

The Internet of Things

November 2, 2010, 10:00 PM

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Keywords: *Internet of Things, GPS, RFID, social networking, intelligent objects, ubiquitous computing.*

The Internet of Things can be understood as a layer of digital information that covers the physical world. Objects and places become part of the Internet of Things in two ways: First, data and information can be associated with a particular location, using geo-coordinates or a street address. Second with sensors and RFID tags or transmitters installed in these objects allowing them to be accessed via Internet protocols.

These objects may also feel and react to the environment, as well as communicate with users or other objects. The Internet of Things is the next social network and is already happening.

Introduction: From the outset, the Internet has been called the “world web of computers”. Fortunately, it is much more than a bunch of connected computers. With the creation of social networks, the Internet began to be recognized as a web of connected “people”. Besides the PCs that are plugged into the web and the cell phones (nearly 1 billion), every year, new objects “enter the web”, through innovative technologies, such as RFID (Radiofrequency Identification), WI-FI and Bluetooth, which give these objects the capacity to communicate.

However, in recent years, everyday objects have begun to receive layers of information (software) and sensors, taking them beyond the simple transmission of data. Today, these “intelligent objects”, “feel” and “react” to the environment independently, without any need for us to give an order or command. We are entering the era of the “Internet of Things”. According to Michael Nelson, Professor of Communication, Culture & Technology at Georgetown University and Internet Technology Director at IBM, “In 5 to 10 years we are going to have more than 100 billion objects connected online”. He says our difficulty in measuring the size of the “Internet of Things” market can be compared to the difficulty in measuring the market for plastics in 1940. At that time, it was hard to imagine that plastic could be used in practically everything.

The same is happening today in relation to objects we are providing with a layer of digital information, processors or sensors. This new area has been called the

“Internet of Things”. But what is the “Internet of Things” after all? Among the diverse ideas and concepts, the best definition for the Internet of Things would be: “an open and comprehensive network of intelligent objects that have the capacity to auto-organize, share information, data and resources, reacting and acting in face of situations and changes in the environment.” Along that same line, Julian Bleecker, founder of the Near Future Laboratory, created the term “blogjects” to describe objects that blog. Writer Bruce Sterling coined the term “spimes” to describe “an object of unique identification, aware of its location, its environment, that initializes and auto-documents itself and launches data about itself and its environment in large quantities.”

Things That Think: Our digital world expansion seems limitless. This new digital universe of “connected things” redefines our relation with objects that surround us, because it does not occur only out of utility (like today), but also through the object’s own initiative and will. This relation can be with people or with other intelligent objects, without our interference or command. “Another” social network, connected to “our” social network, full of new possibilities, capable of significantly altering our lives, how we buy products, enjoy our leisure and live in society. But there is nothing new in imagining objects connected invisibly and exchanging information with each other. In 1999, Professor Neil Gershenfeld, of MIT, published his book “When Things Start to Think”, where he described the principles of the “Internet of Things”. Furthermore, one of the most used technologies today to connect objects, RFID, is not new either, having been discovered by the Scottish physicist Robert Alexander Watson-Watt in 1935 and used during World War II.

RFID technology is considered essential for this new revolution since it permits adding objects without any type of electronics or digital circuit to the network. This already happens for example with books, cars and clothes. As we cover different areas of our everyday life with wireless networks and add RFID tags to objects, information travels invisibly and silently from one object to another, without us realizing, what the writer Adam Greenfield called “information in the shadows”. We are also promoting the control and monitoring of these in all stages of the value chain, as well as their connectivity, inter-communication and sharing. This creates a network of objects, a community that can exchange information and evolve. A new type of social network, which will certainly connect to the existing social networks such as Facebook and Orkut. This is much more than ubiquitous computing.

Conclusion: The proliferation of “intelligent online objects” is also guiding civilengineering and architecture practices in what today we call “smart buildings”. Buildings with sensors and devices connected by an IP network are capable of “feeling” the internal and external environments, adjusting ventilation, illumination, water use, escalators and elevators in accordance with sustainable parameters for energy consumption. In entertainment, Nintendo DS and Sony PSP consoles have been able to access wireless networks - and a Kernel Linux for some time now, permitting integration with other devices. When we think of our home security, we can already install video cameras, audio and integrated motion detectors, capable of

sending warnings to our cell phones concerning invaders and to notify police centers.

In the near future, the virtual and real will coexist in a more sophisticated version of what today we call “augmented reality”. In this new space for interaction, intelligent objects, agents and autonomous avatars will be our work colleagues, virtual employees or just another friend on Facebook. The “Internet of Things” is the next social network and it is already happening.