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Middleware design and implementation for personal health monitoring system using sensor network.

Abstract

Medical care system requirements differ from other existing applications. The gap between existing sensor networks and medical care needs makes it more complex. To enable medical personnel for real-time triage, long-term observation of patients is necessary, while sharing the most accurate and real-time patient information. During the tracking of a patient's health condition, data received should be lossless and accurate. The sensor devices themselves should be programmed to process the vital sign data, for example, to raise an alert condition when vital signs fall outside of normal parameters. Any adverse change in patient status must then be signaled to a nearby base station or central controller. The data should be displayed in real time and integrated into the development of pre-hospital patient care record for in future observation. So, such medical care system is envisioned that communicates real time information reliably to fulfill the above mentioned needs.

Specifically, medical tele-monitoring in wireless sensor networks must support multicast routing topologies, synchronization, scalability, high degrees of reliability, wide range of data rates, frequency and optional filter conditions. The presented work is an initial exploration into the challenges of hardware and software design for medical care and an initial phase implementation of health monitoring system through the design of a middleware framework for wireless sensor networks. This thesis further explores the comparative study of medical care simulation environments such as: Avrora, TOSSIM & EmStar simulators.