Wireless Communications Trends: Health Care and Wellness Applications

Description: This report concentrates on recent contributions of wireless communications in health care and fitness to enhance the quality of service together with the significant cost reduction.

The health care cost is rising each year, and in the U.S. reached around 16%-17% of the GDP with the trend to add at least one percent each year. Wide utilization of wireless communications, as our analysis showed, can reduce the health care cost by billions of dollars on an annual basis. Much of that savings is derived by reducing hospitalizations and extending independent living for seniors.

Ambient Intelligence is a vision where environment becomes smart, friendly, context-aware and responsive to any type of human needs. In such a world, computing and networking technology coexist with people in a ubiquitous, friendly and pervasive way. Numerous miniature and interconnected smart devices create a new intelligence and interact with each other seamlessly. For health care, this translates into proliferation of remote monitoring and telemedicine.

The report addresses recent advances in wireless technologies medical/fitness applications. Particular, it analyzes the following:

- Evolving IEEE 802.15.6 standard-Wireless Body Access Networks (WBANs)
- Bluetooth technology and its Medical Profile
- ZigBee technology and its Medical Profile
- Continua Health Care Alliance activities and wireless communications.

All these technologies can satisfy, in various degrees, major requirements that the health care industry is asking for: a combination of extremely low power consumption of communicating nodes and very low power signals together with high reliability of communications channels and quality of service (QoS).

1. Recent technological progress in low-power integrated circuits, wireless communications and physiological sensors promote the development of tiny, lightweight, ultra-low-power monitoring devices that can be used in a wide spectrum of applications. A body-centric network, so-called WBAN-Wireless Body Area Network, can be formed by integrating these devices on a human body (or its proximity). WBAN, with sensors consuming extremely low power, is used to monitor patients in critical conditions inside hospital. Outside the hospital, the network can transmit patients' vital signs to their physicians over the Internet (or private networks) in real time. WBAN can use ZigBee, Bluetooth or Ultra Wideband radio technologies.

This report analyzes the WBAN development, evolving standards, markets and applications. Details of the IEEE802.15.6 WG project are discussed. Together with other organizations, the IEEE actively persuades work on WBANs with emphases on medical applications. It is envisioned that WBAN proliferation will start in 2011-2012.

2. Bluetooth is one of the most popular technologies in consumer electronics. Until recently, it was used in health care mostly for interconnection various medical apparatus. The situation changed with the development of the Bluetooth health device profile-HDP. This profile is used for connecting application data Source devices such as blood pressure monitors, weight scales, glucose meters, thermometers, and pulse oximeters to application data Sink devices such as mobile phones, laptops, desktop computers, and health appliances without the need for cables. This profile will be combined with another Bluetooth development-Ultra-low Power (ULP) consumption profile to make sure that medical devices can be in the operational conditions for many months and even years without changes of power sources.

3. ZigBee technology from its origination was aimed to provide inexpensive, low-power consumption nodes. In March of 2009, the ZigBee Alliance has completed development of an application profile for the wireless communication standard aimed at remote health care monitoring (Personal, Home and Hospital Care (PHHC) Profile). Specifically, this profile supports secure monitoring and management of non-critical, low-acuity health care services targeted at chronic disease management, obesity and ageing. It also provides full support for IEEE 11073 devices including glucometers, pulse oximeters, electrocardiographs, weight scales, thermometers, blood pressure monitors and respirometers.
The report assesses characteristics of Bluetooth and ZigBee technologies and benefits of their utilization in health care and wellness. Market issues are also addressed with emphasis on medical applications. The Continua Health Care Alliance is working on the second version of its guidelines, and, besides industry-wide standard technologies, it also pays attention to such wireless technologies as Z-wave, BodyLAN, ANT and other. This is also reflected in the report.

Altogether, the report shows the importance of wireless communications integration into health care to achieve significant cost reduction together with the best care.

Target Audience:

This report provides the analysis of wireless technologies and markets in health care applications; it concentrates on the recent developmental trends. The report is useful for service providers, IT departments of hospitals and other medical organizations, retail operators, vendors, network operators and managers, investors and end users seeking to gain a deeper understanding of new trends in the wireless communications medical applications.

For systems integrators, the report provides an analysis and assessment of competing products currently available as well as an estimation of the overall opportunities in the coming years.

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- Amber (RF Systems)
- Arch Rock (WSN)
- Atmel (Chipsets)
- CEL (modules)
- Chipcon –TI (Chipsets)
- Cirronet-RFM (Modules)
- Crossbow (WSN, Environment Monitoring, motes)
- Digi (Radio, Medical Application)
- Duolog (Transceivers)
- Ember (Chipsets)
- Falcom (Modules)
- GreenPeak (WSN)
- Helicomm (Modules)
- Jennic (Chipsets-Modules-Health Care)
- Freescale (Chipsets)
- Moteiv- Sentilla (Modules, SW)
- Nanotron (Chipsets, Health Care Applications)
- Oki (Chipsets)
- Renesas (Platforms)
- Silicon Laboratories (Chipsets, Modules, Medical)
- Synapse (Module, Protocols)
- Telegesis (Integrator)
- TI (Chipsets)

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