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Enhanced Strategic Surveillance And Competitive Intelligence Systems Through Advanced Big Data Capabilities

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Summary

A systematic review was carried out on the production and publication of research papers related to the study of BigData and Surveillance Systems with the effectiveness of Open Government in Ibero-American countries, under the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) approach. The purpose of the analysis proposed in this document was to know the main characteristics of the publications registered in the Scopus and Wos databases during the study and their scope in the study of the proposed variables, achieving the identification of 33 publications in total. Thanks to this first identification, it was possible to refine the results through the keywords entered in the search button of both platforms, which were BIGDATA and SURVEILLANCE SYSTEMS, reaching a total of 14 documents, excluding duplicates and those that did not meet the analysis criteria. The identified scientific publications were analyzed in the hope of knowing the impact of BigData techniques for the processing of large amounts of information on surveillance systems. The analysis allowed us to identify the position of different authors regarding the proposed topic, as well as the relationship between both variables in the execution of different research projects.

Key words: *BIGDATA, SURVEILLANCE SYSTEMS.*

1. Introduction

The globalization of markets and the development of the digital network have transformed the way in which organizations attribute progress in information, thanks to these technological advances and the vast information of [1]data have been benefits for the development of new strategies, since they can be more coherent, accurate and different. According to the paradigms in business, the incorporation of the use of business intelligence, technological surveillance and competitive intelligence is sought, with these elements it is sought to improve decision-making in a strategic and effective way, which looks after the interests of entrepreneurs.(IN. Pinto-López, 2018)

The association referring to competitive professional intelligence defines it as an algorithmic and systematic process that, hand in hand with the information provided, can positively impact

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commercial, business and production operations. The information provided by this competitive intelligence is necessary to execute decision-making in an essential way, since the situation of the markets and their volatility must be analyzed. On the other hand, business intelligence is based on the autocorrelation of new technologies, computer tools and with these resources redirect this knowledge towards the development of commercial strategies.(Fernández-Pérez, 2015)

Strategic surveillance and competitive intelligence systems are two fundamental sources in charge of detecting future threats and taking advantage of future opportunities, these benefits allow the execution of strategic plans based on the commercial or business needs of each organization. These characteristics would indicate how successful the company can be in both national and international markets, since certain items such as customer portfolio, suppliers, products and its competition must be considered. Therefore, the objective of this research is to know the importance of these sources and how they interact in a balanced way in order to address the different strategic foci for a greater increase in the competitive business environment. This is in order to be able to establish the advantages of the intelligences currently mentioned and which one achieves greater adaptability in the business environment.

The concept of Big Data has been in the spotlight over the past few decades, thanks to its myriad features and benefits that it can bestow on businesses in business sectors. This innovative project of storing and encoding large amounts of information has allowed companies and government entities to exploit new ways of creating and promoting businesses, to have an active participation in the markets and in turn to improve commercial and marketing strategies. In such a way that as the new capabilities offered by the use of Big Data for the formation of strategies and use perfect competition are studied, better management of customers would be obtained, business and marketing strategies would be improved, decisions in the markets would be improved thanks to the supply of information, for this companies must forge and begin to cultivate the use of ICT to exploit their characteristics in pursuit of business needs and intentions. (Hsinchun Chen, 2012)

2. General Objective

To analyze, from a bibliographic perspective, the production of high-impact research papers indexed in the Wos and Scopus databases, on the variables BigData and Surveillance Systems, based on the PRISMA methodology.

3. Methodology

The present research is qualitative, according to Hernández, et al., qualitative approaches correspond to the investigations that carry out the procedure of obtaining information to review and interpret the results obtained in these studies; To do this, it searched for information in the Scopus and Wos databases using the words BIGDATA, SURVEILLANCE SYSTEMS. (2015)

3.1 Research design

The research design proposed for the present research was the Systematic Review that involves a set of guidelines to carry out the analysis of the collected data, which are framed in a process that began with the coding to the visualization of theories On the other hand, it is stated that the text corresponds to a descriptive narrative since it is intended to find out how the levels of the variable affect; and systematic, because after reviewing the academic material obtained from scientific journals, theories on knowledge management were analyzed and interpreted. (Strauss & Corbin, 2016) (Hernandez, Baptista, & Fernandez, 2015)

The results of this search are processed as shown in Figure 1, through which the PRISMA technique for the identification of documentary analysis material is expressed. It was taken into account that the publication was published during the period between 2017 and 2023 limited to scientific production originating in institutions in Ibero-American countries and open to any area of knowledge, as well as to any type of publication, namely: Journal Articles, Reviews, Book Chapters, Book, among others.

