Institute of Computer Science and Engineering

SEMINAR

Information Security's New Frontiers: CPS + IoT

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Abstract:

The last decade has seen computing extended from the digital-only domain to one that controls a wide range of physical processes, including transportation, health, finance, home appliances, and critical infrastructure. This growing environment of cyber-sensing and control makes cyber attacks significantly more dangerous in the past. This talk will touch on a small slice of projects exploring security in this increasingly computational world, including approaches for securing cross-chain transactions in cyber-finance (blockchain), security for transportation systems, and security and privacy for mobile-app based contact tracing. This talk focuses on two pieces of work in blockchain and in contact tracing.

On the topic of blockchain, I will present HyperService, an architecture for trust-free cross-blockchain programmability. HyperService is comprised of a State Model that describes cross-chain applications in a blockchain-neutral way, a Language in which cross-chain contracts are written, a Network Status Blockchain that serves as a decentralized trust anchor, and an Insurance Smart Contract that adjudicates disputes and ensures that non-malicious nodes do not suffer any financial loss. HyperService ensures the successful completion of contracts whenever all parties follow the protocol, and also financial atomicity; that is, non-malicious nodes do not suffer financial losses in the event of mid-execution failure. Financial atomicity is ensured by requiring each party to make a deposit through the Insurance Smart Contract to reimburse legitimate parties. We implemented and evaluated HyperService in 35,000 lines of code, including three cross-chain applications.

In contact tracing, I will examine some issues in app-based contact tracing, and some approaches for addressing those issues.
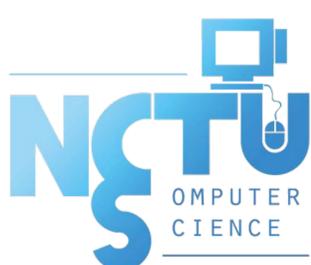
Date:
- October 21st (Wed) 2020, 15:30-16:30

Location:
- Virtual Classroom with GoToMeeting app
- GoToMeeting Access Code: 824402845

Host: Prof. Maria Yuang