Principal Investigator: Byrav Ramamurthy, Ph.D.

Position Title: Professor

Department: School of Computing

Email: ramamurthy@unl.edu

Phone: 402-472-7791

Webpage: http://cse.unl.edu/~byrav/

Project Title.
Smart Grid cybersecurity enhancement using smart authentication and intelligent threat detection.

Abstract.
This project proposes to address Smart Grid cybersecurity by developing innovative Artificial Intelligence (AI) and Machine Learning (ML) based solutions for (a) smart authentication of customer premises equipment such as smart meters and (b) real-time traffic analysis to detect anomalous behavior leveraging network- and application-layer collaboration as well as distributed threat intelligence frameworks. The goals of this project are to explore, evaluate and implement smart authentication and traffic analysis techniques to strengthen the security of the Smart Grid cyberinfrastructures. The project's claim is that smart authentication of customer equipment by the Smart Grid network and continuous traffic analysis for anomalous behavior detection will ensure secure network operation and reduced threat landscape. The project team will develop smart device fingerprinting solutions that can ensure that unauthorized devices cannot become part of the Smart Grid cyberinfrastructure. Their approach will further demonstrate how application- and network-layer collaboration can be exploited to utilize application metadata for influencing secure control and management of the network. They will explore and integrate predictive analytics to provide intelligence for network resource management, improving network visibility for the operators, and securing the Smart Grid cyberinfrastructure. Apart from their research contributions in this project, the team will incorporate innovative modules on Smart Grid security in their undergraduate and graduate cybersecurity courses. During this project, they will partner with colleagues at Nebraska Public Power District (NPPD) and other public energy utilities in Nebraska to facilitate two-way sharing of data and findings to make a significant real-world impact. They will pursue external funding from federal agencies such as NSF, DHS and DOE to sustain and strengthen their research well into the future.