(SD2023-116) Users are Closer than they Appear: Protecting User Location from WiFi Apps

Tech ID: 33283 / UC Case 2021-Z08-1

ABSTRACT

Researchers from UC San Diego have developed MIRAGE, an algorithm that the user can employ on their devices (e.g., smartphone) to maintain their location privacy if desired without compromising their Wi-Fi's quality of service.

The innovation would be additional software on the user's WiFI device, enabling which would make the listening WiFI AP infrastructure unable to detect the user's location unless and until the user is willing to provide it. All of this happens without any compromise to the data rate of the WiFi-user communication.

TECHNOLOGY DESCRIPTION

roliferation of wireless sensing and localization has enabled the widely deployed Wi-Fi APs to not only provide Internet connectivity but also sense the user's location. Specifically, location-based services in indoor settings have gained interest, especially in the recent times for contact tracing, indoor navigation, or density monitoring.

For example, Qualcomm proposes to deploy the Wi-Fi APs for joint wireless communication and sensing in the enterprise network and the upcoming 5G deployments also claim to provide location services. However, this would lead to potential breaches of Wi-Fi users' private location information and consequently other sensitive information . A simple example could be enterprise WiFi network deployed in the malls already try to get accurate user locations. This location data collected in the malls can be used to stalk users, track a user's interactions with other users or even analyze their spending trends to infer private information (e.g., sex, age, personal preferences).

CONTACT

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OTHER INFORMATION

KEYWORDS
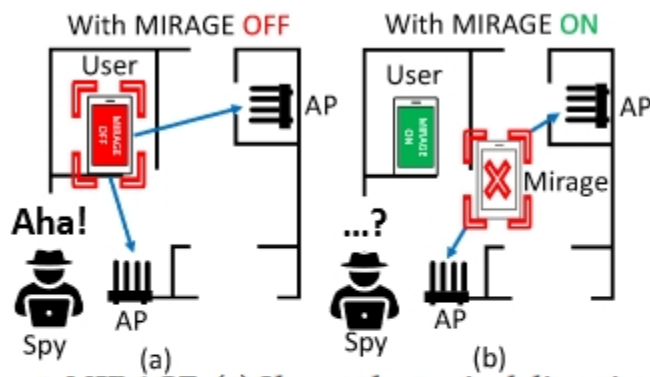
User Privacy, Indoor Location, Beamforming, Obfuscation
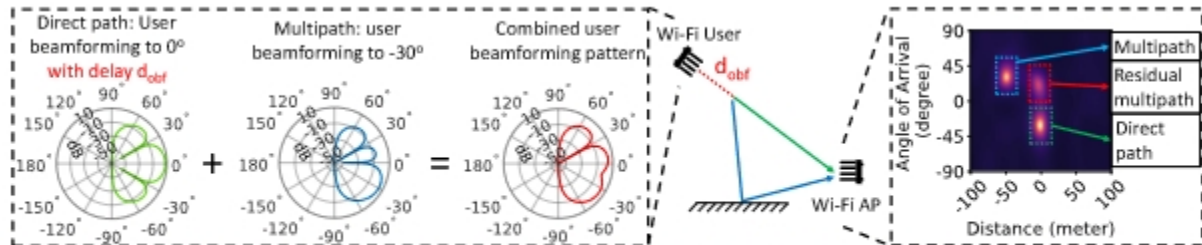
CATEGORIZED AS

▶ Communications
  ▶ Wireless

RELATED CASES

2021-Z08-1

Figure 1: MIRAGE: (a) Shows the typical direction finding (e.g., AoA) based indoor device localization. (b) Shows the obfuscation that MIRAGE provides, which enables the users' location privacy.

APPLICATIONS

Figure 6: Imperfect beamforming introduces residual peak in angle-distance profile (red dotted box) due to the power leakage from the side lobe of the direct path beamforming. *(left inset)* Antenna beamforming patterns transmitted by the user; *right inset* received SpotFi profile at a commodity Wi-Fi AP

ADVANTAGES

Smartphone Manufacturers to ensure their device user's privacies.

STATE OF DEVELOPMENT

This patent-pending technology is available for commercial development.

INTELLECTUAL PROPERTY INFO

RELATED MATERIALS

▶ Ayyalasomayajula, R., Arun, A., Sun, W. and Bharadia, D., 2023, February. Users are Closer than they Appear: Protecting User Location from WiFi APs. In Proceedings of the 24th International Workshop on Mobile Computing Systems and Applications (pp. 124-130). - 02/22/2023