Artificial intelligence (AI) applied to informative documentation and journalistic sports writing. The case of BeSoccer

Inteligencia artificial (IA) aplicada a la documentación informativa y redacción periodística deportiva. El caso de BeSoccer

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Abstract:

In fields such as journalism, the digitalization process runs in parallel to that of robotization tasks, which facilitate professional work and imply the loss of routine jobs at the same time, but also the need to train in emerging disciplines that are progressively entering media newsrooms. The automation of documentation and news production is based on Artificial Intelligence (AI) and Big Data (BG). The main objective of this article is to search for theoretical references on AI applied to journalism as well as to learn about the case of BeSoccer through a case study and in-depth interviews with its CEO and marketing manager. The results allow us to discover new journalism production forms closely linked to BD and IA.

Keywords:

Bots, Content development, Artificial intelligence (AI), Data journalism, Sports journalism.

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Resumen:

En campos como el periodismo, el proceso de digitalización corre en paralelo al de la robotización de tareas que, al tiempo que facilitan la labor profesional, implican la pérdida de puestos de trabajo convencional, pero también la necesidad de formarse en disciplinas emergentes que progresivamente van adentrándose en las redacciones de los medios de comunicación. La automatización de las labores de documentación y elaboración de noticias viene dada a partir de la inteligencia artificial (IA) y el big data (BG). Este artículo tiene como principal objetivo buscar referentes teóricos sobre la IA aplicada al periodismo, así como conocer el caso de BeSoccer a través del estudio del caso y las entrevistas en profundidad a su CEO y responsable de marketing. Los resultados permiten conocer nuevas formas de producción de contenidos de periodismo aplicado al ámbito deportivo, así como el perfil del nuevo profesional del periodismo vinculado estrechamente al BD y la IA.

Palabras clave:

Bots, Elaboración de contenidos, Inteligencia artificial (IA), Periodismo de datos, Periodismo deportivo.

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1. Introduction

In 1970 Toffler predicted some of the implications of technological changes. The terminology from both academic and professional points of view was diverse in the field of journalistic information; they included information overload (Toffler, 1970; Goyanes, 2014; Benaissa, 2017), information intoxication (Cornella, 1999) or informational intoxication (Figueroa, 2006). "Artificial intelligence" (AI) is a new concept that has emerged over time due to the (r)evolution of technologies. Despite AI being relatively recent, as it only dates back to the 1950s, it has progressively acquired different meanings. Nevertheless, there is a consensus on the theory of AI as well as the computer systems that are capable of performing tasks that usually implement human intelligence.

Since many of the AI tools that journalists use come from diverse disciplines (engineering, computer science, and statistics, among others), the tools are usually regarded as an opportunity for the future while also having a purpose; to know how to use and implement them in everyday professional life**.**

Both documentary makers and journalists are increasingly using AI. It is also gradually being incorporated into research agendas and teaching curricula both by teachers and in training centers. For this reason, this article aims to explore "the algorithmic turn" (Napoli, 2014), which is being adopted for news from artificial intelligence, as is the case of BeSoccer.

1.1. Investigation of AI applied to journalism.

It is possible to increase and speed up automatically generated news from structured data, artificial intelligence, and the internet in the era of infoxification, big data, algorithms, and the rest of the new current and future technologies. Bots, which are also known as software robots, are gradually being incorporated into journalism. Since contents generated by automatic and automated software are being implemented, we are prompted to rethink and reformulate the future of the profession of journalism,

Despite the many advantages (speed, economy, and reduction in human errors), this reality should be approached through the balance between the business perspective (profitability) and the human perspective (social and perceptive). In this sense, it is pertinent to know who the primary reference researchers are in regards to AI applied to journalism.

Table 1: Principal investigators of artificial intelligence (AI) applied to journalism.

Authors	Methodology used
Matsumoto, Nakayama, Harada & Kuniyoshi (2007)	Experiment.
Clerwall (2014)	Experiment and survey.
Karlsen & Stavelin (2014)	In-depth interview.
Dörr (2016)	Semi-structured interviews.
Sánchez & Sánchez (2017)	Documentary analysis, direct observation, and interviews.
Lindén (2017)	Case studies.
Salazar (2018)	Case studies and interviews.
Túñez, Toural & Cacheiro (2018)	Survey.

