

Comparative Study of RSS-based Indoor Positioning Techniques on Two Different Wi-Fi Frequency Bands

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Abstract— Wi-Fi based indoor positioning achieves increasing attention for modern location based services due to its benefit of cost effectiveness. However, multipath propagation characteristics and interferences in indoor environment cause variability of Received Signal Strength (RSS) typically high, resulting in high positioning error. In this research, localization performance of path-loss model based indoor positioning technique and RSS Fingerprinting technique, which are the most popular Wi-Fi based indoor positioning techniques, are analyzed on two different Wi-Fi frequency bands: 2.4GHz and 5GHz. According to the comparative analysis of experimental results, the RSS fingerprinting based indoor positioning achieves higher positioning accuracy than the path-loss model based approach for both frequency bands as RSS variability is high in indoor environment and estimating position information directly from the RSS value in path-loss model based approach causes high positioning error. Results also indicate that applying 5GHz frequency band in the test-bed indoor environment shows better performance for less interference from devices using existing 2.4GHz frequency band.

Keywords— RSS Fingerprinting; Path-loss model; indoor positioning system; 2.4GHz and 5GHz frequency bands;