

Wireless Body Area Network (WBAN): Middleware

Motivation

A typical wireless body area network (WBAN) comprises a number of wireless sensor nodes and a body gateway. It is a distributed system with various hardware configurations and operating systems. The role of middleware is to provide an abstraction layer between applications and the underlying networking/RTOS protocol stack so as to simplify the application development, and make codes re-usable from one application to another.

Objective

The objective of the project is to design and develop a set of highly reusable software components based on the unique middleware architecture that support various healthcare applications.

Scope

- Development of novel middleware architecture that supports distributed data request under the constraints of very limited system resources,
- Proposing new methods for data modeling, service definition and service discovery,
- Exploring sensor management approaches for optimizing resource utilization,
- Development of highly reusable software components and prototype system that implement the middleware framework and all its functions.

Innovative Ideas

The WBAN middleware bridges the gap between the applications and lower-layer heterogeneous networking/sensing/computing devices and/or protocols, easing the development of distributed WBAN applications. The sensor management approaches provides quantitative manner for satisfying application requirements and optimizing resource utilization.

Demonstrable Activities

We are developing prototype WBAN platforms and systems to demonstrate the middleware functions such as sensor node plug and play, service dissemination and discovery, query processing, as well as adaptive tasking of sensor nodes, using XBow and/or BSN motes connecting with various sensors (e.g., ECG sensors, accelerometer sensors) for collection of vital and activity signals.

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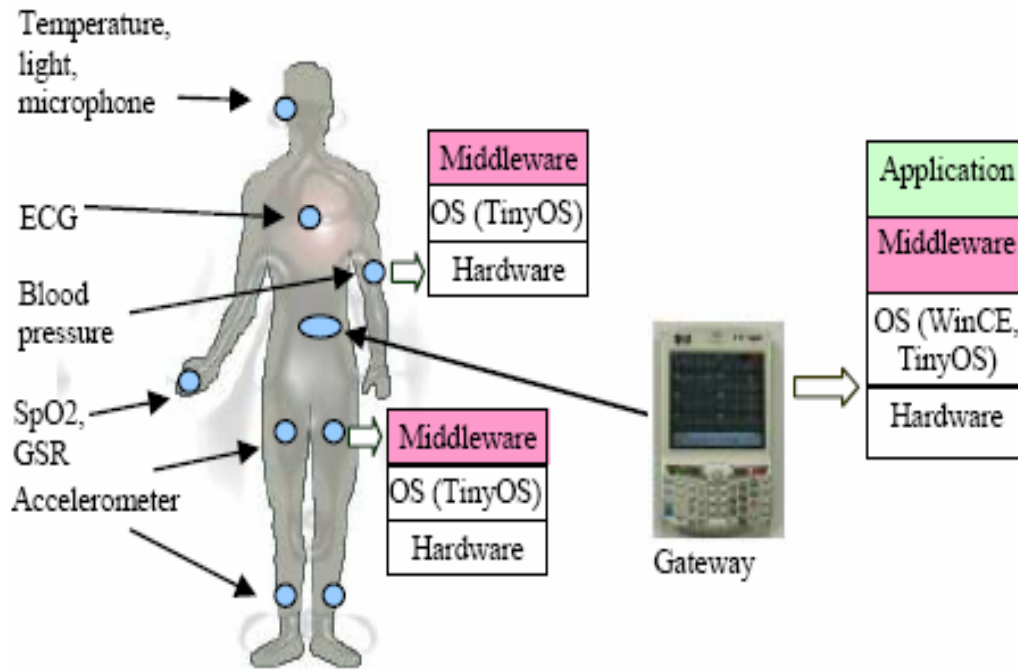


Figure 1. Middleware for wireless body area networks (WBAN)