Call for Papers

Special Session: Underwater Wireless Sensor Networks (UWSNs) and Wireless Body Area Networks (WBANs)

Outline:

Underwater Wireless Sensor Networks (UWSNs) has recently become a prominent area of research in the field of acoustic communications. Acoustic waves are the most accurate means of achieving adequate transmission range and data rate in underwater communications. New progresses achieved in UWSN communications make reliable data transmission across several meters conceivable. Many studies have been investigated on developing networking solutions for underwater networks, including acoustic channel modeling and physical layer transmission analysis as well as networking protocols. In radio channels, path loss depends on link length; whereas acoustic waves in underwater experience both frequency and link length dependent path loss. Furthermore, reflections from the water surface and sea bottom increase channel fading. All these factors are considered in the design of UWSN wireless systems. Hence, in UWSN communications, range and bandwidth are important bottlenecks. Noise in the underwater environment is related to signal carrier frequency. Also both path loss and Signal-to-Noise Ratio (SNR) in underwater communications are distance and frequency dependent. Researches are trying to improve UWSN systems by applying new schemes borrowed from radio communications. UWSNs exhibit many unique constraints like slow propagation speed, variable link quality, low available bandwidth, high end-to-end delay and energy constraint. These constraints present big challenges in devising energy-efficient and delay-efficient routing protocols for UWSNs.

Sensor nodes which are implanted inside or attached to the body, constitute a WBAN. Core concept of WBANs is to provide the inaccessible observing of human body's functions and its contiguous environment. Advancements in technology make it possible to integrate the whole system on a single chip which is affordable and comfortable for the person under observation. Another fascinating aspect of WBANs is the integration of such networks with the emerging technologies like mobile phones and PDAs etc., which makes their use more appealing in terms of quick, reliable and accurate delivery of information. Provisional to the desired factors to be sensed, various nodes and network topologies are needed. WBANs are required to perform correctly for long periods without any battery replacements, particularly for implanted (in-body) nodes. Hence, energy management is a primary concern for WBAN schemes. Continuous data monitoring and broadcast, and large separations between communicating sensors cause more energy utilization. One of the major challenges in designing efficient routing protocols is to maximize network lifetime and stability period by using the merits of both multi-hop and single-hop communication. Efficient selection of forwarding nodes is done on the least hop count mechanism. Another performance parameter that needs to be enhanced is throughput. Major issues in WBANs are energy management and reliable data delivery. Due to small dimensions, sensor nodes have limited energy resources. In WBANs, sensors are small in number and it is uncomfortable to replace them frequently.

Topics: **Topics include but are not limited to:**

- UWSN and WBAN system architectures

- Efficient UWSN and WBAN communications (including acoustic, optical, RF, and wired, etc.), with techniques from the physical layer to the application layer
- UWSN and WBAN modeling and signal processing
- Cooperative UWSN and WBAN communications, including, PHY, MAC, routing, and data transfer, etc.
- Networked UWSN and WBAN robotics and systems, such as localization, navigation, security, communication & coordination, or human operator interaction.
- Coordinated energy harvesting systems and power systems for UWSN and WBAN Energy-efficient algorithms, and protocol design for UWSN and WBAN, as well as signal/image processing and communication systems
- Operating system and middleware support for UWSN and WBAN
- Applications that broadly address UWSN and WBAN and systems, including coordinated underwater vehicles
- Modeling, simulation, and testbeds for UWSN and WBAN systems and platforms
- Experimental results from UWSN and WBAN, signal/image processing and communications field trials
- Application requirements for UWSN and WBAN, signal/image processing and communication systems presented by end users

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Notification deadline: 31 July 2017
Camera-ready deadline: 31 August 2017

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