Source: Author-created

One of the first approaches to the phenomenon of the present study was made by Glahn (1970), who investigated the area of programming in which weather forecasts are created for information purposes. Shortly thereafter, Lee & Kim (1998) analyzed the on-demand news service system that gathers daily information from different sources through a robot that provides news oriented towards its users according to their preferences and interests. Thus, segmented news began to be generated and disseminated to specific audiences.

Van-Dalen (2012) set out to investigate audiences' reactions to sports news. In this sense, his contributions helped journalists to identify the areas in which they have to acquire new skills, such as analytical skills, personality, creativity, and the ability to write linguistically complex sentences. The study concluded that journalists view robot journalism as an opportunity to humanize journalism, while it noted that the greater the automation, the greater the time investment in investigating the facts. Therefore, they did not find a temporary saving.

Graefe's contributions (2016) allowed the state of automated journalism to advance. Thanks to the productivity study of the use of algorithms for automatically creating news from semi-structured data, he was able to find how this also affects its speed, economic profitability, and its potential to reduce human error significantly.

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In contrast, Ford (2016) investigated how the robotization of society has resulted in machines rather than human beings gradually performing different professions, implying that people increasingly tend to be substituted and replaced by robots and intelligent software.

Cevera (2017) studied the effects of AI, big data, and the internet on journalism through robots or bots. Like Ford (2016), he observed an evolution, which is divided between those who decide to adapt to the changes and those who choose to work in the profession traditionally.

Based on the polysemy of the concept of "artificial intelligence" Hansen, Roca-Sales, Keegan & King (2017) give an account of the forum that took place in 2017 by the *Tow Centre for Digital Journalism* and the *Brown Institute for Media Innovation*, in which questions relevant to the present and future of journalism were reflected on**.**

On the other hand, Lindén (2017) and Salazar (2018) use the case study(s) to approach artificial journalistic intelligence, just as Karlsen & Stavelin do in their academic paper (2014) due to the insufficient scientific literature in this field of study.

On the one hand, Karlsen & Stavelin (2014), conduct in-depth expert interviews in the six major Norweigan newsrooms as a comparative case study. They compare traditional journalism to computational journalism and reveal that computational or software journalism skills and tools vary from those used in conventional journalism, although the values and objectives are similar. They also find little evidence to be able to affirm that computer journalism is more effective or frees information professionals from specific technical aspects of their work.

On the other hand, Lindén (2017) identifies that automated news is more effective and satisfactory for workers because it allows them to steer away from routine tasks that could generate human errors. Nevertheless, it brings about consequent job losses while creating new job opportunities in AI linked to **c**omputational thinking.

Salazar (2018) uses case studies of journalistic initiatives but combines them with expert interviews to identify the advantages and disadvantages from both a professional and ethical standpoint. In this sense, he determines a reality with a double dimension in this new form of journalism: new opportunities for the future and collaboration between man and machine that calls for an occupational redefinition.

Another technique used to approach journalistic AI is through experiments. In this line Matsumoto, Nakayama, Harada & Kuniyoshi (2007) describe the process and system of the journalistic robot: "(1) autonomous exploration (2) news recording and (3)generating articles" through labels, which enables images with words to be described, thus making a notable contribution to "artificial journalism".

Clerwall (2014) not only uses the experiment but also a survey of participants who access different news items written by both journalists and software. The questions revolve around variables such as the perception of quality, credibility, and objectivity of the news items which subjects have seen. It aims to analyze how the audience perceives the content generated by software as opposed to the content produced by journalists. In this sense, he concludes that software-generated content is associated with description and boredom, even though they are considered to be objective.

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Dörr (2016) conducts thirteen semi-structured interviews with natural language (NLG) service providers, which are based on structured data. His objective is to study NLG applied to journalism and thus concludes that NLG in journalism has begun to develop and expand considerably.

