Wi-Fi Location Fingerprinting Using an Intelligent Checkpoint Sequence

Guenther Retscher and Hannes Hofer (Austria)

Key words: Low cost technology; Positioning

SUMMARY

For Wi-Fi positioning location fingerprinting is commonly employed. Fingerprinting, however, is very labour consuming as a database with RSS (Received Signal Strength) scans from all visible access points APs measured on a large number of known reference points has to be established. To overcome this drawback a novel approach is developed which uses a logical sequence of intelligent checkpoints iCPs instead of reference points RPs established in a regular grid throughout the area of interest. To navigate a user along the way from a start point A to a destination B certain iCPs have to be passed. Hence, iCPs are twofold intelligent because of the fact that they depend on the selection of the points for the RSS scans and because of their logical sequence in their correct order along the path. While navigating then always the following iCP is known due to a vector graph allocation in the fingerprinting database. Thus, only a small limited number of iCPs needs to be tested when matching the current RSS values. Therefore the required processing time is significantly reduced. From field tests it could be seen that the iCP approach achieves a higher success rate for correct matching of the RSS fingerprints than conventional approaches. In average correct matching results of 90.0% were achieved using a joint Wi-Fi database including training measurements of all employed smartphones. An even higher success rate is achieved if the same mobile device is used in both the training and positioning phase.

Wi-Fi Location Fingerprinting Using an Intelligent Checkpoint Sequence (7993)
Guenther Retscher and Hannes Hofer (Austria)

FIG Working Week 2016
Recovery from Disaster
Christchurch, New Zealand, May 2–6, 2016