

# Artificial intelligence in RTVE at the service of empty Spain. News coverage project with automated writing for the 2023 municipal elections

Inteligencia artificial en RTVE al servicio de la España vacía.  
Proyecto de cobertura informativa con redacción automatizada  
para las elecciones municipales de 2023

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## RESUMEN

**Introducción:** La redacción automatizada es uno de los avances tecnológicos que más interrogantes despierta, pero también expectativas, dentro de la aplicación de la inteligencia artificial en los medios de comunicación. En la actualidad, RTVE (Radio Televisión Española) trabaja en un proyecto piloto junto a la empresa Narrativa Inteligencia Artificial para cubrir las elecciones de 2023 en los municipios que forman parte de la llamada España vacía. Un proyecto que contempla la escritura automática de noticias a partir de una herramienta tecnológica que interprete y transforme los resultados electorales y los convierta en noticias sin la intervención humana. **Metodología:** El presente trabajo parte de la revisión sistemática de bibliografía existente en torno a la materia que trata y constituye un estudio de caso en el que se han realizado entrevistas abiertas a cuatro de los responsables de las empresas mencionadas. **Discusión y resultados:** Una iniciativa pionera de última generación en la que RTVE, utilizando la tecnología como palanca, pretende incrementar la difusión y el alcance de las noticias en regiones con escasa cobertura periodística. **Conclusiones:** La inteligencia artificial aplicada al periodismo revierte en competitividad, flexibilidad, fluidez y rapidez. Este cambio de paradigma para la profesión debe tener sus límites en un código ético que regule esta innovadora forma de automatizar la redacción. Sin embargo, su uso adecuado permitirá, como en este caso, integrar y vertebrar territorios, con formatos de noticias adaptados a cada destinatario.

**PALABRAS CLAVE:** Inteligencia artificial; redacción automatizada; España vacía; RTVE; innova-

ción; elecciones municipales; narrativas periodísticas.

## ABSTRACT

**Introduction:** Automated news writing is one of the technological advances that raises most questions, but also expectations, within the application of artificial intelligence in the media. Currently, RTVE (Radio Televisión Española) is working on a pilot project together with the company Narrativa Inteligencia Artificial to cover the municipal elections of 2023 in the areas that are part of the so-called empty Spain. A project that contemplates the automatic writing of news by a technological tool that interprets and transforms the election results and turns them into news without human intervention.

**Methodology:** This work is based on the systematic review of existing literature on the subject and is a case study in which open interviews have been conducted with four of the managers of the companies mentioned. **Discussion and results:** A pioneering, state-of-the-art initiative in which RTVE, using technology as a lever, aims to increase the dissemination and reach of news in regions with scarce journalistic coverage. **Conclusions:** The artificial intelligence applied to journalism leads to competitiveness, flexibility, fluidity and fast. This paradigm shift for the profession must have its limits in a code of ethics that rules this innovative way of automating the writing of news. Nevertheless, its proper use will allow, as in this case, to integrate and vertebrate territories, with news formats adapted to each target audience.

**KEYWORDS:** Artificial Intelligence; automated news writing; empty Spain; RTVE; innovation; municipal elections; journalistic narratives.

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Translation by **Paula González** (Universidad Católica Andrés Bello, Venezuela)

## 1. Introduction

Journalism is moving towards robotization at a time of crisis and change. New technologies are unleashing a metamorphosis in journalists' work routines and generating new narratives. All this as a result of the evolution of the so-called artificial intelligence. As Alfonseca (2014) recalls, this term was invented by John McCarthy in 1956 to name the field of computer science that is dedicated to the study and design of intelligent machines. A few years earlier, in 1950, Alan Turing had already tried to define this concept through the so-called Turing Test, which established that if a machine is capable of deceiving human beings, pretending to be human, with the same ease with which a human being can deceive another, it should be considered intelligent. In the field of language, Alfonseca considers that a computer must understand what it writes and be aware of the situation to be able to strictly speak of artificial intelligence. In any case, artificial intelligence represents one of the most drastic and surprising renovations that the profession has faced for many years and has already been incorporated into the routines of marketing, advertising, writing, or infographics departments in many companies. Josep Luis Micó (2017) says that if the technology giants have committed to this trend with conviction and strong investments, the media should also try it. Companies like Alphabet, the business conglomerate in which Google is integrated, or Apple have carried out a similar expansion policy in recent years, with the purchase of firms dedicated to artificial intelligence. Competitors such as Facebook, Intel, and Twitter are somewhat behind in absorbing startups but also in the same line.

Automation is no longer a possible threat to the journalistic profession but rather a reality with almost unpredictable consequences, where it is not clear whether it will benefit or harm those who have made its routines possible until now. The possibility of machines replacing human labor in this sector is still far away. This is, at least, the opinion of Quijje (2017) when referring to an article published by

*The Economist* in December 2017. This article was written with software that he learned from previous science and technology articles published in the journal. The result was, according to the author, comforting, absurd, and sometimes hilarious: a large number of scientific words were merged by the software. The author further states that automation will likely give journalists more work rather than replace them.

It seems clear that changes in production routines will force journalists to define their functions and roles, as they will not be able to compete with some of the advantages offered by automatic writing presented by the computer, such as low marginal cost, the speed with which the articles can be written, and the broad spectrum of events that can be covered. However, as Van Dalen (2012) argues, journalists will be able to spend more time on research and in-depth journalism; compared to mechanical texts generated by machines, they will be able to produce higher quality texts; Furthermore, automated writing allows the media to cover certain news stories that usually do not have a place on the agenda, such as small sporting events followed by a minority audience.

