BrontoBytes Generated by TSensors, Foundation for the Abundance and Our Future

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Abstract

Abundance concept, introduced in the bestselling 2012 book by Peter Diamandis and Steve Kotler of the same title[1], is defined as a world without hunger, with clean environment, and energy and medical care to all. Abundance is expected to be reached in about 20 to 25 years through technological innovations driven primarily by exponential technologies producing goods and services faster than global demand. Sensors are one of the exponential technologies.

Triggered by mobile revolution, shipments of consumer sensors grew from 10 million units in 2007, to about 13 billion units in 2015, with forested demand up to 100 trillion sensors (TSensors) in 2030.

TSensors Summit was formed in Silicon Valley in 2013 to accelerate development of new sensors supporting Abundance. Historically, it has taken 30 years for new sensors technology to move from concept to prototype to commercial high volume production[2]. TSensors initiative aims at a significant reduction of this cycle time by providing advanced visibility of emerging ultrahigh volume sensor based applications. To achieve this goal, TSensors Summits are organized with presentation by visionaries. In 2013, TSensors Summits were organized at the University of California (Berkeley) and Stanford University, then in 2014 twice in Tokyo, Munich and San Diego. 2015 Summit is scheduled in Orlando, Florida, December 8-10 http://tsensorssummit.org/.

As mobile market dramatically restructured sensor industry, the emerged biggest global economic tides, such as Wearables, Unobtrusive and Digital Health and Internet of Everything are the expected largest consumers of sensors. Cisco is forecasting growth of IoT to $19 trillion by 2025. The boldest forecast for Iot, $32.5 trillion in 2025 or about 30% of 2025 global GDP, came from General Electric.

TSensors generated Big Data volume is forecasted to reach 1 BB (BrontoByte, or 10^{27}) in 2025. Processing of such volume of data to extract useful applications will be challenging. One of the emerging tools for such processing is deep learning, a subset of artificial intelligence.

Examples of sensor big data based applications include:
- Medical diagnostics; IBM supercomputer Watson was fed with 3 billion pages representing all medical knowledge on Earth, plus 1500 cases of real cancer. All patient data collected by a broad range of sensors, including body images, are processed and recognized to formulate, for the first time in history of humans, a statistically based diagnosis.
- Global pollution map: pollution monitoring nodes will include sensor array to monitor chemical, biological, pollutant pollution of air, water, soil, food etc., as well as radiation and threats (earthquakes, tornados, mudslides, etc.). Superimposed on e.g., Google maps, it will allow not only planning personal trips and vacations, but also provide feedback to companies reducing global pollution.
- Unobtrusive health monitoring; the next generation of eHealth technology will not only bring the new non-invasive sensors, such as DNA, biome, blood test, mineral and vitamin deficiency, inflammation, etc., but will embed them into our infrastructure (beds, cars, desks, walls, etc.).

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[1] http://www.abundancethebook.com/

[2] R. Grace, S. Walsh; MEMS Industry Roadmap; Chapter 2; Micro and Nanotechnology Commercialization Education Foundation; 1990; www.mancef.org

These sensors will continuously monitor our health without our awareness, and will enable early health warning, as well as low-cost global deployment, enabling healthcare Abundance.

This presentation will discuss related issues in more depth and conclude with an overview of amazing sensor based products reaching market.