

Eventuality of an Apartheid State of Things: An Ethical Perspective on the Internet of Things

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ABSTRACT

Notwithstanding the potential of IoT to revolutionise our personal and social lives, the absence of a solid framework of ethics may lead to situations where smart devices are used in ways uncongenial to the moral fabric of a society. In this work, the authors seek to provide a conceptual framework toward incorporating ethics in IoT. They employ the concept of object for each smart device in order to represent ethics relevant to its context. Moreover, the authors propose dedicating a separate ethics layer in the protocol stack of smart devices to account for socio-cultural ethical aspects of a society. The ethics layer enables us to account for ethical responsibilities of smart devices vis-a-vis society so that inadvertent physical, emotional or psychological harm to human beings is avoided. Such mechanism ensures that devices operate ethically not only at individual level but also at D2D level to give rise to high order ethical structures e.g. ethical home, ethical office, ethical university, ethical city, etc.

KEYWORDS

Apartheid, Ethics, Information Society, Internet of Things, Racism, Smart City, Social Considerations, Socio-Technical Systems

INTRODUCTION

Modern technologies are often heralded to usher in a new era of human prosperity, but to what extent these assertions really hold is debatable. No doubt, technology has been really shaping our lives: the way we interact, conduct businesses, exchange information, get entertained etc. and the recent wave in this technological streak is the Internet of Things (IoT) - a pervasive technology that seeks to connect virtually all things on the planet to global Internet. Though the idea of ‘smartening’ ordinary things for greater good of humanity has been romanticised for quite some time, design of a framework for implementing ethics into smart devices of the IoT has not been duly considered. Such technological enhancement would ensure that artificially intelligent pervasive technologies do not inadvertently jeopardise essential human values.

IoT has been hailed as the technology with far reaching consequences, poised to transform the way we perceive and interact with the physical world. IoT seeks to create a virtual world that contains a counterpart for everything in the physical world in order to provide an advanced class of services to people. IoT offers immense market opportunities particularly for manufacturers, ISPs and application developers. The IoT based smart devices are expected to reach 28 billion by the end of 2021 (“Ericsson Mobility Report,” 2015). IoT is anticipated to have unprecedented economic impact estimated to be in the range of \$2.7 trillion to \$6.2 trillion by 2025 with IoT healthcare having a share of about

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\$1.1–\$2.5 trillion (Manyika et al., 2013). Other market opportunities include such application areas as intelligent transportation systems, industry, agriculture, building automation systems, smart grids, smart cities etc. Due to this potential, IoT is receiving considerable attention from academia, research organisations, enterprises and governments.

In this work, the authors review various IoT applications from an ethical perspective to illustrate situations where ‘things’ go awry and lead to racism, bias and discrimination. The need for designing value laden smart things to safeguard common human interests is expressed, however no commitments to any particular ethical theory are made. Also, to break away from such tendencies, the authors suggest dedicating a separate ethics layer in the protocol stack of smart things and contribute implications for the design of the proposed ethics layer.

IS THE INTERNET OF THINGS RACIST?

In the IoT world, sensors embedded all around us could gather colossal individual, organizational and government data. However, mere collection of data by ubiquitous sensors and subsequent processing represents oversimplification of the IoT vision because not all trifling details that could be sensed are relevant to the context of an application. Although, smart services that IoT seeks to provide would necessitate collection of certain data, unbridled surveillance over public and private lives of people raises serious security and ethical concerns (Michael, Michael, & Perakslis, 2014). Such apprehensions assume greater importance due to increased use of artificial intelligence (AI) embedded in smart devices, as Rosalind Picard, director of the Affective Computing Group at MIT articulated, ‘The greater the freedom of a machine, the more it will need moral standards’ (Picard, 2000). Also, people must know and be able to manage what type of data are collected by their smart things, how they are shared and its implication for their moral and ethical lives. The situation is even more exacerbated by the recent exposé that 70 percent of IoT products contain some kind of security vulnerability, according to a research study by Hewlett-Packard (Hewlett-Packard, 2015). Moreover, it is envisioned that cloud services would be able to auction large volumes of user data to third parties or end users might sell their own daily data feeds to garner financial reward. Furthermore, this information could be processed using various data analytics techniques to develop entire psychological profile of an individual giving insight into the decisions likely to be made by the individual, thereby severely affecting privacy of a citizen. Similar situations might jeopardise businesses and make governments dysfunctional. Generally, industry would happily vouch for such measures as it would facilitate selective marketing of services and subsequent economic benefit, while impact on security and ethics of society is not their necessary concern (Michael, Michael, & Perakslis, 2015; Ridley-siebert, 2015).

Absence of a conscious effort to preserve ethics could lead to unintentional racism. For instance, online ads suggesting arrest are likely to appear with names related to blacks and neutral ads or no ads appear with names related to whites, regardless of whether an arrest record is associated with the name (Sweeney, 2013). A study involving an online rental marketplace suggested that non-black hosts charge 12% more than black hosts for similar facilities (Edelman & Luca, 2014). Similar discrimination has been reported in job applications with white names receiving 50 percent more call-backs for interviews for similar resumes (Bertrand & Mullainathan, 2003). According to a study, searching ‘unprofessional hairstyles for work’ in Google retrieved images mainly of black women whereas ‘professional’ type revealed pictures of white women, oftentimes having similar hairstyles differing only in hair type and wearer’s skin (“Do Google’s ‘unprofessional hair’ results show it is racist?,” 2016). Several other examples of racism in AI have been reported e.g. in Google’s photo app, Nikon’s camera, crime forecasting etc. (“Artificial Intelligence’s White Guy Problem,” 2016).

It is not far-fetched that algorithms behind video surveillance systems in Major European and American cities could be trained to exploit certain physical, linguistic or cultural traits to target specific ethnic groups, supposedly more likely to be linked to criminal or terrorist acts (Bianchini & Ávila, 2014). Similarly, a lending algorithm may refuse loan to an economically disadvantaged student by

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