Ronderos (2019) recalls that this so-called “automated journalism” will be one of the purposes for which artificial intelligence will be used in this profession. It is, according to this journalist, to create stories from data. Originally, it was used to report sports and financial news. The advantage is that it frees the journalist from other routines and reduces costs. AP uses Wordsmith Software to turn financial data into news items. The Washington Post uses Heliograf technology to report on sporting events and election campaigns.

There are already many examples of automated writing. On March 17<sup>th</sup>, 2014, the Los Angeles Times published this text:

A low-magnitude 4.7 earthquake struck five miles from Westwood, California on Monday morning, according to the US Geological Survey. The earthquake occurred at 6:25 AM Pacific time at a depth of five miles. According to the USGS, the epicenter was six miles from Beverly Hills, California, seven miles from Universal City, California, seven miles from Santa Monica, California, and 348 miles from Sacramento, California. In the last ten days, there have been no earthquakes of magnitude 3.0 or greater. This information comes from the USGS Earthquake Notification Service and this publication was created by an algorithm (Rodríguez, 2018).

The 96 words of this text were the work of a robot. Ken Schwencke, a journalist and programmer for the Los Angeles Times, the fourth-largest-selling newspaper in the US, felt the earthquake at 6:25 a.m. He got up quickly from the bed, count the teletype, and went running to his computer. He logged on to the newspaper’s content management system and found all 96 words written. He glanced at the text and hit publish. And that is how this newspaper became the first media outlet to report on the earthquake. The algorithm, called Quakebot, had taken only three minutes to write the news (Rodríguez, 2018). But Quakebot is not capable of writing news on its own. It is programmed to select relevant data from some reports, in this case from the United States Geological Survey. It then includes them in a pre-written template. Later, the news, already in the newspaper’s content management system, is pending review and publication by a journalist. This process is known as automated journalism. Quakebot doesn’t assess the damage it caused on the ground, can’t interview experts, and can’t discern the notoriety of different aspects of the story. But it’s only a matter of time. In fact, Ken Schwencke, creator of the writing algorithm, already pointed out in 2014 that it was only something complementary and that it would never completely replace the work of a writer.

Another example of commitment to these emerging technologies is the Lynx Insight tool, which analyzes Thomson Reuters data to identify facts and potential financial articles. The aforementioned tool works with language generation software capable of writing headlines and creating structured sentences in templates. The resulting articles are highly useful to your customer base, delivering financial data vital to their interests in milliseconds. From them, editors can also develop their texts or start their research. On the other hand, the Reuters News Tracer program has enabled journalists to gain an eight-minute to one-hour head start on other media when reporting on breaking news. However, machines still write bad stories, according to Reginald Chua, Reuters executive editor for editorial operations. For this reason, the agency tests hybrid operations, in which the robot performs the data

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processing operation and the journalist writes articles with the base provided by Artificial Intelligence. Writers are also needed to identify the newsworthiness of the facts. Indeed, the machines do not understand the context or the nuances, or how to get readers to engage with the stories, according to Chua (Garciamartín, 2018).

Christer Clerwall of Karlstad University in Sweden conducted a study to measure the public's impression of the quality and level of acceptance of texts produced with automatic writing software. This study highlighted the difficulties of readers when it comes to identifying the authorship of the texts. As part of the procedure, the authorship of each text was hidden and readers were asked questions related to the quality, credibility, and objectivity they perceived in them. As a result, texts written by human journalists received higher scores for coherence, quality of writing, clarity, and readability, while text generated by the software was considered more descriptive, informative, credible, and objective. The respondents were not able to distinguish the authorship of the texts (Clerwall, 2014).

The Automated Insights company has been working with augmented reality since 2000 to develop the Wordsmith computer system, a software capable of creating prose texts based on data. It first started writing small pieces of sports journalism, based on data and statistics, and then expanded into other fields, such as finance, which allowed it to reach an agreement with the Associated Press in 2014 to produce small texts on this subject. Fernández Barrero (2021, p. 77) points out that Automated Insights uses the Wordsmith platform, an ultra-fast editor capable of producing 4,400 news items per quarter, thus multiplying by 14 the production of finance news, with an extension of between 150 and 300 words. It is a text apparently written by a human being that contains a note at the end stating that it has been written by an algorithm.

Fernández Barrero states that the application of automatic writing is still in an experimental phase. On the other hand, the application of Artificial Intelligence to humanoid robotics has not achieved the desired results either, so that, far from the initial fears of journalists about a displacement in their functions, these technologies are for the moment freeing the information professionals of mechanical processes and leaving room for the development of creativity, a framework with which mechanization cannot compete at the moment (Fernández Barrero, 2021, p. 92). However, some see automated news writing as more efficient and satisfying for workers, alerting them to job losses, but they agree on the generation of new professional profiles and, also, on the reconversion of the professional from mere editor to a supervisor or text editor (Segarra-Saavedra et al., 2019). Equally striking is the fact that there is no clear awareness among journalism professionals that the generation of news through algorithms has ceased to be a possibility and has become a reality. Many journalists are unaware that some international media and agencies have already replaced their editors with computer apps to prepare the content they transmit to their audiences (Túñez-López et al., 2018).

