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Abstract

Lora-Based System for Tracking Runners in Cross-Country Races †

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Abstract: In recent years, the organization of cross-country and popular races where hundreds of people participate has become a significant trend. In these events, runners usually subject the body to extreme situations that can lead to various types of indisposition, and they can also suffer falls. Currently, the electronic systems used in this type of race only monitor when runners pass through checkpoints. However, it is necessary to implement systems that enable the control of the population of runners and the monitoring of their status all the times. For this reason, this paper proposes the design of a low-cost system for monitoring and controlling runners in this type of event. The system is formed by a network architecture in infrastructure mode based on low-power wide-area network (LPWAN) technology. Each runner will carry an electronic device that will allow their position and vital signs to be monitored. Likewise, it will incorporate an S.O.S. button that will allow runners to send a signal to the organization should they require help. All these data will be sent through the network to a database, which will allow the organization and bystanders of the race to check the location and history of vital signs of runners. This paper shows the proposal of a design of our system and the different practical experiments that have been carried out with the devices that have allowed for the proposition of this design.

Keywords: wireless sensor networks (WSNs); low-power wide-area network (LPWAN); runners; long range (LoRa); monitoring