Chapter 85
Managerial Controversies in Artificial Intelligence and Big Data Analytics

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ABSTRACT

This chapter discusses several fundamental and managerial controversies associated with artificial intelligence and big data analytics which will be of interest to quantitative professionals and practitioners in the fields of computing, e-commerce, e-business services, and e-government. The authors utilized the systems thinking technique within an action research framework. They used this approach because their ideology was pragmatic, the problem at hand, was complex and institutional (healthcare discipline), and they needed to understand the problems from both a practitioner and a nonhuman technology process viewpoint. They used the literature review along with practitioner interviews collected at a big data conference. Although they found many problems, they considered these to be already encompassed into the big data five V's (volume, velocity, variety, value, veracity). Interestingly, they uncovered three new insights about the hidden healthcare artificial intelligence and big data analytics risks; then they proposed solutions for each of these problems.

INTRODUCTION

Technological entrepreneur and UK-based venture capitalist Viktor Prokopenya (2018) pointed out that artificial intelligence applications like machine learning have many limitations especially that many tasks have too much data and are simply too complicated to program. Scholars already know about the major

challenges faced by big data analytics practitioners across all disciplines which are described as the five V's (Jovanovi et al., 2015, Terry, 2015) or sometimes more (Sun et al., 2016). The big data five V's are commonly phrased as high volume (Chen and Zhang, 2014), complex variety (Kessel et al., 2014), large velocity (Ekbia et al., 2015), strategic value (Gandomi and Haider, 2015), and more recently veracity (Strang and Sun, 2016). Value in big data can be viewed as a constraint because it can be challenging to derive a benefit from analytics that is worth the investment time and cost to accommodate the other factors. Big data veracity can refer to ethics, accuracy, validity, or truthfulness (Vajjhala et al., 2015) as well as social-cultural relevance (Vajjhala and Strang, 2017). In addition to the above characteristics, each discipline and industry has unique big data analytics issues.

In the healthcare discipline researchers have posited that privacy is one of the biggest problems associated with the big data paradigm (Thorpe and Gray, 2015, Hoffman and Podgurski, 2013, Kshetri, 2014, Filkins et al., 2016, Rothstein, 2015). Most countries have legislation to uphold the privacy of individuals, such as the *Health Insurance Portability and Accountability Act* in USA (Brown, 2008). However, we propose there are important hidden big data analytics issues in the healthcare industry that are not documented in the literature. In this study we review the literature and collect information from practitioners about tacit problems associated with healthcare big data analytics and then summarize the results in a visual model.

The big data paradigm is relatively new since it formally commenced in 2011 (Salleh and Janczewski, 2016, Burrows and Savage, 2014, Strang and Sun, 2017) so there is roughly half a decade of research at the time of writing. Most of the published big data research has been focused on technology-related keywords like data mining, cloud computing, machine learning, electronic data processing, algorithms and others (Strang and Sun, 2017). According to a recent meta-analysis of the big data literature only 2% of peer-reviewed publications examined privacy and security topics including healthcare during 2011-2016 that that decreased to 1% for the first three months of 2017 (Strang and Sun, 2017). Many researchers have called for more studies about big data privacy (van Loenen et al., 2016, Eastin et al., 2016, de Montjoye and Pentland, 2016, Salleh and Janczewski, 2016, Chen and Zhang, 2014), and particularly in healthcare (Jungwirth and Haluza, 2017, Filkins et al., 2016). This is strong evidence that more research about healthcare big data analytics is needed. This also implies there may be unseen risks that practitioners know exist in healthcare big data analytics. We attempt to articulate these obscure issues in healthcare big data analytics through a literature review and from discussions with other practitioners.

LITERATURE REVIEW

Overview of Big Data Literature

Chen and Zhang (2014) reviewed the literature several years ago and came to the conclusion that privacy was not adequately investigated within the big data body of knowledge. However, in addition to being dated, they did not perform a longitudinal structured review of the literature. Therefore we conducted a thorough review of the big data literature published during the last decade.

We start with a summary of the literature before we review the relevant healthcare data analytics papers. Using "big data" as the search term, we closely examined 13,029 manuscript titles, abstracts and keywords published in journals during 2011-2017 (only the first three months of 2017 were included). We used the title, abstract and keywords to a dominant theme for every article. We counted the frequencies of

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