The Spanish company Narrativa Inteligencia Artificial, established in 2015, has its headquarters in Estonia and two major operations centers in Madrid and Dubai, from where it carries out e-commerce projects. It is the only Spanish company that writes journalistic texts through software, Gabriele, to distribute them to different media outlets. The product and the formats used by Narrativa Inteligencia Artificial reflect the cultural and technological change that the media industry is undergoing. Since its launch, this company has customized its services to generate and capture value and respond to the demands of different companies and industries that deal with data overloads, such as the financial sector, e-commerce, real estate, and the health and telecommunications sectors. In the field of the media, it has generated automated news for outlets such as El Confidencial, Sport, El Periódico, El Independiente, 20 Minutos, El Heraldo, La Información, and MediaPro, besides internationally collaborating with the Associated Press agency for the joint writing of texts (Ufarte Ruiz and Manfredi Sánchez, 2019).

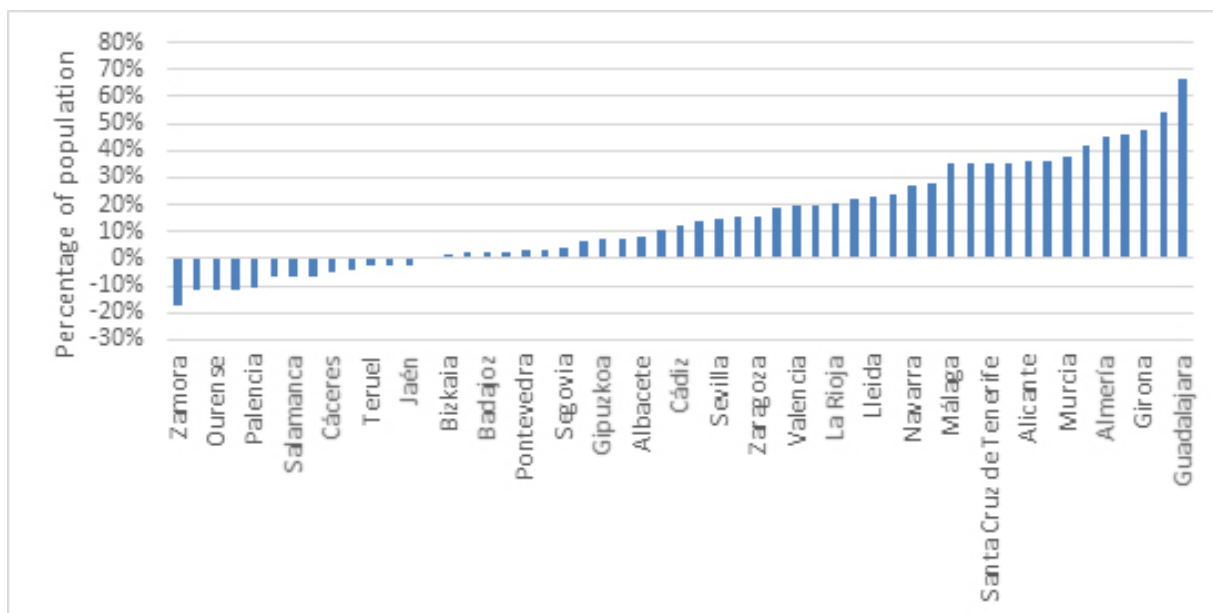
Hand in hand with Narrativa Inteligencia Artificial, Radio Televisión Española will carry out a pilot project to cover the 2023 municipal elections that will consist of the automated generation of news on this subject. The objective is to meet the demand for information from the small towns included in so-called empty Spain, usually far from the focus of media attention.

### 1.1. Empty Spain

Spain has been an eminently rural country until well into the 20th century. In less than twenty years,

cities doubled and tripled in size, while vast expanses of land on the interior that were never very populated emptied and entered the cycle of rural decline. Between 1950 and 1970, the exodus to the city took place. In a very short time, the field was abandoned. Thousands of villages disappeared and thousands of others were left as nursing homes, without any economic activity and the most basic services (Del Molino, 2016). That depopulated Spain, generally rural and anchored within the geography, demands infrastructure and maintaining its way of life (Vega, 2019). It is the so-called “Empty Spain”. Empty Spain is a vast territory that has no cities. In its most restrictive version, it extends over 268,083 square kilometers without a coastline and with a notable elevation above sea level. It occupies more than half of the total of Spain, 53% of the territory. 7,317,420 people live in it, which represents 15.8% of the Spanish population. In other words, the Spanish population is distributed very unequally: it is highly concentrated in a few points and is almost non-existent in a large part of the country (Del Molino, 2016).

