

Localization of IEEE 802.11 Access Points Using Low Cost, Low Fidelity Receivers

Master's Thesis Defense

by

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Abstract

Wireless Local Area Networks (WLANs) that comply with the IEEE 802.11-series standards are widely used, and establishing a wireless network is easily accomplished with a minimal amount of effort and skill required. However, the proliferation of WLAN equipment has greatly increased the security risk to networks that contain sensitive information, such as those belonging to corporations as well as to local and federal governments, since an unauthorized WLAN can easily be established resulting in a backdoor into an otherwise secure network. Network administrators thus require the ability to *localize* or *geolocate* such transmitters. Current localization techniques are limited to indoors systems that assume coverage provided by a wide range of sensors, are expensive and typically integrated with Wireless Intrusion Detection Systems (WIDS). An ideal solution would be to provide administrators with an inexpensive localization system that uses low-cost hardware, does not rely on an entire infrastructure and can be used to locate indoor transmitters while either walking or driving outdoors. This indoor transmitter/outdoor locator problem has not been effectively addressed to date, especially when limiting the collection devices to low-cost, commodity hardware. We address this localization problem from the perspective of a collector possessing a single data collection system with commodity hardware and an omni-directional antenna. Localization is conducted in four steps: 1) Collect data at a number of stationary points, 2) estimate received signal strength parameters, 3) generate transmitter range estimates using empirical channel models and 4) solve for the location of the unknown transmitter.