

Research statement

My research interests are algorithms, distributed systems, computer networks, software system design, and machine learning.

In 2000- 2005, at computer science department of University of Georgia, I studied the technology stack for service oriented distributed system and discovered that it was lack of a solution to service composition with conversational partners. I have proposed and implemented a design and analysis framework to address the issue. The analysis part of the framework is enabled by application and implementation of graph algorithms. My work has resulted in publication #1 and #2.

At University of Georgia, I also collaborated with Complex Carbohydrate Research Center(CCRC) in a project where I applied computing analytics to biological data sets to discover biological knowledge about glycans.

After graduation in 2005, I joined AT&T labs, where I continued my research in algorithms and started to accumulate experiences in computer networks. I utilized my experience with graph algorithms again in the development of IPTV metro area network planning tool. It has not only automated verification of fiber path diversity, but also shortened the network planning time for a metropolitan from 2 weeks of manual planning to several hours of programed search time. My work has resulted in patent #1.

In 2006, I started to investigate wireline access network and developed a Single End Loop Test tool as a part of IPTV access network performance management platform [patent #2]. The data powered software succeeds in estimation of loop length with <5% error, detection and locating bridged tap or bad splice, or metallic fault such as open/short/water at 90% precision. The software tool has reduced the need to send technicians to the customer's home to test the loop if ready for IPTV service sale with expensive handheld proprietary equipment.

Early years of the 2010 decade marks the beginning of the mobile Internet era. Significant increase of Internet traffic and different quality of service requirements have posed new challenges to Internet operators. To overcome these challenges, my research goes back to studying distributed systems. This time I focus on how to build fault tolerant and scalable distributed systems that can handle big volume of log data sets and streams. In addition, I have embarked on exploration of machine learning algorithms and its application to gain insights in network operation.

Patents

1. Communications link discontinuity detection systems and methods, US Patent 9548793, issued January 17, 2017.
2. System and method for providing topology and reliability constrained low-cost routing in a network, US Patent 7768935, issued Aug 3, 2010

Publications

1. JCPNet tool and automated analysis of distributed systems. The 43rd ACM Southeast Conference, Atlanta, GA, March 2005
2. A CP-nets-based design and verification framework for web services composition. In Proceedings of 2004 IEEE International Conference on Web Services, pp. 756-760. July 2004, San Diego, California

Certifications

Udacity Machine Learning Nanodegree, Jun 2018

Coursera Machine Learning, 2016