**Research statement**

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

From 2000 to 2005 I studied the technology stack for service oriented distributed systems and discovered that it was lack of a solution to service composition with conversational partners for my Ph.D. at the University of Georgia. I have proposed and implemented a design and analysis framework to address the issue. I have successfully applied and implemented graph algorithms to solve the analysis of the framework, and my originality was rewarded with one publication on ACM Southeast Conference and one on IEEE International Conferences on Web Services.

After graduation in 2005, I joined AT&T labs, where I extended my research in algorithms on how to solve large computer network issues. 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. The algorithm was the first optimized solution in the area of the triple play network planning, which was patented in 2010.

In addition to optimization of network planning, I have also investigated methods to identify/locate wireline access network faults, using machine learning techniques. One patented approach is single ended loop test (SELT), where per frequency tone data from DSLAM is used to predict faults on twisted copper pair. This algorithm achieves 99.9% of fault detection rate with 0.01% false positive. This algorithm beats all other algorithms developed by companies such as ALU and Ericsson by 100 times. It saved AT&T many hundreds of millions of dollars for unnecessary dispatches over last 10 years. It also saved $30 million because AT&T didn’t have to buy the software license from ALU.

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.

// How to balance your teaching and how research is going to benefit the university and students?

Research literature review and grant proposal help designing course and keep course content current. Combining research and teaching will help me develop deep insights in the research areas. In research, I find relevant and impactful projects for student projects.

//What is your future research plan? It’s better match to department’s goal/objectives.

I plan to continue my research in software system design, computer networks, and machine learning. At AT&T labs I have gained experience working different organizations to the technical and business challenges each organization face, learning new areas fast, proposing POC solution with agile and iterative development for client review. I have many experiences of successfully securing R&D funding. I plan to utilize this experience and skills for future research endeavors.