

Chapter 12

Socio–Ethical Impact of the Emerging Smart Technologies

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ABSTRACT

Today, technology is being integrated in all social environments, at home, school, or work, shaping a new world in which there is a closer interaction between human and machine than ever before. While every new technology brings along the expected “blessings,” there is also the thick end of the stick, namely the potential undesired effects it might cause. Explorative research in smart and enhancing technologies reveals that the current trend is for them to transcend to persuasive technologies, capable of shaping human behavior. In this context, this chapter aims at identifying the social and ethical implications of such technologies, being elaborated after reviewing literature from various research domains. It addresses the implications of today’s smart and enhancing technologies on several levels: health repercussions, the social and behavioral changes they generate, and concerns of privacy and security. Also, the chapter emphasizes the need for scientists and researchers to engage not only with the technical considerations, but also with the societal implications mentioned above.

INTRODUCTION

In today’s society “smart” things are in the center of attention: smartphones, smart grids, smart meters, smart cars, smart homes, smart cities, and so on, are just a few examples of (until yesterday) ordinary devices and technologies that turned “smart” in the past decade, becoming connected to the Internet, more attractive to customers, and also more pervasive with regard to the user’s everyday life. Smart technologies are gaining more and more presence in the user’s everyday life; they even enter highly sensitive environments, such as the home. This leads to the emergence of specific ethical issues concerning these new smart socio-technical systems.

Being based on the concept of ambient intelligence (which describes electronic environments that are sensitive and responsive to the presence of people), smart devices are developed by integrating microprocessors and sensors into ordinary objects, making them able to respond to the environment and interact

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with humans and other smart objects. Today's technology makes it possible for computers to surround and serve humans in every-day life by working non-intrusively in the background. This is referred to as "ubiquitous computing", a concept that has long been foreseen by scientists and researchers (Weiser, 1993). Ubiquitous computing is a method of achieving the most efficient technology that interacts with and surrounds its users while remaining effectively invisible to them. Research in ubiquitous computing has focused on three main topics: natural interfaces (a diversity of communication capabilities between humans and machines), context-aware applications (the application's capability to adapt its behavior based on information from the physical and computational environment), and automated capture and access (for recording and rendering live experiences) (Abowd & Mynatt, 2000). The European Union 1999 IST Programme Advisory Group (ISTAG) vision statement for Framework Programme 5 describes a scenario where "people will be surrounded by intelligent and intuitive interfaces embedded in everyday objects around us and an environment recognizing and responding to the presence of individuals in an invisible way" (Ahola, 2001). This 1999 vision has become today's reality.

A common feature of all smart technologies and devices is the focus on existential experience, the capability of a particular item to provide situation and context-aware services to the users in real time. For example, a smartphone weather application knows how to update the weather forecast based on the user's location (location-awareness). A smart car navigation system can adapt its route based on real-time traffic and weather analysis. A smart grid provides real-time detection and understanding of conditions in order to get a timely response in emergency situations. All these smart products and services are being designed to co-exist in the emerging global Internet-based information architecture named the "Internet of Things" (IoT). The IoT is considered as the ideal backbone for ubiquitous computing by enabling objects to be easily identifiable in smart environments, easing the retrieval of information from the Internet, thus facilitating their adaptive functionality (Fabian, 2008). IoT enables ordinary objects to communicate and interact, therefore becoming smart and providing smart services.

The research presented in this chapter pertains to the field of technoethics. This is an interdisciplinary field that emerged in the 1970's highlighting the moral and social responsibilities that engineers and technologists have for the outcomes of the technological progress and development (Bunge, 1977). Such an approach makes perfect sense given that technology cannot be viewed as a segregated part of society, but a complex, integrated component that influences life on a variety of levels.

Technoethics is defined as an interdisciplinary field concerned with all ethical aspects of technology within a society shaped by technology (Luppicini, 2009). Given the variety and heterogeneity of technologies, and the multitude of fields where they are being used, technoethics brings on the mandatory inter-disciplinary approach needed in order to properly deal with all the technological processes embedded within all the spheres of life.

This chapter aims, using a technoethical perspective, to identify the specific ethical challenges and concerns that have been raised by the emergence of new smart technologies and to provide specific ideas on how to properly address them in order to benefit safely from the advantages and strongpoints of these technologies, while limiting the potential unintended consequences.

Smart Technology - Smart Users?

The smart devices of today are tending to become extensions of the human brain. Latest generation smartphones offer a variety of features and functions that perform tasks which were normally done by the user's brain. For example, now the user doesn't have to remember important facts, because he can

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