Lingkun Kong

https://ohyoukillkenny.github.io/

Email : klk@rice.edu

6100 Main St, MS 132

Education

Rice University — Houston, TX

Department of Computer Science — *Aug. 2018 – now*

Ph.D. Candidate, GPA: 4.0/4.0

Shanghai Jiao Tong University — Shanghai, China

Department of Computer Science & Zhiyuan College — *Jul. 2014 – Jul. 2018*

B.S. in Computer Science with Honors, GPA: 3.9/4.0

Research Interests

Data Stream Processing, Programming Languages, Big-Data Systems, Differential Privacy

Work Experience

Meta — May. 2022 - Aug. 2022

Summer intern in Data Infrastructure Privacy team

Goal: To enforce Differential Privacy (DP) using SQL rewriting technologies, where DP is a formal mathematical framework for achieving privacy protection when analyzing statistical data.

Details: Finished tasks on the project plan five weeks earlier, which include the rewriting of queries with complex shapes (e.g., nested SELECT, multiple UNION/JOIN); Developed the core DP rewriting engine.

Facebook — May. 2021 - Aug. 2021

Summer intern in Data Infrastructure Privacy team

Goal: To reduce the latency of Policy Evaluation Service (PES) by inserting a cache of SQL templates.

Details: PES performs static analysis over SQL queries to determine whether they cause unsafe data flows. I built a cache with a 77% cache hit rate (close to the theoretical upper bound 84%) such that cache hits increase the speed of PES by 30x, and cache misses only add $< 3\%$ latency.

Selected Research Projects

Software-Hardware Codesign for Efficient In-Memory Regular Pattern Matching — 2021 - 2022

Research Assistant, supervised by Dr. Konstantinos Mamouras and Dr. Kaiyuan Yang

Goal: To provide a memory-efficient software-hardware codesign for the matching of regular patterns.

Details: Provided a compiler that translates POSIX-style regular expressions into hardware-readable code; Proposed a hardware design that achieves substantial energy/area reduction compared to state-of-the-art designs.

Query Language for Complex Analysis over Data Streams — 2018 - 2020

Research Assistant, supervised by Dr. Konstantinos Mamouras

Goal: To design and implement a language that facilitates the complex analyses over data streams.

Details: Proposed a language and implemented it as a Java library for fast data stream processing (5x faster than prior advanced tools), which is particularly useful for healthcare monitoring and high-frequency trading.

Bancor Simulator: Simulator for Market Analysis under Bancor Protocol — Jan. 2018 - Aug. 2018

Research Assistant, supervised by Dr. Emin Gün Sirer

Goal: To validate the robustness and efficiency of Bancor, a protocol used for trading virtual currencies.

Details: Proposed and built the simulation model for both Bancor market and classic market; Revealed that the Bancor protocol is flawed by experiemntal results.

Selected Publications

L. Kong, Q. Yu, A. Chattopadhyay, A. Le Glaunec, Y. Huang, K. Mamouras, and K. Yang. *Software-Hardware Codesign for Efficient In-Memory Regular Pattern Matching*, PLDI, 2022.

L. Kong, K. Mamouras. *StreamQL: A Query Language for Processing Streaming Time Series*, OOPSLA, 2020.

J. Huang, **L. Kong**, L. Kong, Z. Liu, Z. Liu and G. Chen. *Blockchain-based Crowd-sensing System*, HotICN 2018.

L. Fu, S. Ma, **L. Kong**, S. Shi, X. Wang, *FINE: A Framework for Distributed Learning on Incomplete Observations for Heterogeneous Crowdsensing Networks*, IEEE ToN 2018.

Selected Scholarship & Honors

China National Scholarship *highest honor for undergraduates in China, top 0.2% nationwide* — *2015 & 2017*

Zhiyuan Honor Scholarship *award for academic performance* — *2014 & 2015 & 2016 & 2018*