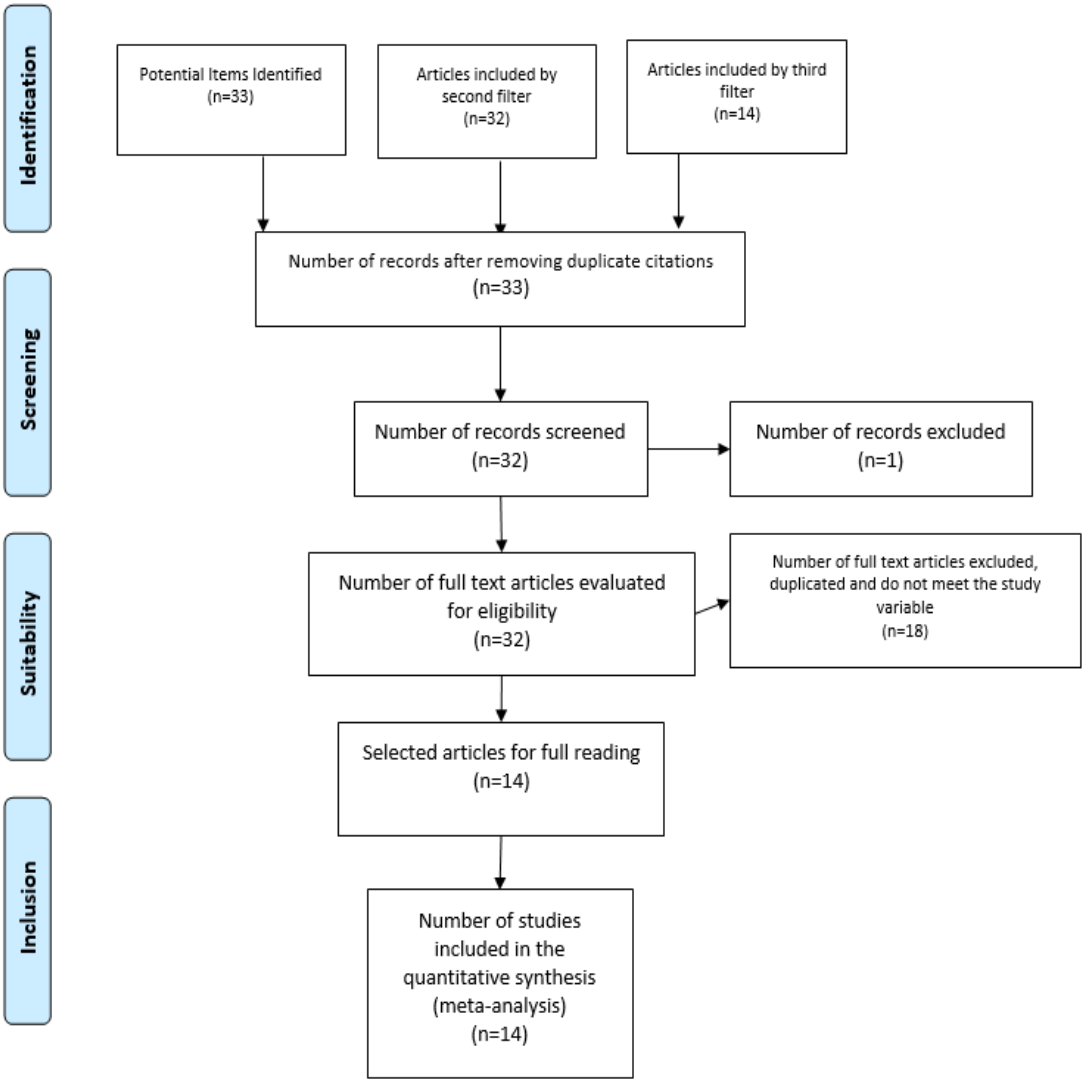

Figure 1. Flowchart of a systematic review carried out under the PRISMA technique (Moher, Liberati, Tetzlaff, Altman, & Group, 2009)
Source: Authors' own creation; Based on the proposal of the Prisma Group (Moher, Liberati, Tetzlaff, Altman, & Group, 2009)

