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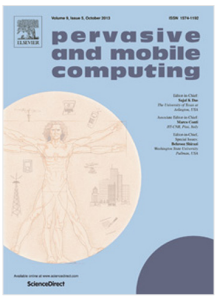

Location-based IoT applications on campus: The IoTtalk approach

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Location-based IoT Applications on Campus: The IoTtalk Approach

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Abstract

The National Chiao Tung University is deploying several location-based IoT applications on campus based on an IoT device management platform called IoTtalk. The applications include dog tracking, emergency buttons, and indoor/outdoor environment conditions monitoring (PM2.5, temperature, CO2, and so on). Some of the IoT devices for these applications have simple hardware structures to save energy, and therefore are not equipped with the positioning sensors (e.g., GPS or iBeacon). To support mobility management for these simple IoT devices, we develop a location finding mechanism in IoTtalk. By introducing the locator device in IoTtalk, we can effectively support mobility management for simple IoT devices that does not have location positioning capability. We describe how to develop the device applications to accommodate the location update feature, and show how to configure the location finding mechanism through the IoTtalk GUI. Then we conduct analytic analysis and simulation to investigate the accuracy of location tracking and power consumption for the dog tracking application.

Keywords: Internet of Things, IoTtalk, Location tracking, LoRA, LTE, Mobility Management

1. Introduction

Over the past 20 years, outdoor location-based applications have been developed based on the cellular telecommunications technologies [Lin05]. Examples include advanced metering infrastructure, fleet management, and smart bus applications. These applications are deployed in either GPRS or LTE based broadband services. In the recent year, wireless technologies have been deployed for Internet of Things (IoT) applications with low data rate transmission, e.g., LoRA [Sornin15] and NB-IoT [3GPP23.720]. In National Chiao Tung University (NCTU), we have developed several location-based IoT applications, including temperature/PM2.5 detections, emergency button, and dog tracking. These applications utilize