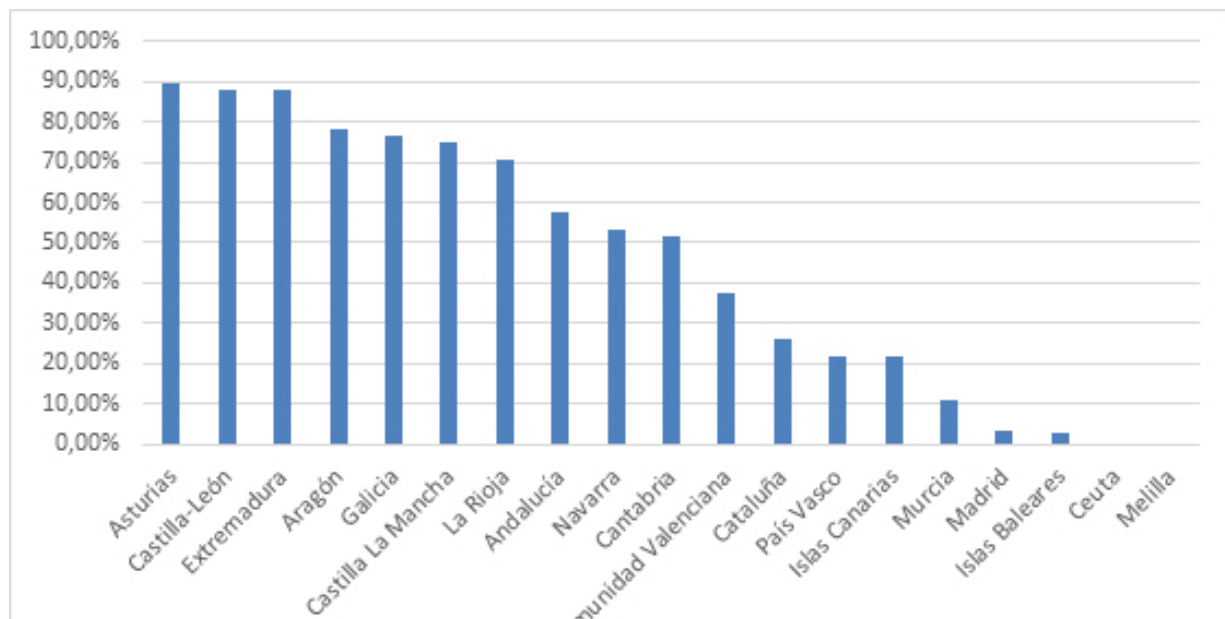
This demographic phenomenon converges, on the one hand, a low rate of natural growth of the population, and on the other, the abandonment of population centers by the active population that does not find employment opportunities in them. This fact, together with the increase in life expectancy of the inhabitants, is causing a decadent and slow agony in municipalities and localities in which the young population moves to areas with “more opportunities”, while older people remain anchored in these areas, which fall, not only into depopulation but also into oblivion.



**Chart 1:** Provinces that have gained and lost population (in percentage) during the period 1996-2020.

**Source:** Own elaboration based on INE data.

This phenomenon, as can be seen in charts 1 and 2, is occurring with greater intensity in the autonomous communities of Northern Spain, skewing mainly towards Castilla-León, Asturias, Galicia, Extremadura, or Aragón. The population that leaves these areas ends up moving towards coastal areas or large cities.



**Chart 2:** Percentage of municipalities in each autonomous community that have lost population (in percentage) during the period 1996-2020.

**Source:** Own elaboration based on INE data.

For this reason, converting these areas into information centers and bringing news events closer together can contribute to their greater integration within Spanish territory, which can lead journalism to develop its social function through greater structuring of the territory. This is the purpose of the aforementioned project that RTVE will carry out in 2023 on the occasion of the municipal elections, and its possible repercussions will be studied and analyzed in the following lines.

## 2. Methodology and objectives

The methodological design of this research is based on the systematic review of the existing scientific literature on Artificial Intelligence applied to the media and, particularly, to everything that surrounds automated writing in newsrooms, as well as an approach to the reality of the so-called empty Spain, which has made it possible to discover the main contributions to the issue.

The present work constitutes a qualitative case study in which we have used the so-called “Homer Simpson” strategy (Santana Leitner, 2013, p.135), where the objective is to analyze in detail a typical, average, or standard case in a way that the results apply to a wide range of cases. The interest is focused on the pilot project of RTVE (Radio Televisión Española) to cover the municipal elections of 2023 in towns with a small population, in which it is already working with the support of the Narrativa Inteligencia Artificial company. This project contemplates the automatic generation or writing of news in the small towns of so-called empty Spain from a technological tool that interprets and transforms the electoral results and converts them into news items without human intervention. The objective is to cover the information of approximately five thousand Spanish municipalities whose population do not exceed one thousand inhabitants.

Beyond the general objective of knowing the operation of the project proposed by RTVE, the present work proposes a series of objectives related to the application of Artificial Intelligence in the particular case that concerns us in these pages. These are:

- Describe the benefits and negative effects of the application of Artificial Intelligence in the work routines of the public entity.
- Analyze its economic and technical feasibility.
- Describe the informative content that will be generated within this project and evaluate its impact on the population of the small towns that make up Empty Spain.

Within the research, we have carried out four open or unstructured interviews. In this sense, on October 22<sup>nd</sup>, 2021 we interviewed David Llorente, general manager of Narrativa; On October 28<sup>th</sup>, we interviewed Pere Vila Fumás, Director of Technological Strategy and Digital Innovation at Radio Televisión Española; On November 3<sup>rd</sup>, we interviewed Cristina Blanco González, Narrativa's Customer Success Manager; and, finally, on November 4<sup>th</sup> of this year, we interviewed Alberto Moratilla, CTO of Narrativa.

### 3. Discussion and results

#### 3.1. RTVE and Artificial Intelligence: Risks or opportunities?

The irruption of Artificial Intelligence (AI) in the media is becoming more and more evident. Its use in newsrooms is being introduced gradually and progressively, but without a doubt, with great expectations. In 2015, Radio Televisión Española (RTVE) began a research program on innovation in audiovisual journalism, focused on researching the opportunities offered by the various systems based on intelligent information processing.

