



[Volume XXXVIII-4/C26](#)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXVIII-4/C26, 1-5, 2012
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXVIII-4-C26/1/2012/
doi:10.5194/isprsarchives-XXXVIII-4-C26-1-2012
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INDOOR LOCALIZATION USING WI-FI BASED FINGERPRINTING AND TRILATERATION TECHNIQUES FOR LBS APPLICATIONS

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Keywords: Indoor Localization, Access Points, Trilateration, Fingerprinting, Database, Wi-Fi, RSS, GIS

Abstract. The past few years have seen wide spread adoption of outdoor positioning services, mainly GPS, being incorporated into everyday devices such as smartphones and tablets. While outdoor positioning has been well received by the public, its indoor counterpart has been mostly limited to private use due to its higher costs and complexity for setting up the proper environment. The objective of this research is to provide an affordable mean for indoor localization using wireless local area network (WLAN) Wi-Fi technology. We combined two different Wi-Fi approaches to locate a user. The first method involves the use of matching the pre-recorded received signal strength (RSS) from nearby access points (AP), to the data transmitted from the user on the fly. This is commonly known as "fingerprint matching". The second approach is a distance-based trilateration approach using three known AP coordinates detected on the user's device to derive the position. The combination of the two steps enhances the accuracy of the user position in an indoor environment allowing location-based services (LBS) such as mobile augmented reality (MAR) to be deployed more effectively in the indoor environment. The mapping of the RSS map can also prove useful to IT planning personnel for covering locations with no Wi-Fi coverage (ie. dead spots). The experiments presented in this research helps provide a foundation for the integration of indoor with outdoor positioning to create a seamless transition experience for users.

[Conference Paper](#) (PDF, 676 KB)

Citation: Chan, S. and Sohn, G.: INDOOR LOCALIZATION USING WI-FI BASED FINGERPRINTING AND TRILATERATION TECHNIQUES FOR LBS APPLICATIONS, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXVIII-4/C26, 1-5, doi:10.5194/isprsarchives-XXXVIII-4-C26-1-2012, 2012.

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