

Design of Aging-Resistant Wi-Fi Fingerprint-based Localization System with Continuous Active Learning

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Abstract—Wi-Fi fingerprint-based localization systems are widely used for indoor localization as it only needs Wi-Fi network infrastructure that exists almost everywhere nowadays. However, it can be vulnerable to environmental change if Wi-Fi fingerprint-based localization system uses fixed Wi-Fi fingerprint database as training dataset and has no method for updating training dataset. In this paper, we propose AR-WFL system including update phase that can reflect environmental change periodically and prevent performance degradation. The proposed AR-WFL system is based on crowdsourcing and no dedicated annotator exists. In addition, we adopt active learning scheme with uncertainty selective sampling algorithm to maximize cost-efficiency of the update phase. We evaluate the performance of the update phase as location estimation accuracy using a dataset we collected for 2 months. It shows that average accuracy is increased by 1.83%p using update phase with uncertainty sampling algorithm compared with the system without an update phase.

Keyword—Indoor localization, Wi-Fi fingerprint, Active learning, Selective sampling, Database update



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