Lingkun Kong

https://lk21.web.rice.edu

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

Research Projects

Query Language for Complex Analysis over Data Streams — Aug. 2018 - Now

Research Assistant, supervised by Dr. Konstantinos Mamouras
Goal: to design and implement a language that facilitates the complex analyses over data streams.

1. Proposed a language that provides high-level programming abstractions for stream processing and gave a formal denotational semantics for the programming model.
2. Implemented the language in a Java library with a rich set of stream operators and, in benchmarking, showed it is on average 5 times faster than other state-of-the-art tools.
3. Used the proposed language to prototype algorithms for real applications, including healthcare monitoring and the analysis of high-frequency market.

Formally Verified Data Stream Processing System — May. 2019 - Now

Research Assistant, supervised by Dr. Konstantinos Mamouras
Goal: using formal methods, to build stream processing engines with correctness guarantee.

1. Designed a stream processing engine with clear and formal semantics inspired by Stanford's STREAM project.
2. Implemented the engine by a functional programming language provided in Coq, a formal proof management system.
3. Verified the correctness of stream engine by formal mathematical proofs in Coq.

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 protocol, a standard that converts virtual currencies.

1. Proposed and built the simulation model for both Bancor market and classic market.
2. Revealed that the Bancor protocol is flawed by experiemntal results in the following aspects:
   a. The problem about "Double Coincidence of Wants" Bancor wants to solve is unsubstantiated in real world.
   b. The price of smart token may fluctuate significantly, as Bancor neglects potential human behavior.
   c. Severe cancellation of concurrent transactions occur to Bancor under limited order.

Acemap: *Academic Map System* — Jun. 2015 - Dec. 2017

Research Assistant, supervised by Dr. Xinbing Wang
Goal: to analyze the big data constructed as academic networks, which contains massive academic information including paper, author, research topic, and etc.

1. Developed visualizing applications for academic information networks and presentation approaches.
2. Implemented the paper recommendation algorithms, presented it on website, and published a patent.
3. Created two statistic models, EBM and MSM, for academic network analysis.

Publications

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

L. Kong, K. Mamouras. *StreamQL: A Query Language for Efficient Data Stream Processing*, OGHPC 2020 (Poster).

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*