

Big Data, IoT,

Buzz Words For Academia Or Reality For Industry?

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ABSTRACT

The concepts of Big Data have become intertwined with those of the Internet of Things, creating mental pictures of a fully connected, all-encompassing, cyber-physical world, where each and every object will contribute with information to a “fully aware” society. Academic works are presenting this as the natural evolution for our current technologies. The panel looks at these promises from the hard perspective of reality: what is being done, how much it cost, what needs to be developed, and what can be expected in the near and mid-term.

Categories and Subject Descriptors

C.2.1 [Network Architecture and Design]: Network Architecture and Design – wireless networks

H.3.4 [Information Storage and Retrieval]: Information Storage and Retrieval - Systems and Software

General Terms

Design, Economics, Security, Standardization

Keywords

Big Data, IoT, Industry-applications

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1. INTRODUCTION

The development of sensor networks, coupled with increasingly low power sensors and actuators, has led to the creation of scenarios where the physical reality is being measured and reported at rates which can be considered as continuous for practical purposes. All these devices, these “things”, are supposedly exchanging all relevant information, acting as a mediator layer between the assessment of physical reality and the user. This Internet of Things allows the user to see its environment according to his/her specific preferences, with examples like “the fridge is warning that you are out of milk”.

Such a level of knowledge, of understanding, is only possible by the developments on automated intelligence. All the data presented by the sensors, must go through a huge set of actions, like synthesis, inference filtering, scoping, or clustering. With the need of intelligent processing for many sensors, it is of no surprise that techniques of Big Data become involved in this process.

It is thus natural that, as concepts, Big Data and IoT have been variously (re-)interpreted and studied extensively in academia, at least in the last decade, with very diverse proposals. For industry, however, these concepts have increasingly become the reality. Data have emerged everywhere, and big data analytics often holds key to business opportunities. Devices of all sorts have also flourished, paving way for a full-connected world. Not surprisingly, the two concepts have become intertwined in some sectors, as more “things” are connected to the Internet, each generating data continuously. This panel is intended to bring together various industry sectors and academia to discuss where we stand and how coupled can these concepts become now and in the mid-term.

2. QUESTIONS TO CONSIDER

We try to shine some light on the point where we are in the intersection of these two concepts, what can be achieved in industry at this stage, and what is already felt as needed. Research questions that are not yet answered will be highlighted, and the challenges on how to transfer existing theoretical work into our society. The questions tackled will consist of two different tracks: where we stand, and where we expect to go.

2.1 Where we stand

Looking into current industry, it is important to look at our status. Several different aspects will be addressed.

- Is there already a global IoT industry? Can we consider that we have reached a maturity stage that any application vendor can deploy an “intelligent connectivity” on its consumer devices? Are standards (both communication and electronics) at such a stage that smooth interoperation is to be expected?
- Are we prepared for the communication and processing needs for this Internet of Things? Do we have adequate architectures for processing data at the required rates, and do we have communication architectures which are adequate for the traffic patterns expected in IoT? Are standards up to these challenges? Do we have “intelligence processors” for our IoT world?
- Do we have an “Internet of Things” or an “Internet of Rich Things”? Can we replace existing physical devices with cost-effective IoT-enable alternatives? Is it possible to show social benefits (economic, environment, safety) for pushing for such a conversion?
- Are there vertical sectors where this widespread usage is now easier to perform than others? Which areas are now intrinsically dependent of the merger of Big Data and IoT?
- Do we have a sustainable industry at this stage? What kind of actors are emerging? Are legacy players (operating system manufacturers, telecom operators, search engines,

distribution companies) taking over all new business functions, or can we see independent SMEs increasingly relevant?

2.2 Where do we expect to go

The second line of discussion inside the panel will look into the future, and how our society will react to (and impact) this revolution.

- What challenges do we perceive for the future? Are these mostly technical or fundamentally of economical nature? Do we envisage scalable techniques for data processing? Are communications able to cope with how many sensors?
- What power limitations do we envisage? Do we see realizable power budgets for the sensors? Do we need novel (self) power techniques? Are we requiring an increasingly large piece of world power?
- Will markets be transformed by Big Data usage over widely deployed IoT? For an aging society, do we see IoT as a piece on elderly care? Can we trust these techniques for health applications, or are they limited to active aging?
- Legal issues are clear? How can these impair worldwide developments? How can we have a global framework for data acquisition, storage and processing, with all the different ethical, cultural and legal frameworks across the world? Will ownership of data and information become as important as ownership of the device? Are there privacy issues to consider? Will the user accept such an intrusive society? Can we expect technology to help in these matters?
- How can we establish a proper market for the whole connected society? Can the user remain in control of its information (and its devices)? Is the IoT society ownerless? Will value pass from data to algorithms?
- What does industry need from academia? Cost reductions or technology performance developments?