UNIVERSITY OF SOUTH FLORIDA

Defense of a Doctoral Dissertation

Leveraging Channel State Information to Localize and Pair Wireless Devices

by

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For the Ph.D. degree in Computer Science and Engineering

Abstract: The availability of channel state information (CSI) may enhance the security of the IoT pairing process without requiring any overhead equipment or sensors. Leveraging CSI help to distinguish between indoor and outdoor connections. In this presentation, we prese new system that utilizes CSI to establish a secure pairing protocol. This system localizes the devices requesting to pair before acceptance of that connection. First, we built machine learning models to distinguish and localize devices based on the pattern of CSI. The highest accuracy of identifying the pairing device's location (indoor vs. outdoor) is 96.24% (AUC=0.993). Also, we built a hierarchical deep learning model that detects attacks in the f level and then precisely detects the location of indoor packets based on a grid layout. Our D learning model achieves 89% spot localization and attack detection rate at 75% compared t 35% in traditional localization schemes. For validation, we conduct a real-life experiment that utilizes commercial off-the-shelf (COTS) Wi-Fi devices to extract physical layer properties, the channel state information.

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Online (Collaborate Ultra)
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THE PUBLIC IS INVITED

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