And it is that RTVE seeks to be a pioneer in research projects with the use of this new technology applied to news (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021). The projects are supported by multidisciplinary workgroups that combine both journalistic knowledge through students and teachers and the know-how of experts in Artificial Intelligence processes. Although the project has a theoretical research base, its purpose is to apply it to the journalistic world. Studies but also explorations. The research works, which date back six years, are being developed hand in hand with the University, through joint chairs on innovation methods and systems, within the new framework of the information society. This is how the RTVE-UAB Chair (with the Universidad Autónoma de Barcelona) was born and the creation of an observatory for News Innovation in the Digital Society (OI2). The engineer Pere Vila Fumás, director of Technological Strategy and Digital Innovation of Radio Televisión Española, defends that Artificial Intelligence is something more important and profound than a simple robot that writes news. He states that for RTVE it constitutes different and independent tools from one another that are entering the house's publication and that contribute to speeding up and optimizing journalistic work: "We are monitoring different phases of Artificial Intelligence to the extent possible and we are integrating them little by little to the rhythm of the informative work of the journalists. They are tools that contribute not only to getting the job done faster but also more efficiently" (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

Vila details that these projects began by exploring what exists in the scientific, technological, and journalistic world about AI. Within technology, they have thoroughly researched the bases of its procedures as well as its methods, and within journalism with what criteria these systems are being applied, what is happening, and what is the opinion that its application is generating among journalists. The second step was to know the companies that are offering these services worldwide, locate them, and try to have descriptions. Subsequently, they went on to research the media outlets that were using these tools and analyzed the success stories and failures. The penultimate step of these projects is to see their feasibility and application within their news programs to, finally, design their incorporation into RTVE's audiovisual newsrooms. Hence, this corporation seeks to apply a pilot plan in the 2023 elections, using AI within the coverage of political news in Spanish municipalities with less than a thousand inhabitants.

News automation is a system that quickly raises concerns among information professionals. Its detractors state that it is an instrument that will generate the dismissal of many journalists, and its defenders, that it will contribute to speeding up journalistic work (Graefe, 2016; Hansen et al., 2017; Cerezo, 2018; Fernández Barrero, 2018). In any case, there are already news items in the world produced by AI (Lewis et al., 2019) and it is the first time that a Spanish media outlet is going to offer news of electoral results from places where they were never previously broadcast by a media outlet. The director of Technological Strategy and Digital Innovation of RTVE defends the project:

I think that televisions cannot be oblivious to the new realities. There are two fatal aptitudes: one is to think that nothing is wrong and the other is to think that it will save your life. I think that neither one thing nor the other happens. But simply what you have to do is be

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attentive, know it, understand it, and, to the extent that it is useful to you, implement them (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

### 3.2. RTVE and its pilot experience: a robot writing political news for empty Spain

The automation of news with intelligent algorithms is one of the new tools introduced by AI in the 21<sup>st</sup> century. Furthermore, technological innovation in journalism has become fundamental (Küng, 2013). It has even been shown that not presenting consistent innovation distances oneself from the audience (Posetti, 2018). Hence RTVE's initiative to implement an AI system for news production.

This innovation will consist of a pilot experience that will be carried out in the municipal elections of 2023, will focus on towns with a small population, and will pursue the objective of journalistic coverage of this event through AI processes generated from the electoral data provided by official information sources. This is an applied research project, on which RTVE is already working, and which has the support of the Spanish company Narrativa Inteligente Artificial S.L., a start-up specialized in the generation of natural language that has already collaborated with media such as Agencia Efe, Diario Sport, and El Confidencial.

Within the project, this start-up will make its artificial intelligence technology available to RTVE for the creation of narratives. The automatic generation or writing of news in the small towns of deep Spain seeks that the technological tool interprets and transforms the electoral results and converts them into news items without human intervention. The objective is to cover the information of approximately five thousand municipalities, throughout the Spanish territory, whose peculiarity is that they have a maximum of one thousand inhabitants. In this pilot plan, the State Corporation has seven professionals, including technicians and journalists, while Narrativa, for its part, offers five members of its team, including Natural Language Processing (PLN) engineers, experts in automatic content, and developers.

The director of Technological Strategy and Digital Innovation highlights that his department is focused on offering support from the University to the project of automatic writing of journalistic texts. See the possibility of having 10, 12, 15 different narrations of the events so that they are not always the same story. That the narratives are in many forms and with various nuances. Master these new techniques to learn about the possibilities behind a few standard stories and how you can take full advantage of this system to cover not only the elections but also present useful topics for its inhabitants:

For example, informing that it is going to rain tomorrow... but we should know that this population has been waiting for water for a long time: and therefore, the story there is "it is finally going to rain, tomorrow!". But that same rain can be located in a place where it has been raining for days and whose population is fed up with so much rain. The message must be different: What a disaster, tomorrow it will rain again! (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

For her part and along the same lines, Carmen Pérez Cernuda, deputy director of Technology and Digital Strategy at RTVE, highlights the possibilities offered by this pilot plan amid populations that, until now, had not been able to be served with information that would develop their concerns and interests: "It will make possible the arrival of news that is more real and focused on what truly interests the users of so-called empty Spain" (Corral, 2021).

