



PhD Proposal 2017

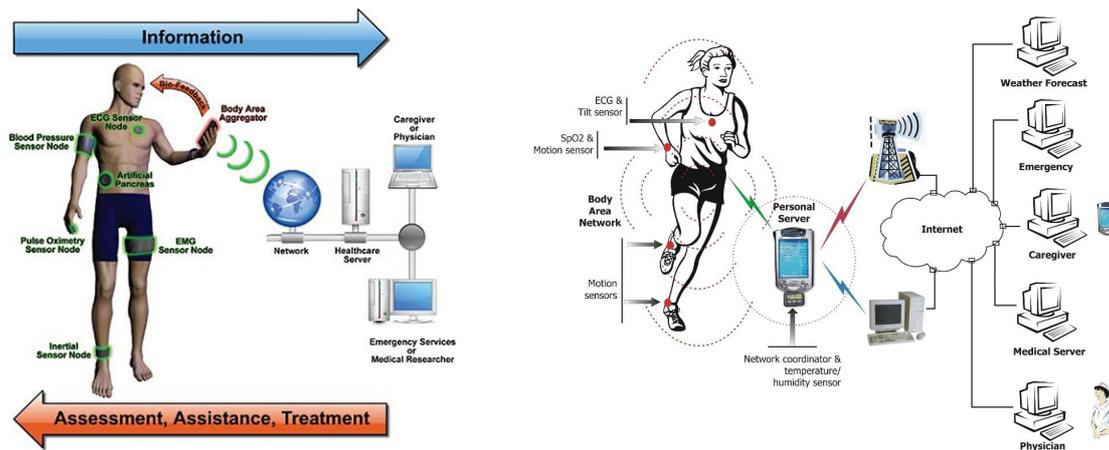
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Collaboration with other partner during this PhD:	
In France:	In China:

Title: Communication Network for Healthcare Monitoring in Hospital Environments
Scientific field: Telecommunications
Keywords: Wireless communications, healthcare, optical communications

Details for the subject:

Background, Context:

With the increase in the life expectancy and the need to the monitoring and the healthcare of elderly and disabled persons, there is an obvious interest in increasing the efficiency of medical treatments, decreasing the cost of hospitalization, and minimizing the risk of hospital-acquired infections. Thereby the idea of employing a communication infrastructure to provide immediate access of the medical information and data records of the patients to the medical staff. This can be realized by using a number of smart devices and sensors placed either inside the patients body (e.g. pacemakers, implanted prostheses, etc.), on his/her body (e.g. ECG recorders, SpO2 sensors, etc.) or close to the hospital bed. A convenient way of connecting these devices to the monitoring system is to use wireless communications, which compared with wired connections, allow more comfort and mobility to the patients. This approach is called a wireless body area network (WBAN) for which some radio-frequency-based standards have been recently proposed (e.g. the IEEE 802.15.6 standard). Given the restrictions on the use of radio waves in medical environments, due mainly to possible electromagnetic interference with the medical equipment, the (still) undetermined the effect of these waves on the health, and also data transmission security and medical secrecy issues, the use of visible-light for communication finds all its interest within this context.



Illustrations of medical applications of WBANs (© Univ of Virginia Eng., BioMed Central)

Research subject, work plan:

This thesis focuses on the design of such WBAN networks based on visible light communications. A first step consists in developing realistic channel models while taking into account the effect of the human body and its mobility. At a second step, we intend to work on the appropriate signaling schemes to insure reliable communication when multiple sensors and devices are functioning. Another important aspect is the case of coexistence of several patients equipped with such networks, which are monitored within the same hospital room. The important question is that of the interference between the multiple transmission links that has to be managed.

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