4. Results

Table 1 shows the results after applying the search filters related to the methodology proposed for this research, after recognizing the relevance of each of the referenced works.

No.	RESEARCH TITLE	AUTHOR/YEAR	COUNTRY	TYPE OF STUDY	INDEXING
1	Bigdata enabled realtime crowd surveillance using artificial intelligence and deep learning	Rajendran, L., & Shankaran, R. S. (2021, January)	INDIA	QUALITATIVE	SCOPUS
2	ESPY Carting Systems:The Real-Time Tracking Mechanism Architecture	Sugathan, D., Revanth, M., Kumar, V. P., Desai, S., & Keshava, L. (2021, June).	INDIA	QUALITATIVE	SCOPUS
3	Country-specific Ensemble Learning: A Deep Learning Approach for Road Damage Detection	Bhavsar, M., Alfarrarjeh, A., Baranwal, U., & Kim, S. H. (2022, December)	INDIA, JORDAN, UNITED STATES	QUALITATIVE	SCOPUS
4	Reliable Surveillance Tracking System based on Software Defined Internet of Things	Isravel, D. P., Silas, S., & Rajsingh, E. B. (2020)	INDIA	QUALITATIVE	SCOPUS
5	Short term prediction of statistics for bigdata in video surveillance	Intawong, K., Puritat, K., & Jarusawat, P. (2018, November).	THAILAND	QUANTITATIVE	SCOPUS
6	A Deep Learning Approach for Road Damage Detection from	Alfarrarjeh, A., Trivedi, D., Kim, S. H., & Shahabi, C. (2018, December).	UNITED STATES	QUALITATIVE	SCOPUS

	Smartphone Images				
7	Investigation on Challenges of Big Data Analytics in UAV Surveillance	Vanitha, N., Padmavathi, G., Nivedha, P., & Bhuvana, K. (2022).	INDIA	QUALITATIVE	SCOPUS
8	Bio-inspired system architecture for energy efficient, BIGDATA computing with application to wide area motion imagery	Andreou, A. G., Figliolia, T., Sanni, K., Murray, T. S., Tognetti, G., Mendat, D. R., ... & Doxas, I. (2016, February).	UNITED STATES	QUANTITATIVE/QUALITATIVE	SCOPUS
9	Vision-based garbage dumping action detection for real-world surveillance platform	Yun, K., Kwon, Y., Oh, S., Moon, J., & Park, J. (2019).	KOREA	QUALITATIVE	WOS
10	A Self-Supervised Sampler for Efficient Action Recognition: Real-World Applications in Surveillance Systems	Seo, M., Cho, D., Lee, S., Park, J., Kim, D., Lee, J., ... & Choi, D. G. (2021).	KOREA	QUALITATIVE	WOS

11	Camera planning for area surveillance : A new method for coverage inference and optimization using Location-based Service data	Han, Z., Li, S., Cui, C., Song, H., Kong, Y., & Qin, F. (2019).	CHINA	QUALITATIVE	WOS
12	The Fever Coach Mobile App for Participatory Influenza Surveillance in Children: Usability Study	Kim, M., Yune, S., Chang, S., Jung, Y., Sa, S. O., & Han, H. W. (2019).	KOREA	QUALITATIVE	WOS
13	Confidence-Based Data Association and Discriminative Deep Appearance Learning for Robust Online Multi-Object Tracking	Bae, S. H., & Yoon, K. J. (2017).	KOREA	QUANTITATIVE	WOS
14	A Thermal Infrared Pedestrian-Detection Method for Edge Computing Devices	You, S., Ji, Y., Liu, S., Mei, C., Yao, X., & Feng, Y. (2022)	CHINA	QUALITATIVE	WOS

Table 1. List of articles analysed
Source: Authors' own creation

4.1 Co-occurrence of words

Figure 2 shows the relationship between the keywords used to search for the study material for the systematic analysis proposed for this research.