This is how RTVE understands it with the implementation of a pilot news automation project in small municipalities in the 2023 elections. This project has two fundamental objectives: to bring political information closer to populations never before served by journalism and to facilitate the journalistic work of the professionals of this communication house, offering them more time and resources for the creation of their own content or of higher quality:

The focus of this project is aimed at offering journalistic coverage never seen before. We will have, thanks to AI, access to information that was unthinkable in other times since we do not have the necessary personnel to cover the entire territory of Spain. RTVE has 1,800 journalists who write thousands of news items weekly for radio, television, and the new digital media. The writing of texts is an essential part of the work we do and this system



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will allow us to approach a population that for the first time will have access to information specific to their locality. Topics that have the same right to be covered and reported on as other events. This is a relevant fact in the audiovisual sector (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

Pere Vila states that, moreover, this pilot will help the staff of this channel to experiment, learn, and train within the irruption of this technology throughout the thirty months in which its development has been planned. There are three important moments or stages in the development of this system, which is in charge of the Department of Innovation and Technological Planning. The first stage has to do with the conceptual design that the news will have, the second stage with the elaboration of the structure of the product, and the third stage has to do with the style that the texts will present. The idea is that the information is not cold or repetitive but rather that it retains a singularity that makes it different from the gray news that robots usually present: “One of the priorities within this innovation is to discover new uses and applications to be at the forefront of technological innovations” (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

Vila affirms that this applied research, for RTVE, seeks to achieve five main objectives. First, the knowledge of the state, the real application, and the result in the practice of the use of the automatic generation of news. Second, to offer a service never before provided by a media outlet in Spain aimed at generating content of greater relevance and social sensitivity, improving informative aspects focused on empty Spain. Third, form, within the television corporation, an interdisciplinary group made up of technicians and journalists who end up being specialists in the use of artificial intelligence within the field of journalism. Fourth, seek to integrate the various technologies since they are convinced that they will have a very important impact and could be decisive in the future of the sector; and, finally, in fifth place, placing Radio Televisión Española on the map of Artificial Intelligence applied by important media outlets worldwide:

The idea is not only that users of a town receive the news of the municipal elections of their locality in a fast way but also that they can have access to an image, a photo, graphics, and that they can also hear it through the voice from one of our news anchors in that location. We are already in talks with them and there are several interested in lending their voices to the project. Additionally, we want them to have access to information from other towns in which they have family, friends, etc. And that they are interested in reading or listening. Also, we want the news items to have modules connected to social networks. Bring technology closer to journalism and its benefits to all its inhabitants. One of the fundamental functions that Radio Televisión Española must exercise is to offer all populations the possibility of presenting their issues (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

Topics and information that are not usually covered by the corporation’s journalists and that now, the Innovation and Technology department seeks to generate in a matter of minutes. With the launch of this pilot, they not only want to provide a greater amount of news but also offer a higher quality of information for the inhabitants of those areas. Automatically generated news items tend to look very similar and RTVE is working to prevent this from happening, incorporating a huge amount of information and its journalists carefully monitoring the material to help the system provide unique information. Furthermore, Vila emphasizes: “It is not a substitution economy, it is an economy of production of something that we cannot be doing. There are economic aspects but there are feasibility aspects” (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

For her part, Cristina Blanco González, Customer Success Manager of Artificial Intelligence Narrative, highlights that her company provides RTVE with a tool for generating journalistic articles based on data, using the latest Artificial Intelligence techniques that allow the generation of large volumes of personalized texts. Information that could not be offered previously since it was unfeasible to carry out adequate coverage in five thousand small municipalities using traditional media because of capacity.

It is now possible not only for each of the municipalities in Spain to have an informative article on the results of the elections but also for the citizens of those localities to have, in real-time, each of the advances in the count that will take place on election night, which

means the automatic generation of tens of thousands of articles in a period of a few hours (Blanco González, C., personal communication, November 3<sup>rd</sup>, 2021).

The project plans that during the two and a half years in which the preliminary work is carried out, a minimum of three real-time tests will be carried out to demonstrate its correct application in journalistic coverage. Precisely, in the elections to the Madrid Assembly of 2021, held on May 4<sup>th</sup>, they carried out the first trial. RTVE and the Narrativa company had the collaboration of the Autonomous Community of Madrid, the Ministry of the Interior, and Minsait for the database. The rehearsal began at 8:00 p.m. and the first news was published at 8:37 p.m., while the latest information came out at 12:39 a.m. the next day. During those four hours, they generated nearly 2,600 news items with 77 batches of files available. Blanco González highlights the experience:

We had conversations with Indra, the company responsible for providing the data, and we attended technical tests that were organized the days before the elections. The results were positive since we were generating hundreds of narratives during the municipal scrutiny. It was a great starting point for us and really helped us understand the complexity of what we were dealing with. Since that test, our goal is to improve the final product much more and increase its attractiveness (Blanco González, C., personal communication, November 3<sup>rd</sup>, 2021).

The company Narrativa, which collaborates with RTVE in the automatic news generation project for the 2023 municipal elections in towns with less than a thousand inhabitants, is internationally known for the generation of natural language, the only company in the country that writes journalistic texts for others media outlets (Ufarte Ruiz and Manfredi Sánchez, 2019), thanks to software called Gabriele. This technology allows the generation of natural language from structured and processable data such as binary files, databases, numerical data, etc. Among its functions are not only reading the data but also analyzing and extracting the information, feeding on similar news, being capable of creating narratives in natural language, adding important context and style words to the language with local tones, offered automatically and in real-time. Gabriele feeds on thousands of texts from reliable sources, processes them, and chooses the most relevant ones. The system can offer two services: news that is published automatically and a type of content based on a basic data template, which the journalist can easily complement and edit.