From a methodological point of view, the most relevant contributions are Sánchez and Sánchez's (2017) and Túñez's, Toural's and Cacheiro's (2018). On the one hand, Sánchez and Sánchez (2017) use documentary analysis, direct observation, and interviews to delve into the study from Polibot on audiences' perspectives. This is how they study the bots with conversational applications such as Messenger or Telegram, identifying that they are perceived in a positive light based on the quality of the information and the emotional connection to it. Finally, Túñez, Toural, and Cacheiro (2018) survey professional bodies, associations, and trade unions whose aim is to create a world reference map which does not only include media and agencies but also companies using news automation. The study also provides an insight into the professional perception of the phenomenon in Spain, while at the same time highlights the lack of knowledge about the influence that AI has on the profession of journalism.

Target audiences are undoubtedly one of the keys to the robotized, computerized, and computerized machinery. For that reason, we must not lose sight of the audience and the investigative process in this phenomenon. Therefore, it is also essential to analyze and be attentive to potential changes generated in audiences just as Napoli did (2012). An alternative is to adopt Pineda-de-Alcázar's (2018) approach, who investigated the relationship between AI and human being's communication. Thus, from Pineda-de-Alcázar's point of view, AI research needs to be complemented with social studies linked to ethics, semiotics, ecology and human behavioral sciences. From the research team's perspective, the audience's perception must not be the only one to be taken into account, but also the views of professionals of rigorous and quality journalistic information. Salaverría (2017) indicates that new forms of automated content production are emerging, which require modifications to the ways the information is produced and disseminated.

2. Methodology

Like Karlsen & Stavelin (2014), Lindén (2017), and Salazar (2018), this research uses a dual methodology. On the one hand, it uses a case study of the quantitative analysis of BeSoccer data and its comparison with other organizations in the sector; on the other hand, it uses qualitative interviews that were carried out with the organization's founder and CEO and BeSoccer's director of marketing and business development. According to Monge (2010), by using case studies we can obtain significant results and information that can not be found through quantitative methods, making it extremely valuable for decision making in companies. In any case, it is necessary to differentiate the concept of case studies as a whole from the type of case study at hand, which is for academic research. According to Yin (1994), it is clear that opinions from case studies are not statistically generalizable, nor do they represent a sample of the population; instead, they are a theoretical proposal in which researchers support the broadening or generalization of theories. As a research tool, the aim is to understand how they interact and what the characteristics of a system are to be able to apply generic conclusions, as Hartley points out (1994). In short, by using case studies we can try to find correlations from a single case and apply it to others in a generalized way.

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Interviews use a qualitative technique that is particularly common in the social sciences. Oxman (1998) describes this tool as a verbal interaction (written or oral) with questions and answers that are oriented towards a fixed topic and have some specific objectives. In this case, the focused interview is one of the two types of qualitative interviews- the other one is the in-depth interview- which has a particular application when it comes to interviews that have a predetermined interest and in which, according to Sierra (1998) interviewer and interviewee must know each other beforehand.

For Merton and Kendall in Flick (2014), the main characteristic of focused interviews is exposure to a specific situation. The interview must evoke cognitive and emotional responses in the interviewee. Valles (2002) points out that the interview should be developed based on four pillars: the interview should not be guided, instead the interviewer should try to make the answers spontaneous; these answers should be specific, not vague or blurred; the interview should explore the interviewee's emotions, and finally, the interview should be profound and take place in a relevant personal context. Valles (2002) also emphasizes the importance of the interviewee, insofar as he/she must have professional experience in the field referred to in the research.

Thus, the interview for this research has three sections: one of three introductory presentation questions, seven other questions related to journalism and content writing, big data and artificial intelligence, and finally, two questions for reflection.

Table 2: Structure of the interview

Survey structure
Introductory questions
What is your role in the organization?
Do you use big data (BD) or artificial intelligence (AI) daily?
What is your personal opinion of the relationship between AI and BD with journalism?
Development questions related to journalism
What role do you think the journalism professional has today regarding content writing?
what role do you think BD and IA have today regarding digital content writing?
What do you think will be the journalism professional's future role? And the role of BD and AI in relation to journalism?
What applications do BD and AI have for content writing (besides the BeSoccer case)?
Describe your organization's experience with AI and BD.
Is there enough technology for AI to replace physical news writers?
What influence can news writing have on sports journalism without human journalists' participation?
Final reflections
In your opinion, what ethical problems can arise from the use of AI and BD in journalism?
What is, in your opinion, the perfect balance between AI, BD, and journalism?

