Next 5 years: More things other than computers and humans can communicate
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The things described in the topic are currently referred as "smart objects" or "Internet of things". Cherise Fong from CNN describes the world with smart objects as "an imminent world where physical objects and beings, as well as virtual data and environments, all live and interact with each other in the same space and time"[3]. Thanks to wireless networks and Radio Frequency Identification(RFID) chip that is embedded or sticked onto objects[4], which transform the concept into real life technology, allows the objects to interact with each other via wireless network. The 6th Annual Horizon Report released on 28th Jan 2009 expects that it will take 4 to 5 years to reach the horizon of its development[5].

Some companies are trying to take the first step to transform the concept "internet of things" to products for end-users. Currently, objects become smart objects by sticking a programmable tag with a unique identifier that can be read at a distance. Embedded in the tag is a RFID chip, which stores its information and user-defined command for this object to be executed once the chip is read by sensors. In that case, every object becomes "alive", they can tell information about themselves, thus allows them to interact and communicate with each other via wireless network. On the other hand, this also allows automatic, real time identification and tracking of individual objects. Some typical existing commercial products are Pachub produced by Violet and Touchatag(formerly Tikitag) presented in DEMO 08 conference, details of both can be found at [7].

Some others are realizing, experimenting and even predicting the future development of "Internet of things". The Nokia research center foresees the future of smart objects to be powered by human-like senses and have their camera phones "talking to" real-life objects such as a castle[8]. Also, Eric Besson, the Minister of National identity and Solidary development in the government of François Fillon, concludes at the European Union Conference that the power of identity is the main concept that builds up Web 3.0/2.1 where objects can have both virtual and physical "shape", and most importantly, they can interact[1].

By blurring the line between physical and virtual, what are some potential benefits that investors see? On the other hand, what are the obstacles laying ahead? They see tradeoffs.

Third generation of social network

Facebook catches the attention of the world due to its effect of the power of virtually connecting massive number of people. However, when the line between virtual and physical is blurred, people can interact physically via a virtual space, for instance, the Internet. One example is the Pachub rabbit that mentioned above produced by Violet. Each rabbit allows users to remotely deliver movements in near real time from one rabbit to another inter-trusted rabbit or an object with RFID tag[7]. Moreover, people will not be the only factor in the third generation of social network, but also objects. The Nokia research center also noticed that a growing number of mobile phones are equipped with NFC readers. They predict that in a few years' time, people just may get into the habit of using

their camera phone scanning the virtual information contained in physical objects out there, including people[6].

Real time monitoring

With the ability to communicate through the RFID chip embedded, machines and engines can become more environmentally friendly. As concluded from the 6th Annual Horizon Report[5], power consumption can be optimized by self-coordination among machines. This can be done by having the sensors within the machines to exchange data among themselves. On the other hand, lost books in libraries or lost shipment of goods of any kind can be discovered and located in real time for less risk in management. Moreover, infants or patients with senile dementia can be closely monitored for their location for less opportunity of getting lost. Also other patients having a family history of sudden coronial disease, can benefit from earliest possible treatment with the real time monitoring of their.

Security threats

Since the current version of "Internet of things" use the existing Internet, therefore, they are subjected to the same security issues that people have been discussing for any web applications. Some of the main challenges are to keep data confidential, protect the smart objects from spam and protect information exchanged from unauthorized access or manipulation. Only if the "Internet of things" can earn the trust of its users, over time larger deployment will take place.

Privacy threats

"Do you want to be monitored by your wife/husband?" "What if your boss asks you to wear a piece of RFID at work?" The answers to the above questions are most likely a "No". Potential tracking, identification or profiling of an individual through the aggregation of heterogeneous data, possibly collected from different sources, constituting "personal data" should develop a law system along with development, the ownership and scope of usage of those data collected, for both the collector and the user. This requires a wide realization of "Internet of things" from the government sector.

Despite of the tradeoffs, the realization of "Internet of things" is emerging and growing at an incredible speed. For instance, Cisco, Ericsson, Sun Mircrosystems and at least 24 more companies have founded the IPSO Alliance to promote and explore the use of Internet Protocol for smart objects[3]. Also, the conference namely "The Internet of things: the first international conference" was hosted in Zurich for industry and academia back in March 2008[2]. In conclusion, after the tradeoffs and confusion will be resolved in the upcoming 4 to 5 years as predicted by the Horizon Report, should there be intensive development or discussion about the products of the concept "Internet of things"[5].

Bibliography

[1] Besson, Eric. "Building tomorrow's Internet together." Internet of things, Internet of the future. French Presidency of the European Union Conference. 15 Feb. 2009. <http://www.w3.org/News/2008>

[2] Floerkemeier, Christian. The Internet of Things. New York: Springer London, Limited, 2008.

[3][3]Fong, Cherise. "Internetting every thing, everywhere, all the time." 02 Nov. 2008. CNN International. 15 Feb. 2009. <http://edition.cnn.com/2008/TECH/11/02/digitalbiz.rfid/>

[4] Jones, Erick C., and Christopher A. Chung. RFID in Logistics : A Practical Introduction. New York: C R C P LLC, 1999.

[5] Metros, Susan. "2009 Horizon Report."2009 Horizon Report. 28 Jan. 2009. The New Media Consortium. 15 Feb. 2009. <http://wp.nmc.org/horizon2009/>

[6] Mike. "Research on the Internet of Things, officially begins." 05 June 2008. Nokia Conversations. 15 Feb. 2009. <http://conversations.nokia.com/2008/06/05/research-on-the-internet-of-things-officially-begins/>

[7] Perez, Sarah. "5 Companies Building the "Internet of Things"" 13 Feb. 2009. Read Write Web. 15 Feb. 2009. <http://www.readwriteweb.com/archives/5_companies_building_the_internet_of_things.php>

[8] The Nokia Connections Team. "Internet of Things: powered by human-like senses." 08 Apr. 2008. Nokia Connections. 15 Feb. 2009. <http://conversations.nokia.com/2008/04/08/internet-of-things-powered-by-human-like-senses/>