor: Thao Nguyen, Stefanie Tellex
- Mentoring three student groups for their final projects, holding debugging hours twice per week, answering miscellaneous questions on Ed, and grading assignments

Graduate Research Assistant — Providence, RI
BATS Lab*, Brown University* — *Sep 2023 – Present*

- Advised by Prof. Stephen Bach
- Building soft-prompted weak supervision systems
- Improving the performance of LLMs on out-of-domain datasets with parameter-efficient soft prompting

Graduate Research Assistant — Providence, RI
Conversational AI Lab*, Brown University* — *Jun 2023 – Present*

- Coadvised by Prof. Shekhar Pradhan and Prof. Ritambhara Singh
- Training semantically rich embeddings in language models from images supervision
- Designed relation-aware contrastive loss, which effectively encourages models to discriminate between relations in text

Undergraduate Research Assistant — Zhejiang, China
Zhejiang University — *Apr 2020 – Jul 2021*

- Most work focused on finding appropriate representations of molecules that allow for efficient and precise prediction of properties
- Designed a numeric descriptor that transforms, using spherical projection, the spatial, continuous van der Waals surface to a sequence of 2D matrices, on which CNNs can be applied
- Conducted a thorough ablation study on the accuracy gain brought by different modifications on GNNs in predicting molecular energy

Head Teaching Assistant — Zhejiang, China
Structural Chemistry and Spectroscopy*, Zhejiang University* — *Feb 2020 – Dec 2021*

- Prepared course materials, designed assignments, and hosted group presentations

Projects

GourmAIt | *Python, PyTorch, C++* Jul 2023 – Sep 2023

- Implemented the Noisy Student Training, where pseudo labels generated by a teacher model are used to train a larger-or-equal-size student model, which will be used as the teacher model in the next iteration
- Added stochastic depth feature into ResNet architecture

WeenixOS | *C, Unix kernel, X86_64 arch* Feb 2023 – May 2023

- Semester-long project of Operating Systems instructed by Prof. Thomas Doeppner
- Developed a well-functioning kernel-based Unix operating system, the Weenix, written in C
- Implemented a thread pool, a device driver, a VFS, an S5FS, and a virtual memory system
- Implemented system calls, e.g. do_waitpid, do_read, do_write, do_brk, do_fork, etc.

TransformerHub | *Python, PyTorch* Sep 2022 – Aug 2023

- Implemented encoder-only, decoder-only, and encoder-decoder Transformer models like Transformer, BERT, GPT, ViT, and CLIP
- Incorporated advanced designs like mixed precision training, rotary position embedding
- Evaluated these models on different tasks, including text summarization, language modeling, and sentiment analysis

Leadership and Social Engagement

Mentor in Data101 bootcamp Providence, RI

Brown University *Apr 2023*

- Introduced fundamental concepts of data science to a group of underrepresented high school students in the College-Day data science bootcamp

Mentor in WiDS at Brown Providence, RI

Brown University *Feb 2023 – Mar 2023*

- Provided tutoring to prospective young women data scientists
- Rendered hands-on guidance of numpy and pandas, and demonstrated a classification task on a time-series weather dataset

Honors and Awards

Outstanding Graduates	2022
Cho Kochen Honors Chollege Scholarship for Innovation	2020, 2021
Outstanding Students	2019, 2021
Zhejiang University Scholarship, First Prize	2019, 2021

Technical Skills

Programming: Python, C/C++, CUDA C++, Java, SQL (MySQL), Latex
ML Frameworks: Tensorflow, PyTorch, Huggingface, LibTorch, Scikit-learn
Development Tools: Venv, Conda, Mamba, Docker, Git, ssh, spaCy, Jupyter, CMake, SLURM, Google Cloud Platform, gdb, Hydra, wandb
Deep Learning Systems: DeepSpeed(ZeRO), Accelerate, Flexgen, MegatronLM
LLMs/VLMs: GPT2/3/4, Claude, OPT, T0++, Llama1/2, Falcon, T5, Flan-T5, Mistral, CLIP