

A new frontier of telecommunications

By Pujan Roka

When Tim Berner-Lee invented the World Wide Web, he envisioned that the Internet revolution would unfold in two parts: The first part would be collaboration between people using a vast network of computers, and the second part would be machines collaborating with each other.

His vision, which he described in his book "Weaving the Web," did not take that long to turn into reality.

We are intimately familiar with the first part of his vision and the second part is slowly unfolding around us.

Consider the Nest thermostat that learns to program itself and adjust the room temperature for you. You can also remotely adjust temperature using its mobile app.

Consider the Nike+ Sportwatch that tracks your running history with GPS location and creates a personalized analytics for you.

Atlanta-based CardioMEMS has developed a tiny sensor that can be implanted in the heart and vital statistics can be sent wirelessly to health care providers.

In many places around the world, farmers are already tracking their farm animals using GPS-enabled devices.

In cities like Austin, Texas, and Boulder, Colo., energy companies are piloting the smart electrical grid that can be integrated with consumer appliances, so they could utilize energy efficiently.

Telecommunications company Ericsson has implanted sensors in a live tree that uses electromagnetic field to detect motion around it. The sensors analyze the data, and the tree's reactions are tweeted in real-time.

If any object could be enabled with the Internet, then it could collect data associated with its functions, share that data with other systems, and these systems could automate



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tasks without human intervention. This type of technology is called "the Internet of things" or IOT in short.

Smartphones and tablets also are considered as IOT devices, as they come with sensors like GPS, accelerometer, gyroscope and compass along with Internet access that enable collaboration between multiple systems with no or little human intervention.

The falling prices of electronic hardware and the rising ubiquity of the Internet are fueling the explosion of IOT devices that have already outnumbered the human population in the world. There are nine billion devices estimated to have been deployed around the world, and that number is expected to reach 24 billion by 2020.

IOT devices have given rise to what the technology world calls "machine-to-machine" communication, or M2M in short. M2M is poised to become the new frontier of telecommunications, as the number of machine-to-machine connections is about to exceed the number of human-to-human connections. The opportunity created by M2M has become quite compelling to telecommunications providers from the revenue standpoint.

When the Internet became available for mass consumption in the late twentieth century, no one could imagine that one day we would be watching Internet-enabled streaming videos on our phones. Social networking was several years away from becoming a mainstream media, so the thought of people communicating over Facebook or Twitter would have

been quite improbable only five years ago.

Today, the Internet of things resembles the early days of the Internet of human collaboration: We are yet to fully understand how it will revolutionize the world.

If you look closely at the existing IOT systems, you will notice a vast amount of analytical data produced by the interactions of IOT devices over M2M connections. The Nest thermostat produces analytics of energy consumption at home. The Nike+ Sportwatch produces analytics of calories expended and miles covered after each run, including visual summary of GPS tracking.

The CardioMEMS sensor transmits heart's vital statistics to physicians, thereby allowing immediate medical intervention in case of emergencies. These types of analytics are known as value-added services of IOT systems, and according to Harbor Research, such services will create \$500 billion in revenue by 2015.

As illustrated by the aforementioned examples, IOT systems will lead to the creation of intelligence in many aspects of our lives and the world around us, which we lack today, and that intelligence, in turn, will not only help us to identify our deeper needs and wants but it also will help us to uncover new economic opportunities that we are not quite aware of today.

Human civilization went through several revolutions – social, economic and political revolutions – each time a new mode of communication was introduced to the world: the printing press in the 15th century, telegraph and telecommunications in the 19th century, and the Internet of human collaboration in the 20th century.

The Internet of things or machine-to-machine collaboration lies ahead of us to unveil its revolutions.

Pujan Roka writes on topics of management and technology.