This text generation system can be configured so that each of the articles has a style similar to those that a journalist would write. To do this, adjustment tasks will be carried out, based on natural language processing (NLP) techniques, on articles written by professionals in the past. To extract headlines, writing techniques, narratives, expressions, and other relevant constructions that represent a writing style as an RTVE journalist would do.

David Llorente, general manager and founder of Narrativa, affirms that the software has a quick way of learning and that can contribute to retaining certain audiences, which would never be reached otherwise:

The input of narrative models is very important. Once Gabriele is fed with news of electoral elections, it analyzes and extracts their structure, records the sentences, classifies them by theme, and learns the style. Then it is capable of automatically recounting thousands of texts (Llorente, D., personal communication, October 22<sup>nd</sup>, 2021).

David Llorente states that the use of automatic news generation in the RTVE pilot project will demonstrate the great benefits that this system offers to journalism and that the machines do complementary work. In this way, the information professional can carry out more qualitative and complex tasks: “Journalists will be able to dedicate themselves to doing their work on issues that require their knowledge. Machines are aid instruments, they cannot replace human intelligence” (Llorente, D., personal communication, October 22<sup>nd</sup>, 2021).

Indeed, that is the limitation of machines, they are not human. Until now they need people for their learning and management. And it is that the elementary functions of every journalist to listen, observe, react, and engage directly with information sources are, as Diakopoulos (2019) states, unknown to arti-

ficial intelligence. Moreover, journalists must train the algorithms, although as Llorente points out, the intelligent algorithms, once trained, have access to the content manager, making human intervention practically unnecessary from then on.

The founder of the start-up affirms that two years ago it was very difficult for there to be a robot in journalistic newsrooms but that now the mentality in the media is changing when seeing its benefits. He believes that these changes are because there is information that, due to its simple and direct form in which only data is transmitted, can have a good assistant in this robot since it stands out for its speed and scalability:

It is proven that this system can write a news story of between 700 to 1,000 words on average in a time of 0.005 seconds. Something important when it comes to generating a lot of content, even more so in electoral elections. Achieving that speed is really impossible for a journalist (Llorente, D., personal communication, October 22<sup>nd</sup>, 2021).

Alberto Moratilla, Technology Director of Narrativa and responsible for working with the data supplied to Gabriele, points out that these are one of the most important parts of the automatic content generation tools since they are the cornerstone on which the whole process settles. In this RTVE pilot project, different data sources are used for different purposes. The main database is provided by the Ministry of the Interior through Indra, and corresponds to information from the election counts, both at the historical level of past elections, which allows an analysis of trends, as well as of others in real-time that are given throughout the electoral night. Additionally, other sources of information are used that can offer data that are useful to enrich the contents, such as those provided by the National Institute of Statistics about different aspects of the voters or the towns with a thousand inhabitants that participate in the democratic party.

Moratilla indicates that Gabriele is also being fed with the information offered by RTVE. Thousands of past articles on elections written by journalists, which, applying the different natural language processing techniques with artificial intelligence algorithms, make it easy for this software to extract the structure of the articles that it has to develop, expressions, and other language resources that allow promoting the writing of articles of higher linguistic quality: “It is essential to have sources of information with the appropriate format, that do not contain errors that could harm the later phases of the process, and that, of course, have useful and quality information for the objective” (Moratilla, A., personal communication, November 4<sup>th</sup>, 2021).

Cristina Blanco González details that this project for Narrativa comprises four phases. First: the approach, second: the implementation, third: the tests, and fourth: the launch. The first phase was a joint effort between the representatives of RTVE and the members of the Narrativa team through constant meetings to solve all the needs of the Corporation and the objectives that the work would propose. Here, the collection of databases was also carried out, as well as the platforms with which it was going to work were identified and the most effective mechanisms to develop the work were structured. “This phase ended in October 2021. Now we have just started the implementation phase, the most fun and above all exciting for everyone. It will be when we begin to see how all the effort we have put in during the beginning starts to sprout” (Blanco González, C., personal communication, November 3<sup>rd</sup>, 2021).

Facts always rule and circumstances too. The untimely call for regional elections to the Madrid Assembly, in May 2021, imposed that despite being in the first phase of the project, the political situation was taken advantage of to carry out the first concept test: “Basically we were testing with a huge amount of data, we implemented it, and generated live news with it during the night of May 4<sup>th</sup>” (Blanco González, C., personal communication, November 3<sup>rd</sup>, 2021).

RTVE reported that during those elections, the news items had an average of five hundred words each and the editorial structure was complete: a headline that highlighted the winning political party with the number of votes it had obtained within the count and the population in which it had been chosen; a subtitle, which highlighted the number of votes or the result in the locality; a lead, which presented the most important information of the count; a body of the news where all the complementary data on the winning party were developed as well as the result of the other political parties that participated in the elections in quantity and percentage. Data on citizen participation in this day and the comparison with

previous elections (Corral, 2021).

