Hao Xu

E5008, X2 Building, Jiangwan Campus, Fudan University

(+86) 13127995331 | xuhao21@m.fudan.edu.cn

github.com/haoxufd | haoxufd.github.io

Education

Fudan University, School of Computer Science and Technology — *Shanghai, China*

M.Eng. in Electronic Information — *Sept 2021 - Current*

- GPA: 86.5/100
- Supervised by Jin Zhao in Shanghai Key Laboratory of Intelligent Information Processing

Northeastern University, School of Computer Science and Technology — *Shenyang, China*

B.Eng. in Computer Science and Technology — *Sept 2015 - June 2019*

- GPA: 84.4/100

Industrial Experience

Intel — *Shanghai, China*

Algorithm Engineer — *Feb 2022 - Current*

- Collaborate with a six-person team to develop Hyperscan, a SOTA regular expression matching engine which has been deployed in network security solutions worldwide. It has been integrated into widely used open-source IDS and IPS products like Snort and Suricata.
- Design, develop and benchmark Teddy and Harry, two pattern matching algorithms for small-scale and large-scale pattern sets respectively. Utilize SIMD to accelerate the matching process.
- Teddy can match dozens to hundreds of patterns simultaneously, boosting the matching speed by 200% on a single commodity server. Harry can match hundreds to thousands of patterns, boosting the speed by 40%.
- **Technical Skills:** SIMD, C, C++, Linux, Git

Bytedance — *Shanghai, China*

Network Engineer — *May 2021 - Sept 2021*

- Build a testbed to test the functionality and performance of P4 gateway. The testbed utilizes a single server to simulate multiple network topologies(e.g. gateway connecting with switches, gateway connecting with servers, gateway connecting with both switches and servers).
- **Technical Skills:** Docker, Python, Pytest, Ansible, Linux, Git

Sangfor — *Beijing, China*

Software Engineer — *July 2019 - Aug 2020*

- Develop the control plane of an SDN system.
- **Technical Skills:** Redis, Kafka, Python, Java, Linux, Git

Publications

Conference Proceedings

- **Hao Xu**, Harry Chang, Wenjun Zhu, Yang Hong, Geoff Langdale, Kun Qiu, Jin Zhao, "Harry: A Scalable SIMD-based Multi-literal Pattern Matching Engine for Deep Packet Inspection". In *IEEE International Conference on Computer Communications* **(INFOCOM'23)**. *Acceptance Rate: 252/1312=19%.* [Deployed in Hyperscan]

Journal Articles

- **Hao Xu**, Harry Chang, Kun Qiu, Yang Hong, Wenjun Zhu, Xiang Wang, Baoqian Li, Jin Zhao, "Teddy+: An Enhanced SIMD-based Literal Matching Engine for Deep Packet Inspection". In *IEEE Transactions on Parallel and Distributed Systems* **(TPDS)**. [Deployed in Hyperscan] [Under Review]

Achievements

2022	**Winner**, Intel Fellowship	*Shanghai, China*
2022	**Winner**, Intel Excellent Intern	*Shanghai, China*
2021	**Top 1%**, National Graduate Entrance Examination Towards Fudan CS	*Shanghai, China*
2017	**Class 1**, Northeastern University Scholarship	*Shenyang, China*
2016	**Winner**, National Encouragement Scholarship	*Shenyang, China*
2016	**Class 1**, Northeastern University Scholarship	*Shenyang, China*