Xintian Pan

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github.com/XintianPan

Education

Nanjing University, BS in Computer Science   Sept 2021 – Jul 2025
- **GPA:** 4.51/5.0 (**Rank**: 3/103)
- **Selected Honors:** First Class People's Scholarship of NJU, Second Prize Scholarship for Basic Subjects of NJU

University of California, Berkeley, Exchange student   Jan 2024 – May 2024
- Berkeley International Study Program, **GPA:** 4.0/4.0
- **Core courses:** CS188 Introduction to Artificial Intelligence, CS61B Data Structures, MATH54 Linear Algebra and Differential Equations

Research Experience

Student Intern, Yale University – New Haven, CT   Jul 2024 – Jan 2025
Supervisor: *Assistant Prof. Zhuoran Yang,* **Department of Statistics and Data Science**
- Conducted comprehensive literature review over the mechanistic interpretability of LLM. Especially focused on Garg's* paper and related articles to investigate Transformers' ability of In-Context Linear Regression (**What Can Transformers Learn In-Context? A Case Study of Simple Function Classes*)
- Designed new experiments to understand how Transformers learn In-Context Linear Regression and the ability of length generalization
- **Identified the kernel estimator learned by 1-Layer Transformers**
- Justified empirical results' accordance to theoretical analysis through unveiling the training dynamics.
- Currently working on extending the experiments in two directions: 1. exploring how 1-layer Transformers learn **nonlinear regression**, 2. further understanding how **multi-layer** Transformer and its variant (e. g. **Looped Transformer**) learn linear regression

Group Leader, NJU Student Research Training Program – Nanjing, China   Jan 2023 – Dec 2023
Supervisor: *Prof. Jian Wang,* **School of Electronic Science and Engineering**
- Designed and Implemented an Active Visual Driver Monitoring System Based on Deep Learning to detect fatigue driving
- Held weekly meetings to discuss progress and assign new tasks accordingly as group leader
- Collected and annotated facial expression data related to fatigue driving
- Trained YOLOv5 model in Linux using PyTorch system and generated preliminary pt weight
- Optimized the model through hyperparameters adjustment and data enhancement to improve its detection accuracy and robustness
- Converted pt weights into ONNX format weights with YOLOv5's export.py script, converted ONNX weights into RKNN format models with RKNN-Toolkit and deployed them on RV1126 platform
- Implemented real-time detection and verified the effect of the mode, successfully identifying drivers' fatigue driving accurately when deploying the model on RV1126 platform

Research Undergraduate Student, NJU WebSoft Lab – Nanjing, China   Feb 2023 – Now
Supervisor: *Prof. Gong Cheng,* **Web SoftLab, School of Computer Science**
- Read papers related to data recommendation and mastered the programming languages and tools for reproduction, such as Python, Pandas, NumPy, etc.
- Crawled relevant data from website, wrote codes in Python, and reconstructed the dataset
- Ran the reconstructed codes and used the performance indicators mentioned in the paper (run recommendation tasks on datasets' titles and descriptions and verify the number of top k datasets which match one of the genre metadata provided by a target datasets) to compare the reproduction results, analyzed the differences and

possible reasons
- Reproduced the T5 fine-tuning model of the paper *Relationships are Complicated! An Analysis of Relationships Between Datasets on the Web* and tested the performance on NTCIR dataset

Course Projects

Batch Operating System Based on RISC-V32 Instruction Set Sep 2022 – Jan 2023, github.com/XintianPan/ICS_PA

- Simulated a CPU that can perform arithmetic operations and execute jump instructions
- Implemented the initial abstraction of CPU functions and added serial port output, keyboard interaction, image drawing and sound card function interfaces
- Realized the interrupt instruction function of the CPU and the basic support of the batch operating system for C language library functions
- Improved the interactive functions with image drawing, keyboard interaction, and serial port output, tested and ran simple interrupts, picture players and a computer game
- Completed functions such as virtual memory address, paging, and time interrupt, supported simultaneous mounting and running of multiple programs
- Tools Used: C/C++, RISC-V32 Assembly, Vim

CS61B Course Project Jan 2024 - May 2024

- Built basic data structures from scratch, collaborated with another student to complete the final project, a game in which player can pick up weapons to defeat enemies, implemented additional features such as changing perspective of player's view, save slot, mouse clicking functions and switch of languages
- Tools Used: Java

CS188 Course Project Jan 2024 - May 2024

- Completed the 6 projects of the course, implemented A* search, Alpha–beta pruning, First-order Logic Inference, Bayes Nets, Machine Learning Algorithms and Q Learning of Reinforcement Learning
- Tools Used: Python, Pytorch

Activities

Unofficial Teaching Assistant, **Introduction to Computer System** Sep 2023 – Jan 2024
- Shared project experience with students, held Q&A sessions

Technologies

Languages: C/C++, Python, Java, SQL, LaTeX, Markdown

Toolkit: Linux, Git, Pytorch, Jax, NumPy, Jupyter Notebook, MySQL