

Digital Fabrication: Enabling Ambient Intelligence, Ubiquitous Computing and the Internet of Things

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Abstract

In 1999, Kevin Ashton, cofounder of MIT's AutoID Center, is credited with coining the phrase "Internet of Things" (IoT). The phrase was used to describe a new information technology paradigm linking new developments in Radio Frequency Identification (RFID) and wireless networking with the expanding internet. At the time, the vision for the IoT was focused on revolutionizing supply chain logistics and inventory management using RFID tagging. By using RFID tags it became possible to "endow" packages, physical assets and other items with unique identities and location awareness thus bringing new efficiencies to the logistics domain. A decade later, the concept of an "Internet of Things" has expanded and evolved dramatically. This concept now describes a vision of a fully interconnected world where swarms of sensors provide real-time information about a vast number of physical and virtual state variables around the world. The evolution of digital fabrication methods, materials and

applications has been influenced by the IoT vision and technology demands. Innovations focused on new functional inks, flexible and unconventional substrates, low temperature device and circuit fabrication, and roll-to-roll manufacturing are already being leveraged to produce all-printed RFID tags and antenna, "smart" labels, "smart" packaging, and novel sensors fabricated on unconventional surfaces and substrates.

The first part of the presentation will provide a brief overview of the evolution of the IoT, ambient intelligence and ubiquitous computing technologies. Next, the presentation will focus on the advantages provided by digital fabrication approaches and how these approaches are enabling current IoT applications. Finally, the presentation will provide an outlook for next generation IoT applications which will incorporate new and different digital fabrication approaches including nanofabrication and biofabrication.