Journal of Strategic Information Systems 24 (2015) 3–14

Contents lists available at ScienceDirect

Journal of Strategic Information Systems

journal homepage: www.elsevier.com/locate/jsis

Strategic opportunities (and challenges) of algorithmic decision-making: A call for action on the long-term societal effects of 'datification'

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ARTICLE INFO

Article history:
Accepted 6 February 2015
Available online 27 February 2015

Keywords:
Algorithmic decision-making
Digital traces
Sensors
Strategic
Social and ethical issues

ABSTRACT

Today, digital data are captured through a variety of devices that have the ability to monitor the minutiae of an individual's everyday life. These data are often processed by algorithms, which support (or drive) decisions (termed 'algorithmic decision-making' in this article). While the strategic value of these data (and subsequent analysis) for businesses is unquestionable, the implications for individuals and wider society are less clear. Therefore, in this Viewpoint article we aim to shed light on the tension between businesses – that increasingly profile customers and personalize products and services – and individuals, who, as McAfee and Brynjolfsson (2012, p. 5) suggest, are 'walking data generators' but are often unaware of how the data they produce are being used, and by whom and with what consequences. Issues associated with privacy, control and dependence arise, suggesting that social and ethical concerns related to the way business is strategically exploiting digitized technologies that increasingly support our everyday activities should be brought to the fore and thoughtfully discussed. In this article we aim to lay a foundation for this discussion in the IS community and beyond.

Introduction

The last decade has witnessed the widespread diffusion of digitized devices that have the ability to monitor the minutiae of our everyday lives (Hedman et al., 2013). Nolan (2012, p. 91) argues that 'Global IT has enabled information on most everything to flow most everywhere at stealth speed'. The data trail we leave is increasingly used by companies to manage employees and target and personalize products and services for clients and customers, based on developing algorithms that can make predictions about individuals by recognizing complex patterns in huge data sets compiled from multiple sources. In this article we consider some of the observed and potential consequences of this new type of data-driven, algorithmic decision-making, illustrating that while it can offer strategic opportunities for business and sometimes benefits for individuals, there are also costs, hence raising societal issues: as Galliers et al. (2012) indicate, there can be a difference between how *business* is benefiting and how *society* is benefiting – or otherwise.

The IS literature has already raised social and ethical concerns associated with IT (Smith, 2002; Smith and Hasnas, 1999), and in particular those concerns are often associated with privacy issues (e.g., see Belanger and Crossler, 2011; Chan et al., 2005; Coll, 2014; Greenaway and Chan, 2005). However, few IS studies have linked these concerns with the digitization of

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http://dx.doi.org/10.1016/j.jsis.2015.02.001
0963-8687/

our everyday life (exceptions include Abbas et al., 2014; Boyd and Crawford, 2014; Lyon, 2014; Slade and Prinsloo, 2013), and fewer still have discussed this phenomenon in relation to algorithmic decision-making (one exception being Schroeder and Cowls, 2014). Here, we focus on the consequences of 'algorithmic decision-making', which occurs when data are collected through digitized devices carried by individuals such as smartphones and technologies with inbuilt sensors – and subsequently processed by algorithms, which are then used to make (data-driven) decisions. That is, decisions are based on relationships identified in the data, and the decision maker often ignores why such relationships may be present (Mayer-Schonberger and Cukier, 2013). While these data-driven decisions made by businesses lead to personalized offerings to individuals, they also result in the narrowing of their choices (Newell and Marabelli, 2014).

