Personal Physiological Sensor Network Device

Novak, Marek

The goal of this project, that is named ARTEMIS, was to design and develop a concept of wireless body area network (WBAN) for a particular application of monitoring and processing personal physiological data. The previous year's project was based on integration of various electronic devices, where one part included integration of ECG and pulse oximetry to one device. The design of ARTEMIS consists of a set of body sensors that transmit data wirelessly to a central unit that performs data cleaning, processing and displaying. The central unit design allows it to communicate with similar units and the Internet. The implementation of the ARTEMIS design consists of miniature sensors that are attached to the clothes or worn as wristbands. The sensors prepared in this demo implementation feature ECG, motion, geographical location, temperature, transmissive pulse oximetry and several others. The central unit provides an input for a 1.8 inch display integrated into the unit. The unit looks like a wrist watch and provides measured data in a clear graphical form. The engineering components of the implementation consist of inexpensive low-power Nordic 2.4Ghz nRF24L01+, 868Mhz MRF49XA transmitters, STM32F and STM32L ultra-low-power microcontrolers. The whole implementation runs on ordinary battery packs. The network communication is provided by GSM and Bluetooth. From the application point of view ARTEMIS features inexpensive, comfortable monitoring for all age groups – from infants to seniors. The next implementation model of ARTEMIS will feature the Intel Quark platform with built-in Wi-Fi capability that will allow more network integration capabilities.

Awards Won:

Second Award of $2,000