

Kaiwen Sheng

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Peking University, Haidian District, Beijing

EDUCATION

Peking University

Sep 2016 - Jun 2020

Bachelor of Science in Computer Science and Technology

GPA: 3.7 / 4.0

RESEARCH EXPERIENCE

Real-Time Embedded Object Detection System for H.264 Videos

Oct 2018 - Feb 2019

Supervised by Prof. Yun Liang

Peking University

- Designed an algorithm to utilize motion vectors extracted from H.264 coded videos to accelerate object detection procedure on Xavier embedded system and achieved ~13 times than real-time with little accuracy loss.
- Optimized the procedure to extract the motion vectors from raw video streams.
- Designed an asynchronous system framework to parallel DNN computation and motion estimation process.

Automatic Scheduler for Tensor Operations on Heterogeneous Systems

Apr 2019 - Aug 2019

Supervised by Prof. Yun Liang

Peking University

- Constructed and scheduled operations under TVM framework with unified primitives.
- Hand-crafted tensor operators on GPUs and CPUs to promote performance.
- Performed experiments on heterogeneous systems and analyzed the results.
- The work has been conditionally accepted to ASPLOS 2020: "FlexTensor: An Automatic Schedule Exploration and Optimization Framework for Tensor Computation on Heterogeneous System".

A General-Purpose Tracker for Animal Behavior Analysis

May 2019 - Present

Supervised by Prof. Jun Ding, Dr. Kai Du

Stanford University, Peking University

- Designed a deep-learning-based tracker to automatically generate precise labels for raw video streams.
- Utilized pre-trained DNN as the feature extractor and Siamese tracker to perform the tracking procedure.
- Developed a GUI-based toolkit to facilitate the usage of non-computer-experts for animal behavior analysis.
- Performed experiments and analyzed performance.

Blind Image Denoising Filter Inspired by Gap Junctions from Biology

May 2019 - Present

Supervised by Prof. Tiejun Huang, Dr. Kai Du

Peking University

- Used the structure of gap junctions inspired by the neural system as a general de-noising filter.
- Designed the model by putting gap junctions in front of DnCNN and improved the generalization ability of the model to unseen noise type.
- Analyzed the accuracy and performance of the model.

Parameters Tuning and Dynamic Analysis of Detailed Neural Models

Aug 2019 - Present

Supervised by Prof. Tiejun Huang, Dr. Kai Du

- Designed a deep-learning-based algorithm to estimate dynamical parameters for neural models.
- Analyzed the accuracy performance and generalization ability of the algorithms.

PROJECT EXPERIENCE

Multipath HTTP/2 Downloader

Dec 2019 - Dec 2019

Computer Network Practicum(Honor Track)

Peking University

- Implemented a multipath HTTP/2 downloader with nghttp2 library.
- Performed evaluation of the system under variable network conditions.
- Code available on GitHub: <https://github.com/holmosaint/MultipathHTTP2>

Custom Computer Network Stack

Sep 2019 - Present

Computer Network Practicum(Honor Track)

Peking University

- Developed a custom computer network stack running on virtual links, including link layer, network layer and transport layer.
- Code available on GitHub: <https://github.com/holmosaint/CompNet-Honor-Track-Lab-2019-Fall>

Mini Java Compiler

Feb 2019 - Jun 2019

Practice for Compiler Design

Peking University

- Developed a compiler for MiniJava programming language, including: symbol table construction, type check, intermediate representation generation, register allocation.
- Code available on GitHub: <https://github.com/holmosaint/CompilerLab>

JOS Operating System

Sep 2018 - Dec 2018

Lab on Operating System(Honor Track)

Peking University

- Built the JOS operating system under qemu simulator, including process scheduling, interrupt handling, memory management, user environment, preemptive multitasking, file system.

WORKING PAPERS

- Size Zheng, Yun Liang, Shuo Wang, Kaiwen Sheng and Renze Chen. 2019. "FlexTensor: An Automatic Schedule Exploration and Optimization Framework for Tensor Computation on Heterogeneous System". (Conditionally Accepted to ASPLOS2020)
- Lihui Su, Kai Du, Kaiwen Sheng, Jun Ding, Yonghong Tian. 2019. "A general purpose tracking system towards animal behavior analysis". (Manuscript)
- Kaiwen Sheng, Yicheng Jin, Pengcheng Xu, Zhichao Guan, Shuo Wang and Yun Liang. "Real-Time Embedded Object Detection System for H.264 Videos". (Manuscript)

TEACHING EXPERIENCE

Teaching Assistant

Feb 2019 - Jun 2019

Algorithm Design and Analysis Seminar

Peking University

- Prepared lectures and class activities on the analysis and design of algorithms.
- Prepared references on reinforcement learning as supplementary material, and designed exam papers.
- Assisted students in reviewing lessons and reading papers to ensure students understood the material and stayed on track.

AWARDS

- Yanhong Li Scholarship of Peking University 2019.9
- Excellent Research of Peking University 2019.9
- Ke Chuanglong Scholarship of Peking University 2018.9
- Merited Student of Peking University 2017.9 & 2018.9
- May Fourth Scholarship of Peking University 2017.9

TECHNICAL SKILLS

- Programming Language
 - Proficient: C/C++, Python
 - Familiar: Java, MATLAB
- UNIX Environment
- Deep Learning Framework: PyTorch, Keras
- Neuron Simulation Tool: NEURON
- Other: LaTeX, Git

MISCELLANEOUS

Badminton Association in Peking University

Sep 2019 - Present

Head of the Association

Peking University

- Organized badminton competitions at Peking University and scheduled friendly matches among colleges.
- Popularized badminton through social media at Peking University.

Amateur Badminton Player

Sep 2016 - Present

Captain of the Badminton Team of Peking University

Peking University

- 3rd place in Badminton men's singles in 2018 Capital College Badminton Cup
- 2nd place in Badminton men's team in 2018 Capital College Badminton Cup