Given the above, we argue that algorithmic decision-making has societal consequences that may not always be positive and, in this Viewpoint article, we aim to articulate such concerns. In so doing, we bring to the fore the issues related to algorithmic decision-making and highlight the interdisciplinary nature of this topic (Chen et al., 2012; Smith et al., 2011). As we have indicated, some work has been done to shed light on the social implications of the widespread diffusion of digital devices in the IS community, but also in other disciplines such as sociology – as in the work of Lyon (2001, 2003, 2014), Doyle et al. (2013), and Ball (2002, 2005) on impacts of monitoring and surveillance on society, and of Castells et al. (2009) and Campbell and Park (2008) on societal changes determined by the diffusion of digital devices. Here, we call for IS research that examines (and challenges) corporations (and governments) in terms of the strategic decisions that are being made based on data that we are now constantly providing them (see also MacCrory et al., 2014), whether we realize it or not. Next, we define some key concepts and set the boundaries of our analysis.

Big data, little data, and algorithmic decision-making

Data-driven or 'algorithmic' decision-making is based on collecting and analyzing large quantities of data that are then used to make strategic decisions. Algorithmic decision-making incorporates two main characteristics: firstly, decision-makers rely on information provided by algorithms that process huge amounts of data (often big data, as we will explain next); secondly, the reasons behind the 'suggestions' made by the algorithms are often ignored by decision-makers (Mayer-Schonberger and Cukier, 2013). We expand on both characteristics below.

Digitized technologies and data analytics

Data that originate from digitized devices are increasingly permeating our everyday lives. These digitized devices have the ability to keep track of and record what we do. As a result, somebody else may eventually be able to use the data thus produced – often with purposes different from those originally intended. Thus, we focus on 'digital traces' – all data provided by individuals (1) during 'IT-related' activities, captured from social networks, online shopping, blogs, but also ATM withdrawals, and other activities that will leave a 'trace' (Hedman et al. 2013; Wu and Brynjolfsson, 2009) and (2) that are captured through technologies that we use that have in-built sensors. These technologies include LBS (Location Based Technologies) that are IT artifacts equipped with GPS systems and so have the ability to collect a user's location such as a smartphone with GPS – see Abbas et al. (2014) and Michael and Michael (2011) for social implications – and other surveillance and monitoring devices – see the previously cited work of Lyon (2001, 2003, 2014) for privacy implications.

It is clear that the huge amount of digital trace data that are collected through the many digitized devices that we now use to support our daily activities fall into the 'big data' umbrella. The big data (analytics) concept is very similar to the more familiar (and less sexy) business intelligence that has been studied for the past decade or so (e.g., Negash, 2004; Power, 2002; Rouibah and Ould-ali, 2002; Thomsen, 2003). McAfee and Brynjolfsson (2012). Following Gartner's (2001) definition, it is the three Vs of big data[1] on which we focus: Volume (the amount of data determines value); Variety (data arise from different sources/databases and are cross-matched to find relationships), and Velocity (data are generated quickly). Big data encompasses much more than this individually generated data trail (see Chen et al., 2012 for a broad discussion of big data analytics) but here we focus just on this everyday digital trail that we each leave. That is, we focus on *those* big data that are generated by individuals during their everyday lives (and are captured as digital traces). In other words, we focus on data that arise as a consequence of each of us now being a 'walking data generator' (McAfee and Brynjolfsson, 2012, p. 5). This attention to the digitization of our everyday life allows us to narrow the focus of our inquiry and to expand on concerns regarding the use (and abuse) of one aspect of big data analytics that concerns algorithm-driven decision-making and associated personalization – to which we now turn.

Algorithmic decision-making

(Big) data captured through digitized devices are processed by algorithms aimed at predicting what a person will do, think and like on the basis of their current (or past) behaviors. These algorithms can predict particular outcomes, as with

[1] The definition of big data was updated by Gartner in 2012 as they now describe the concept as 'high volume, high velocity, and/or high variety information assets that require new forms of processing to enable enhanced decision making, insight discovery and process optimization (Gartner, 2012). Moreover, others have added 'new Vs' – e.g., veracity, variability, visualization, and value, viewing big data in terms of 5 or even 7 Vs. Here, where we stick with the original definition (Gartner, 2001) as this reflects the essence of big data for the purposes of this article.