

Jordan University of Science and Technology

A cooperative localization scheme using RFID crowdsourcing and time-shifted multilateration

Authors: L. M. Eslim, H. S. Hassanein, W. M. Ibrahim, A. Alma'aitah

Abstract: RFID technology as an enabler of the Internet of Things (IoT) is extensively utilized for object localization. Existing RFID-based object localization techniques follow a centralized and coordinated approach. Indeed, none is designed to leverage RFID crowdsourcing for the purpose of object localization. In this paper, we propose a cooperative scheme to localize mobile RFID tags using heterogeneous, distributed and dynamic mobile RFID readers in indoor/outdoor environments. In addition, we introduce the concept of Time-Shifted Multilateration (TSM) to enhance location estimation accuracy of mobile tags when sufficient synchronous detection information is not available. We validate the proposed scheme and the TSM technique through extensive simulations using ns-3. Results show that our approach can achieve accurate location estimation in typical IoT settings.