Source: Author-created

Non-probability sampling has been applied to the sample to correspond to the needs of the research. It is what Wimmer and Dominick (1996) define as strategic sampling, which centers on the research team's criteria and their knowledge of the research topic. It is a type of selection widely used in small sample research; it helps to bolster the information interviewees provide due to their strategic situation in the research field of knowledge.

The people interviewed for this case study are listed below, as well as their role within the company studied:

– Manuel Agustín Heredia: CEO and founder of BeSoccer.
– Daniel Guerrero: Marketing and business development director of BeSoccer.

Finally, it should be noted that the reasons that led the research team to use BeSoccer as a case study are that Heredia's digital project applies football results and is the most influential in Spanish. Moreover, football is the most consumed sport in Spain as a spectacle, according to the Ministry of Education Culture and Sport (known as MECD in Spanish) (MECD, 2015, p. 14). According to the data provided on its website www.es.besoccer.com/api, it has 175.2 sessions per user, and 98.3% of users are active, making it the market leader according to Ogury's study, which was provided by the organization. The growth of BeSoccer has transformed it into the fastest-growing application on the international scene, reaching 10 million downloads on "Google Play," and making it the first Spanish mobile sports application to do so, according to BeSoccer's corporate information.

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3. Results

The data gathered shows that BeSoccer is the online community with the highest number of active users compared to the competition. Although BeSoccer is not the application with the most users (BeSoccer has 0.9% market share compared to 1.1% for OneFootball) according to the data provided by the company, its users are active at a rate of 98.3%, which is the highest figure out of all the 11 main football applications worldwide, which participated in Ogury's analysis. The second application with the highest number of active users is 365Scores, with 85.2%, followed by OneFootball with 79.9%. BeSoccer sets itself apart from its competitors in the number of sessions per user: 175.2 sessions per user versus 77.3 for MisMarcadores or 65.4 for 365Scores, which are the applications with the second and third highest market share.

The organization's CEO, Manuel Heredia, emphasizes the importance of the journalistic profession in an uncertain future, "the journalism professional today has a fundamental role, although some of that importance will be lost in the future. The use of technological tools such as artificial intelligence or big data will mean that their tasks are more focused on professional supervision and less on writing contents"**.**

Editors are an essential figure in newsroom operations, who find out all the news related to the topics of interest instantaneously thanks to a management system of feeds. These feeds point to automatic writing in the future, "the main application is text mining, which allows texts to be analyzed automatically. In addition to this, another application that will be very important is automatic writing, which will probably not evolve so that it is fully automatic, but we will indeed witness quite realistic semi-automatic writing in the next five years".

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The editor is an analyst who knows what news is more important, which depends on the interaction and visits that it receives on social media thanks to these feeds. Heredia specifically reflects on sports journalism, stating that "there is a lot of journalistic content that can be resolved with technologies such as data visualization, that is, through the numerical analysis of different statistics that are used to write pieces that may appear to be written by a human. Many of the journalistic contents contain critical factual data, which can be analyzed by a machine", that is why "the influence of big data and artificial intelligence may be more important in sports journalism, which is based on data more than other types of journalism such as political or social journalism."

Daniel Guerrero, the company's director of marketing and business development, defines the relationship between artificial intelligence and big data in regards to journalism as "the relationship that a parent has with their child: they know what is going to happen to him/her, even if they do not want to, knowing that he/she will have a greater capacity in the future than with current resources and that he/she will be infinitely attracted, even if at times they think that they are not perfect and that it could harm him/her in some way".

BeSoccer currently works with 40 journalist editors in Portuguese, Italian, English, French, and Spanish, averaging 700 news items a day and a total of 250,000 news items a year.

The organization chart is divided into five rooms:

- Development, with 21 employees, mainly developers, and engineers.
- Editorial, with 41 employees, all journalists, 25 in Spanish and 16 in French, English, Portuguese, and Italian.
- Data, with 20 data managers and analysts.
- Marketing, with 10 employees
- R &D, with 9 employees, four of them are big data experts.

With this employment data, when asked about the possible ethical problems resulting from the use of artificial intelligence and big data in journalism, Heredia points out that "there can be job destruction at first due to the fact that these technologies would have much lower production costs. Therefore, if there were ethical implications, they would be related to the modification of the structure of employment, not to the performance of tasks". Guerrero points out the worker's responsibility, "ethically, the problem can result in the professional being exempted from responsibilities before third parties, making excuses that the technology does their job leaving them with nothing to do."

