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Security Evaluation of IoT Deployments

Abstract:
The security of Internet of Things (IoT) is essential because they are widely used in various critical sectors, such as healthcare, transportation, and finance, and often handle sensitive data, making them a prime target for attackers. Unlike traditional computing platforms, IoT systems pose unique security challenges driven by limited compute resources and heterogeneous interconnected components. These components, such as mobile apps, cloud endpoints, and network infrastructure, increase the attack surface for IoT deployments. In this talk, I will discuss fundamental challenges in evaluating the security of deployed IoT systems and how that contributes to insecurities in modern-day smart-home IoT devices. I will then show how my work addresses these challenges by combining system and network security analysis to discover vulnerabilities in these components. Specifically, I will present novel systematic methods that bridge network vulnerability analysis and end-host binary program analysis to evaluate the security of smart-home IoT deployments. In closing, I will discuss how to build on the foundation of this work to address vulnerabilities in emerging IoT technology and support network infrastructure that leverages AI planning for predictive and defensive capabilities.

Biography:
Omar Alrawi is a Research Faculty in the Electrical and Computer Engineering School at the Georgia Institute of Technology. He completed his undergraduate and master's degrees at Purdue University and obtained his Ph.D. from Georgia Tech. Omar's research interests includes developing practical tools and principles to secure large-scale deployed systems that serve critical societal functions, such as medical and telecommunication systems. His work has been featured in highly regarded media outlets, such as Newsweek and The New York Times, on smart-home IoT security. His research was selected as a finalist for the CSAW applied research competition, and he was awarded The Presidential Fellowship for his exemplary level of scholarship and innovation. At Georgia Tech, his work was awarded first place for Best Research Idea, Cyber Security Demo Day, and Create-X Research Commercialization award.