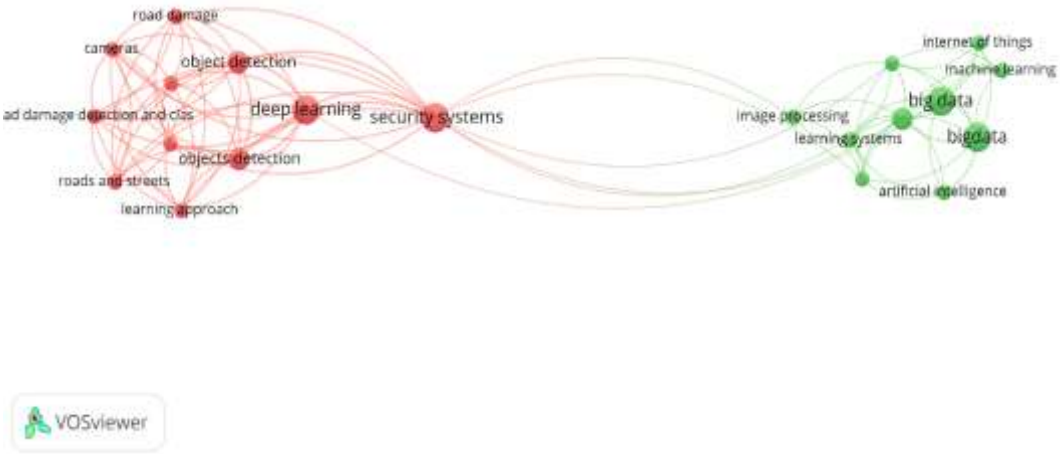

Figure 2. Co-occurrence of keywords.
Source: Authors' own creation

Figure 2 shows the most frequently used keywords and their correlation with research on topics associated with problems in the use of BigData and Surveillance Systems. In this way, it is possible to affirm that Security Systems constitutes the central axis of the research identified for the analysis developed in this article, directly related to research in Artificial Intelligence, Big Data, Objective Management, Learning Systems, Decision Making, Virtual Environments, Deep Learning, among others, which allow confirming the relevance of the data analyzed in compliance with the proposed objective. Big Data capabilities enable the creation of advanced visualizations to make complex data easier to understand. Interactive dashboards and graphical representations can help analysts identify patterns and make informed decisions. Big Data capabilities can significantly empower strategic surveillance and competitive intelligence systems, providing deeper analytics, faster processing, and a more complete view of relevant information. However, it is essential to also address the ethical and privacy challenges associated with handling large amounts of data.

4.2 Discussion

The purpose of this article was to analyze, from a systematic perspective, the contribution of the authors, through their publications, to the study of the usability problems of BigData and Surveillance Systems, carried out in high-impact journals indexed in Scopus and Wos databases during the period 2017-2021 by authors affiliated with Latin American institutions. In this way, it is possible to affirm that the publications indicated in the body of this document have carried out research at different levels whose findings contribute to the generation of new knowledge regarding the variables proposed for this study, which is how great contributions are identified, as contemplated in the article entitled "Chapter 1: Reliable surveillance tracking

