

Call for Workshop Papers

Internet of X-Things (X-IoT): Communication Techniques and Antenna Design Perspective

The fast growth of the world's population demands more food, natural resources and space to reside. This ever-increasing demand requires novel technology for exploration of resources and outer space. Enabling technology to overcome all of the above concern mostly comes under Internet of X-things (X-IoT). The framework of X-IoT consists of three major categories: Terrestrial (Conventional/Space), underwater and underground (Non-Conventional). The first category is Internet of terrestrial things (IoTST) for outer space exploration, to provide coverage, and to enable inter-satellite communications. The second category is the Internet of underwater things (IoUWT) for exploration of ocean and third category is Internet of underground things (IoUGT) for agriculture, seismic monitoring, and Oil & Gas exploration. The technological challenges for IoTST, IoUWT and IoUGT can be broadly classified into communication, networking, and localization. For conventional IoTs (IoTST), radio communication is the best technique for transmission of information's between the devices. For Non-conventional IoT applications, traditional techniques of wireless communication like radio frequency (RF) are not suitable, because of dynamic channel behaviours and high path loss and thus becomes impractical in nature. In underwater environment, the majority of the research work is based on acoustic (sound wave) communication. However, it encounters many challenges like low data rate, and high propagation delay. Acoustic waves provide long transmission range, but due to the low speed of sound waves and low frequency operation, the data rate is low and delay is very high. Therefore, optical waves based wireless communications have been presented to provide high data rate for non-conventional media communication. However, this technique also suffers from low transmission range and require line of sight (LOS). Magnetic induction (MI)-based communication is a recently explored promising technique for non-conventional media applications. This technique exhibits several characteristics such as negligible propagation delay, predictable and constant channel behaviour, sufficiently large communication range and data rate, and also provide stealth underwater and underground operations. Efficient antenna design is very important for getting a good performance of any wireless system. For IoT applications, antenna must support high data rate, compact size. It also has energy harvesting features as well as support filtering response. It can be said that antenna must be smart in nature for IoT applications. So, we would like to present and evaluate/discuss some of the exciting new research approaches that have been suggested to deal with these issues, including state-of-art research in X-IoT from communication technique and antenna design perspective.

Some important topics (but not limited to) is as follows:

- X-IoT communication protocols
- Communication techniques for Internet of underground and underwater things
- Communication techniques for Internet of Vehicles
- Antenna design for Underwater Communication
- MIMO Antenna design for X-IoT Applications
- Smart Antennas
- Energy Harvesting Antennas for X-IoT Applications
- Filtering Antenna for X-IoT Applications
- Quasi-Isotropic Antenna for X-IoT Applications
- Free space optical communication for X-IoT
- Device-to-Device (D2D) Communication in X-IoT
- X-IoT and Machine-to-Machine (M2M) Communication
- Networking and Localization for X-IoT
- Machine learning and AI for X-IoT
- X-IoT privacy, security and vulnerabilities

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Important dates:

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