

**Abstract:** This study provides a new Crowdsourcing-based approach to identify the most crowded places in an indoor environment. The Crowdsourcing Indoor Localization system (CSI) has been one of the most used techniques in location-based applications. However, many applications suffer from the inability to locate the most crowded locations for various purposes such as advertising. These applications usually need to perform a survey before identifying target places, which require additional cost and time consuming. For example, Access Points (APs) installation can rely on an automated system to identify the best places where these APs should be placed without the need to use primitive ways to determine the best locations. In this work, we present a new approach for Wi-Fi designers and advertising companies to recognize the proper positions for placing APs and advertisement activities in indoor buildings. The recorded data of the accelerometer sensors are analyzed and processed to detect user's steps and thereby predict the most crowded places in a building. Our experiments show promising results in terms of the most widely used metrics in the subject as the accuracy for detecting users' steps reaches 95.8% and the accuracy for detecting the crowded places is 90.4%.

**Keywords:** Crowdsourcing; indoor localization system; accelerometer sensors; Wi-Fi access point; smartphones