Yifan Bao

Undergraduate Student

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RESEARCH INTEREST

Machine Learning, Computer Vision, Programming Language, Side Channel Attacks

EDUCATION CREDENTIALS

- **Bachelor of Engineering, Computer Science and Technology |** September 2018 - June 2022 (Expected)
  Zhejiang University, Zhejiang, China
  - CGPA: 3.90/4 (89.45/100), **top 10%**
  - Third Year GPA: 3.99/4 (91.61/100), **top 3%**

  Subjects Studied: *Advanced Data Structure(92), Object-Oriented Programming(96), Operation System(96), Computer Architecture(95), Computer Networks(93), Java Application Design(93), Artificial Intelligence(97) etc.*
- **TOEFL:** 104 (R: 29, L: 28, S: 23, W: 24)
- **GRE:** 332+4.5 (Verbal: 162, Quant: 170, AW: 4.5)

PUBLICATION

Gongfan Fang, **Yifan Bao**, Jie Song, Xinchao Wang, Donglin Xie, Chengchao Shen and Mingli Song (2021) "Mosaicking to Distill: Knowledge Distillation from Out-of-Domain Data, Neural Information Processing Systems (NeurIPS)"

RESEARCH PROJECTS

Domain adaptation on Semantic Segmentation **July 2021 – August 2021**
Supervisor : Prof. Min Chi, NCSU

- Evaluation Letter | Project Page
- Implemented an adversarial training-based domain adaptation model on semantic segmentation task, using Cityscapes and SYNTHIA datasets.
- Performed comprehensive analysis and ablation studies on several factors in adversarial domain adaptation.
- Evaluated and compared the effectiveness and robustness of two segmentation models.
- Corresponded in-depth explanations for the effectiveness of the proposed domain adaptation framework.

MosaicKD: Knowledge distillation from out-of-domain data **February 2021 – September 2021**
Supervisor : Prof. Mingli Song, ZJU & Prof. Xinchao Wang, NUS

- Project page
- Proposed to tackle the novel and challenging out-of-domain knowledge distillation (OOD-KD) task, allowing us to conduct KD using only OOD data that can be readily obtained at a very low cost.
- Supported to form the insight behind MosaicKD: samples from various domains share common local patterns; these shared local patterns, in turn, can be re-assembled analogous to mosaic tiling to approximate the in-domain data and further alleviate the domain discrepancy.
- Participated in the model design, coding, and experimenting on diverse tasks and benchmarks.
- Conducted the quantitative analysis and the ablation study.

Clothing parsing algorithm design for virtual try-on **July 2020 – October 2020**
Supervisor : Prof. Mingli Song, ZJU

Served as a research intern in Computer Vision and Video Analysis Laboratory Computer Vision and Video Analysis Laboratory, Alibaba-Zhejiang University Joint Research Institute of Frontier Technologies(AZFT).

- Customized, modified, integrated and diagnosed the existing segmentation algorithms including Deeplab-v3+, CascadePSP, and PointRend for clothing parsing with Zeekit clothing dataset provided by Alibaba.

Side Channel Attack on AI Chips **March 2019 – May 2020**
Supervisor : Prof. Fan(Terry) Zhang, ZJU

Side Channel Attack (SCA) is an attack technique based on the leakage of information gained from computer system.

- Applied power analysis (one category of SCA) to reverse engineering; the part of parameters and hyper-parameters of feedforward neural network designed for cat recognition task running on Xilink Zynq-7000S FPGA board.

- Applied power analysis to reverse engineering; the inputting binary images of convolutional neural network designed for MNIST handwritten digit recognition task running on Xilink zynq-7000s FPGA board.
- Designed protective strategies for the two experimental neural networks against potential attacks, specifically; random masking and random shuffling.

COURSE PROJECTS

Compiler for a C-like language **April 2021 – July 2021**

Course : Compiler Principle | Supervisor : Prof. Ying Li

- Programmed the frontend (as well as optimization) of a compiler for SysY language (a language used in Huawei Bisheng System Design Contest).
- Engaged in the design of backend (target platform: Raspberry Pi, ARM Cortex-A72 CPU2GB LPDDR4 SDRAM).

Pipelined CPU for MIPS Assembly Language **September 2020 – January 2021**

Course: Computer Architecture | Supervisor : Prof. Shuibing He

- Implemented a pipelined CPU in Verilog based on MIPS R10K architecture with Xilinx Kintex 7 FPGA board.
- Formalized memory hierarchy (a.k.a, cache design compatible with the CPU and memory)
- Engineered stall, forwarding, multiple instructions issues and commits, precise interrupts and branch-misprediction rollback.

STL Allocator and Memory Pool **March 2020 – June 2020**

Course: Object Oriented Programming | Supervisor: Weiwei Xu

- An allocator is used by standard library containers as a template parameter.
- Designed a memory pool to speed up the dynamic allocation of a large number of small blocks, and to lessen memory fragmentation.
- Replaced the default allocator to optimize the memory allocation speed using memory pool, supporting arbitrary memory size allocation request.

Mini-SQL in C++ **March 2020 – June 2020**

Course : Database System | Supervisor : Prof. Jianling Sun

- Built a simple local relational database, with data types including int, float, and char(n) supported.
- Implemented features such as creating, inserting, deleting, and indexing (using self-implemented B+ tree).

AWARDS & HONORS

- Second-Class Scholarship for Outstanding Students of ZJU(Top 8%). **[2020]**
- Third Prize in University Students' Physics (Theory) Innovation Competition of Zhejiang Province. **[2019]**
- Excellent Volunteer of fifth China College Students' 'Internet+' Innovation and Entrepreneurship Competition. **[2019]**
- Excellent Conclusion of Student Research Training Program of Zhejiang University. **[2019]**
- Third-Class Scholarship for Outstanding Students of ZJU(Top 20%). **[2018 & 2019]**
- Excellent Conclusion of Student Quality Training Project of Zhejiang University. **[2018]**

SKILL COMPETENCIES

Languages: Java (Proficient), Python (Advanced), C/C++ (Advanced), Shell (Familiar), LATEX

Research Tools: PyTorch(Competent), OpenGL(Familiar)