


Public Security Sentiment Analysis on Social Web: A Conceptual Framework for the Analytical Process and a Research Agenda

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ABSTRACT

This article presents (1) the results of a literature review on social web mining and sentiment analysis on public security; (2) the idea of a framework for the analytical process involved in the literature review themes; and (3) a research agenda with a perspective for future studies, considering some elements of the analytical process. The literature review was based on searches of five databases: Scopus, IEEE Xplore, Web of Science, ScienceDirect, and Springer Link. Search strings were applied to retrieve literature material of four kinds, without defining an initial time milestone, to get the historical register of publications associated with the main thematic. After some filtering, primary and secondary findings were separated, enabling the identification of elements for the framework. Finally, the research agenda is presented, containing a set of three research artifacts related to the proposed framework.

KEYWORDS

Analytical Process, Framework, Literature Review, Public Security, Research Agenda, Sentiment Analysis, Social Web, Web Mining

INTRODUCTION

The great amount of information available through the social web signals to organizations an analytical perspective aligned with a social need to view human behavior to understand preferences, opinions, emotions, and feelings (Bjurstrom, 2015). The emergence of the concept of Big Data, related to an enormous amount of data in several formats and retrievable by various sources (Poletto, Carvalho, & Costa, 2017), only tends to reinforce this need. It also makes evident the tendency to combine artificial intelligence with data science (Sapountzi & Psannis, 2018).

While there are enormous amounts and varieties of data possible to retrieve and use—for instance, on decision-making (Tien, 2013)—the mining process is not trivial and requires a suitable technological toolbox for different purposes (Dobre & Xhafa, 2014).

In the organizational context, public services have many advantages to derive from both the massive amount of information and the analytical tools to ensure that stakeholders' expectations can

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be met within the appropriate time, and generating processes are satisfactorily attended (Charalabidis, Koussouris, & Ramfos, 2011).

The organizational management is the main beneficiary since the related technological resources can make new knowledge discoveries, combine them with those already existing, and disseminating the results to the organization to promote continuous process improvement (Caione, Guido, Martella, Paiano, & Pandurino, 2016; Handzic, 2011). Knowledge discovery may apply in different data-structuring contexts, but it is important to emphasize that unstructured data are common in Big Data, and in this case, specific tools are required for web mining, text mining, and natural language processing (NLP) (Carvalho & Costa, 2019; Usai, Pironti, Mital, & Aouina Mejri, 2018).

Organizational knowledge management, decision support systems, big data, and data science have all become more integrated, and organizations, in turn, make use of this integration to drive strategic change. The main link among these elements is the need for information technology in the organization, promoting suitable means for sharing information and knowledge, even as they enable decision-making aligned with operational needs to ensure efficient troubleshooting (Navarro, Ruiz, & Peña, 2017; Wang & Noe, 2010).

One of the most critical sectors of public services that may benefit from data analysis is public security. The use of data from different sources (including the social web) and the application of analytical tools could lead, for instance, to the concept of the “smart city,” defined by Manjunatha & Annappa (2018) as a milestone of urban planning and development that integrates information technology with people’s routines, promoting sustainability and quality of life. Public security benefits from this integration insofar as it can make use of data such as past criminal registers, historical registered cases, and real-time information, enabling forecasting of events that threaten the public welfare.

Social web mining and sentiment analysis are areas from text mining dedicated to retrieve users-published records (social web mining) and to analyze these records to classify them according to polarity (sentiment analysis) expressed by the user (Kamel et al., 2010; He et al., 2015). Both have interesting toolkits that grant analytical power to be explored by areas such as public security to assess, for example, the level of satisfaction of people in social networks regarding the actions of policing, investigations, tracking of criminal activity, application, and maintenance of security policies in general (Carvalho & Costa, 2019). In this sense, related tools and their applications in public security deserve to be evidenced through a literature review identifying what is being applied and for what purposes, in other words, demonstrating what types of problems they are solving.

This article aims to: (i) present the results of a literature review about social web mining and sentiment analysis in public security; (ii) present the concept of a framework for the analytical process involved in the literature thematic; and (iii) define an agenda to support future research based on the analytical process. The emphasis is on the public-security area as a critical sector with absolute social repercussions, since it directly deals with the protection of people acting as social agents themselves, the main information providers, using several kinds of platforms (notably the social web).

The rest of this article is organized as follows: Section 2 presents the research procedure. Section 3 contains a summary of the literature findings. Section 4 contains the literature review. Section 5 proposes the framework. Section 6 establishes the research agenda. Finally, Section 7 contains the conclusions.

RESEARCH PROCEDURE

The reported research has a descriptive character, involving social web mining and sentiment analysis related to social impressions of public security. Its first part was a literature search to clarify which elements are necessary to formulate a framework for the analytical process involved.

Social web mining exists to extract people’s registers on several social web sources as weblogs, forums, personal websites, news sites, and social networks, revealing a field of computational

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