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Experimental evaluation of RSSI-based positioning system with low-cost LoRa devices (Article)

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Abstract

Along the last years, we have witnessed the growing demand for services, applications, and systems that depend on the specific location of both people and a variety of things and gadgets. Currently, the Global Positioning System (GPS) offers good accuracy on-location services around the world. Nevertheless, it does not work efficiently on applications that require several small, cheap, and low power devices. Under such conditions, researchers prefer to work with low-cost wireless alternatives such as WiFi, Zigbee, LoRa, Sigfox, among others. The purpose of this work is twofold. Firstly we evaluate the time-measurement and radio frequency capabilities of Pycom LoRa hardware implementation, in order to develop a low-cost and GPS-independent positioning system. Then, with these results, we propose and evaluate a positioning system with LoRa technology and based on the received signal strength indicator. Extensive field test measurements in outdoor rural environments show that we can obtain position estimation errors lesser than around 7% of the maximum distance between anchor nodes. © 2020 Elsevier B.V.

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