The internal organization of data is one of the most important elements, which is why there are 15 people in charge of the data department, with over 560 hours of work per week; five specialized workers in football in Latin America; 10 employees who take the games live every weekend, in 6000 matches per day. Also, the organization itself has internal data auditing tools.

Its databases handle 35000 leagues worldwide, more than 2000 competitions with over half a million teams, over one million players, and more than nine million stored matches. Managing this data is unfathomable for humans, which is why, Heredia points out that the future of professional journalism in contact with big data and artificial intelligence will be "firstly, content supervising and analyzing results. Content writing will have much less importance because these technological

tools will speed up the process of writing content. In the future, we will encounter a role that is a little less decisive when it comes to developing content".

Regarding the data sources, they mainly come from external feeds for the list of injured footballers and typology of injuries, as well as for the weather forecasts for the matches at elite level competitions. Another feed BeSoccer uses to store data is public data: who a player's agent is, what brands his boots are or what his sponsor is. In this sense, Guerrero and Heredia point out that big data and artificial intelligence related to journalism have positive elements, "both technologies combine very well with journalism" in terms of data management and easy access to well-classified sources.

In June 2019, BeSoccer had a significant community on social networks. In addition to 2,600,000 registered users, it has amassed over 2.5 million Facebook fans, more than 100,000 on Instagram, and 17,000 on Twitter.

Regarding the general data, in 2018, they closed the year with over 124 million users, more than 20 billion page views, over 270 million impressions in one day. Its turnover was 3.8million euros in the same year. Part of this success, as Guerrero affirms, is "thanks to the use of big data as their core business. We offer it as an API and widget to media, clubs, entities linked to football as an informative complement to their channels. Big data also allows us to offer decisive consulting services in sports managers' initial phase of transferring players". In the marketing field, the influence of these technologies when it comes to writing the content without human professionals' participation is unquestionable for Guerrero, "It will have a lot of influence. If it is easy to track and "predict" the products and services a consumer is interested in, generating the content they want is exactly the same thing."

4. Conclusions

The objective in this research is to identify reference sources concerning AI applied to journalism as well as to investigate the case of BeSoccer in-depth, a reference in the sports field. BeSoccer has applied "an algorithmic turn" (Napoli, 2014), enabling them to produce news from AI. Firstly the main theoretical and research contributions concerning AI and journalism were highlighted, as well as those related to the case studied. Secondly, it is essential to point out that the interviewees observe an initial statement that centers on sports journalism and in the case of BeSoccer, a greater influence of AI because this type of journalism is more "based on data than on other types of journalism such as social or political journalism."

Following the results from the interviews with Heredia and Guerrero, both point in the same direction as Salaverría (2017) referring to new forms of content production, as well as the profile of a new journalism professional influenced by BD and AI. The transformation of the journalist's role is evident from the results in the case of BeSoccer.

As can be seen in the results, BeSoccer opted for changing and breaking away from the traditional model for the journalistic profession, specifically in sports, following the dual path that Ford (2016) indicated.

Finally, from the professional's point of view, Heredia and Guerrero's assessments coincide with Lindén's theory (2017), who highlighted automated news writing as being more effective and satisfactory for workers, warning of jobs losses, but corresponding again that new professional roles could be generated and, also that professionals roles' can be changed from a mere writer to a supervisor or news editor.

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In this sense, Heredia mentions that semi-automatic writing will be a reality in five years, it would be a milestone in the journalistic profession but poses a challenge for professionals and Academia from a research perspective in such a fast-changing area, which is adapting in a complex way**.**

As possible future lines of research, the research team finds the need to broaden it to other cases, as well as apply it, along the lines of Gómez and Méndez's (2016) research techniques from neuro-journalism in order to find out audiences' reception as well as potential interpretive differences between "human, robotized or conventional journalism". Like García-Avilés, Carvajal Prieto and Arias Robles (2018), it would be necessary to analyze what journalists' perception of innovation is, in this cases of AI, as well as the case studies of journalistic projects in other specialties other than sports journalism, such as event, political or social journalism.

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