Jiakun Yan

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Education

Shanghai Jiao Tong University   **Shanghai, China**
Sep. 2016 - Present
- Senior undergraduate, Dept. of Computer Science.
- Zhiyuan Honors Program of Engineering (an elite program for top 5% talented students)
- Major GPA: 91.88 | Ranking: 4th/151.

University of California, Berkeley   **California, USA**
Jan. 2019 - May 2019
- Exchanging student, Berkeley Global Access Discover Program.
- 13 units, GPA: 4.0/4.0 with two A+ and one graduate level course

Experience

Lawrence Berkeley National Laboratory   **California, USA**
Aug. 2019 - Present
- Research Assistant, Computational Research Division, advised by Aydın Buluç.

Research Interests

My current research interest lies in:

- Parallel Computing
- Distributed System
- Programming language

More broadly, I am interested in using mathematics tools to analyze algorithms and design systems.

Publication

- Benjamin Brock, Yuxin Chen, **Jiakun Yan**, John Owens, Aydın Buluç, and Katherine Yelick. "RDMA vs. RPC for Implementing Distributed Data Structures," to appear in Workshop on Irregular Applications: Architectures and Algorithms (IA3), 2019.

Research Project

Asynchronous RPC Handler (ARH)   **LBNL**
Advised by Aydın Buluç   *Aug. 2019 - Present*
- Data-driven HPC applications suffer significant overheads for their fine-grained communication pattern. ARH is a thread-based RPC system which targets at data-driven applications. It uses Remote Procedure Call (RPC) to provide powerful expressive ability. It achieves high performance through node-level aggregation, auto progress, and innovate concurrent data structures. It also provides a flexible programming interface for users.
- Node-level aggregation is the primary idea underlying the ARH system, which aggregates RPC requests sharing the same source and target node and sends them together as one large message. Using this methodology, ARH is able to utilize high bandwidth across cores on the same node to achieve low overhead and high throughput.
- I am the main developer of the ARH system. ARH is developed as a C++ header-only library based on GASNet_EX backend. It achieves XXX-XXX speedup on XXX applications compared to XXX.

RDMA vs. RPC for Implementing Distributed Data Structures   **LBNL**
Advised by Aydın Buluç   *Aug. 2019 - Sep. 2019*

- RDMA and RPC are two primary ways for implementing distributed data structures. In this project, we compared the implementation of distributed data structures using RDMA and RPC. We developed an analytical model to predict the performance of RDMA- and RPC- based data structures based on their constituent operations, and then compared it with real-world performance.
- My primary focus in this project is to design and conduct experiments to investigate the attentiveness problem of RPC, which became one of the motivations for the later ARH system project.
- This project is accepted by IA^3 workshop, Supercomputing 2019.

Berkeley Container Library in Rust   UC Berkeley
UC Berkeley CS267, graduate level course project   *Jan. 2019 - May. 2019*
- The Berkeley Container Library (BCL) is a distributed data structure library based on RDMA written in C++. Rust is a system programming language for both safety and high performance. We re-design and implement BCL using Rust to provide several safety guarantees for the distributed data structures, including data race, memory leaking, type check, and explicit type convert.
- I am one of the main developers of BCL in Rust. I developed the global pointer based on OpenSHMEM backend, which is the base for high-level data structure and has little overhead compared to the raw backend functions, and the global guard, which prevents data race in reference to the mutex struct in Rust. I also contributed some codes to the distributed Array ,GuardArray struct and their benchmark.

High-speed parallel transmission system with Cellular and wifi hotspot   SJTU
Advised by Prof. Linghe Kong   *Oct. 2018 - Jan. 2019*
- As the live video streaming grows rapidly, high-speed data transmission in the open field is increasingly demanding for high-quality video transmission. In this project, we propose a innovate parallel data transmission system which combines Cellular network with wifi-hotspot to achieve high data transmission bandwidth.
- Link aggregation is the primary idea underlying this system: the host device uses Wi-Fi hotpot to connect several relay device. Then it is able to utilize the high bandwidth of Wi-Fi hotpot and transmit data with the Cellular links of all the devices in this system.
- I am the main developer of the high-speed parallel transmission system as a real-world prototype system on Android platform. I evaluated the system in real world with 4 GigaBytes data transmission and gained 2.5X bandwidth with 4 devices

PPT Ctrl: an interactive PPT control APP   SJTU
Advised by Prof. Linghe Kong   *Sep. 2018 - present*
- PPT is a powerful media to convey idea and share information in a broad array of scenarios. However, current PPT remote control tools is far from perfect. PPT Ctrl is a mobile application enabling people to control PPT in an interactive way. It has various functions including page switching, highlighting, magnifying, drawing, and real-time computer screen display.
- I am the main developer of PPT Ctrl. It won the first price in Chinese University Student Computer Application Ability Competition, 2019.

Video clip retrieval by nature language   SJTU
Advised by Prof. Yi Xu   *Apr. 2018 - Oct. 2018*
- Visual video and natural language understanding are two of the main efforts enabling computer to "think like human". Video clip retrieval by nature language is an interdisciplinary task of these two fields. Its goal is: given a video and a query sentence, find the clip in the video described by the sentence.
- In this project, we proposed a spatio-textual coattention network to establish the interactions between words and spatial regions. We evaluated our model on DiDeMo dataset, and outperformed state-of-the-art methods by a significant margin.

Patent

- **Jiakun Yan**, Jingzhu Shao, Zhen Huang, Yanzhou Xiang, Yutong Liao, Ruohan Hu, Jin Qi, Shuo Jiang, "A vibrating alarm clock based on pressure sensors", Utility model ZL 2017 2 1300094.X, China

Awards

- **Chinese University Student Computer Application Ability Competition, the first price**.   2019
- **Fan Hsu-chi Scholars** Awarded to about 10 students in SJTU every year.   2018
- **National Scholarship** Highest honor for undergraduates in China, awarded to top 0.2% students. 2017