system based on software-defined Internet of Things", this study aims at the creation of the digital society, which has allowed people to have access to information from anywhere and at any time through the Internet. The advancement of technologies such as the Internet of Things, cloud computing, and Big Data supports a variety of small and large-scale applications. The surveillance tracking system is one such application, where multiple surveillance devices become part of the network to observe and detect unusual events in a particular area. Despite its widespread adoption, the modern surveillance network needs a new paradigm technology to improve its performance. Software-defined networking is a new technology that brings agility, programmability, and flexibility to network operation. In this article, the importance, classification, applications, and challenges of the surveillance tracking system are presented. In an effort to improve the current surveillance tracking system, the SDN-assisted IoT solution is provided and a novel SDN-based traffic engineering framework is proposed to improve performance. Therefore, it is absolutely necessary to know first-hand the real needs of them in order to line strategies that pursue success within their training. In support of the above idea, the contribution made by the development of the article entitled "Biologically Inspired System Architecture for Energy-Efficient BIGDATA Computing with Application to Wide-Area Moving Images" is evidenced In this article, we analyze a brain-inspired system architecture for high-speed, real-time BIGDATA processing that originates from large-format mosaic image arrays used in surveillance ubiquitous wide-area moving images. High performance and high throughput are achieved by approximate computing and fixed-point arithmetic in a variable-precision architecture (6-bit to 18-bit). The architecture implements a variety of classes of processing algorithms ranging from convolutional networks (Con-vNets) to linear and nonlinear morphological processing, probabilistic inference using exact and approximate Bayesian methods, and ConvNet-based classification. The processing pipeline is fully implemented using event-driven neuromorphic and stochastic computational primitives. The system is capable of real-time processing raw data from 160 × 120 pixels running on a reconfigurable computing platform (5 Xilinx Kintex-7 FPGAs). However, like any methodology, it is not exempt from presenting problems through its use, as shown in the article entitled "The thermal imaging pedestrian detection system has excellent performance in different lighting scenarios, but there are problems related to weak texture, object occlusion and small objects. Meanwhile, large, high-performance models have higher latency on edge devices with limited computing power. To solve the above problems, in this article we propose a pedestrian detection method with real-time thermal imaging for cutting-edge computing devices. First, we use multi-scale tiled data augmentation to improve the diversity and texture of objects, alleviating the impact of complex environments. Then, the parameterless attention mechanism is introduced into the network to improve functions, which hardly increases the computing cost of the network.(Deva Priya Isravel, 2020)(Andreou, y otros, 2016) (You, 2020)

5. Conclusions

This review article concludes by highlighting the importance of knowing the updated status of the bibliography published in databases such as Scopus or Wos, referring to the study of the usability problems of BigData and Surveillance Systems during the period between 2017 and 2021, and how the implementation of digital tools within the processes of competitiveness and surveillance strategies has positively impacted, However, it has also been important to highlight those problems within their use, identified by the authors cited here, as recorded in the body of this article. The results obtained from the bibliometric analysis demonstrate the importance of research and the use of Big Data in companies, since they improve competitive intelligence and business intelligence by running computer systems. One of the benefits of these new capabilities is the way in which large amounts of raw data are decoded and analyzed, allowing companies to have competitive advantages in a sustainable way, allowing greater

success. However, with the increase of competitors on a global scale and the effects of globalization, which has brought scenarios without physical borders thanks to the characteristics offered by information systems, it is important to give thanks to the new surveillance and intelligence systems, since they break these inequality gaps allowing all the elements to be improved to generate greater competitiveness and improve the levels of adaptability. This is in order to keep them at the forefront of the markets. The consequences of competition and intelligence hand in hand with the innovation factor within companies present positive advances and have proven to be a fundamental tool for decision-making and future development of business strategies. However, despite the benefits that these business practices can execute, it is important to mention that competitive intelligence is still in full development in the business world, since some companies have a series of limitations such as: lack of infrastructures, personnel not trained with the computer language which limits facing the constant challenges, Despite this, innovation is open to be a determinant of change, so that companies can adapt to circumstances, whether commercial or business, allowing them to position themselves in large national and international markets. In addition, companies with these drawbacks must promote an innovation-focused environment that allows them to constantly improve their capabilities, either internally or externally, that not only improves the tangible mechanisms of the companies, but also contributes positively to organizational models in order to take advantage of the capabilities of the company. To conclude, it is important that the main branches of companies are linked to improve the distribution of their resources with what allows, to automatically plan, search and analyze the use of information to maximize the competitive advantages of companies. For the success of these factors, it is important to have a collaborative space that allows them to be dynamic in open innovation and improve the key tools in the processes.(Varela, 2005)

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