ABSTRACT

Improvement in technology helped society to live a better life in all aspects. Enhancement of computing environmental capabilities of every new gadgets forced human beings to get attracted towards it. Healthcare system also got the essence of using better equipment. As per current healthcare scenario, chronic illness largely accounts for death rate in a developing country like India. These are largely preventable by creating early awareness among people. This created a necessity to regularly check a person's health statistics. The demand of continuous monitoring of a patient became one of the main cost factor for wired structure of healthcare system. Moreover, people became neglected towards health and only consults a doctor when became ill. This reactive nature can be changed if caring for health did not demand an extra attention and a cut off from daily routine. Wireless Body Area Network (WBAN) is a promising solution of shifting the scenario to wireless medium. This architecture ensures 24/7 self-monitoring of a person without hampering daily activities. It also provides consultation from a doctor all the time. Additionally, all the medical history of the person is also digitally present securely without any manual intervention. In the current era, a person is unaware of its own health status. To facilitate this awareness WBAN must be cost effective. As it deals with health data, reliability should be ensured to have an efficient system. Transparency, privacy, access and convenience became the key factors in this system that can revolutionize healthcare sector. The main contribution of this thesis is to present several algorithms for efficient routing, many of which are based on analytical foundation, that can effectively transfer the data in one or more WBAN systems without compromising a number of QoS parameters. The efficiency and effectiveness of these algorithms or protocols are evaluated through extensive simulation which measure several parameters such as energy consumption, transmission power, stability of a network, delay, throughput (PDR) , lifetime of a network, SAR etc. Considering the stringent QoS requirement for a WBAN it has been observed that the current state of the art, though provides numerous solutions, but none of them jointly optimize these parameters. So, there is always a trade off between between one and another. The Healthcare sector based on WBAN deals with critical health data. Classifying the data into proper categories and routing them accordingly is one of the major task in this thesis. We have also identified that SAR is an important parameter that cannot be ignored at any point while dealing with sensors which are on the human body. Many of our proposed protocols attempt to overcome these shortcomings and prove to be much better than a naive algorithm implementing the WBAN IEEE 802.15.6 based CSMA/CA technology.