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Title:The internet of multimedia Nano-Things

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Abstract:Nanotechnology is enabling the development of novel devices which are able to generate, process and transmit multimedia content at the nanoscale. The interconnection of pervasively deployed multimedia nano-devices with existing communication networks and ultimately the Internet defines a novel communication paradigm that is further referred to as the Internet of Multimedia Nano-Things (IoMNT). The IoMNT is a truly cyber-physical system with a plethora of applications in the biomedical, security and defense, environmental and industrial fields, amongst others. This paper discusses the state of the art and major research challenges in the realization of the IoMNT. Fundamental research challenges and future research trends are outlined in terms of multimedia data and signal processing, propagation modeling for communication amongst nano-things in the terahertz band, physical layer solutions for terahertz band communication and protocols for the IoMNT. These include novel medium access control techniques, addressing schemes, neighbor discovery and routing mechanisms, a novel QoS-aware cross-layer communication module, and novel security solutions for the IoMNT. © 2012 Elsevier Ltd.

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