Likewise, the body of the information included a “situation” paragraph explaining the reason for the call and what could happen once the results are known. The last paragraphs describe the results of the regional elections in the Community of Madrid. The news was accompanied by an exploded view with “a block dedicated to what happened in the 2019 elections in the municipality?” as background. According to the organizers, the title was changing according to the locality in which the news was presented so that they had their own styles and, although it was a trial that was not available to the public, the results were automatically incorporated into the RTVE website. (Corral, 2021). In this regard, Pere Vila states:

The trial was a success. The immediacy of the news and the various styles in which the information was presented pleased the journalists who carried out the monitoring. The advantages offered by applying AI to improve and offer valuable information in depopulated Spain are great. The automation of news and its personalization can be a great help for RTVE for journalists and a benefit for users (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

And this is not the first time that Gabriele has done journalistic coverage of elections. Narrativa was the company contracted by El Confidencial to, among other services, offer through its intelligent algorithm the automatic generation of articles with the electoral results of the last municipal elections. In this regard, Blanco González recalls:

All the municipalities with more than five thousand inhabitants had the news in real-time with the results of the elections. Our main objective is that the result of our collaboration becomes a product that reaches the entire Spanish population (Blanco González, C., personal communication, November 3<sup>rd</sup>, 2021).

When dealing with the risks and dangers that may occur within the pilot plan for the automatic generation of news, Moratilla (personal communication, November 4<sup>th</sup>, 2021) assures that these come mainly from problems in the data provided by the sources in which the news is based. Gabriele, as an automatic article generation system, is built taking as a premise the minimization of errors that may occur in the writing of journalistic formats, since, as it is an automated process and oriented to the creation of large volumes, the review effort before publication becomes practically impossible to cover: “That is why there are data validation mechanisms before the generation of articles, checking their consistency within, as well as their transformation into text descriptions” (Moratilla, A., personal communication, November 4<sup>th</sup>, 2021).

The Narrativa CTO affirms that the system generates texts for a series of congruent scenarios that have been previously validated by the automation editors, discarding those elaborated for scenarios that have not been previously reviewed, and, therefore, avoiding the publication of incorrect information. Additionally, he assures, there is prior integration work with the data providers at a technical level, including previous drills, where the behaviors that the data sources will have at the time of their actual use are validated and established, guaranteeing that there will be no problems in production. However, there is a contingency plan:

News will indeed be generated in such a short time, of just a few hours on the election night, that is why there will be Narrativa staff controlling the entire news generation process, coordinated with RTVE staff to intervene instantly in the case that there may be problems (Moratilla, A., personal communication, November 4<sup>th</sup>, 2021).

And although the contingency plans are present, there are still some issues to be solved. All the professionals interviewed agree that a manual of ethical principles and rules that must be taken into account when dealing with news produced with AI will have to be drawn up. Llorente defends that readers have the right to know if what they are reading has been written by a person or by a logarithm. Because the content generated by one and the other is hardly distinguishable. Vila is convinced that ethics must go hand in hand with this development, that it must be monitored, and that it must be everywhere, even more so here. In a double directionality in which both issuers and citizens assume their commitment

regarding all the information that circulates:

Roadmaps must be worked out. Some style books that are not only dedicated to formal information on the use we make of machines, on handling that large volume of information that circulates in Big Data. Some milestones must be worked on (Llorente, D., personal communication, October 22<sup>nd</sup>, 2021).

The director of Technological Strategy and Digital Innovation of RTVE is convinced that in a period of approximately ten years we will see great changes in television. His experience in the Spanish audiovisual world has shown him that new technologies tend to consolidate in that period. He states that this is what happened with the issue of self-definition and that is what is also being experienced with ultra-high definition. He also recalls that the electronic newsrooms that are successful today had to go through a trial period. Therefore, he highlights:

In my experience with the topic of innovation, I always have the perspective that we come to it about seven years in advance. What I have been seeing is that from the time technologies appear until companies begin to apply them, a period of between 7 or 10 years passes. In AI, I think there is a way there (Vila Fumás, P., personal communication, October 28<sup>th</sup>, 2021).

#### 4. Conclusions

Artificial intelligence applied to the journalistic sphere is revealed as an instrument to provide competitiveness, flexibility, fluidity, speed, and personalization to the news that the media can offer. RTVE is aware of this inevitable evolution and is involved in several AI projects, one of them, which will be launched in the 2023 municipal elections, will constitute the starting point of this technology.

Artificial intelligence applied to journalism requires multidisciplinary teams of journalists, software engineers, data processing specialists, and even linguists who pursue the goal of giving the best news at the right time, in the right place to the right person in the most personalized way possible. It is, after all, the total personalization that the world of news is heading towards.

In the 2023 elections, an enormous amount of data will feed an artificial intelligence system that will produce a volume of news per minute that exceeds the capacity of any human team, besides this, the news will be offered personalized, and also, it will be of interest to any citizen. In fact, the project focuses on producing personalized news for those inhabitants of so-called empty Spain, who are usually far from the media's focus of interest.

However, the use of these systems to concentrate, select, and personalize news through automated systems that are trained and learn from the data with which they are fed, must have its limits, must be supervised and controlled by an ethical code that avoids abuses and situations in which those organizations that have the data avoid using it to the detriment of certain members of society.

Thus, it is not only about using technologically advanced tools for journalistic work and improving its efficiency but also using them as a vehicular tool to integrate and structure territories.

The generation of news through AI brings advantages such as saving time, efficiency in the use of resources, customization at the level of disaggregation that is desired, and liberalization of tasks so that journalists can carry out tasks that incorporate a greater added value to the news production process. Undoubtedly, questions arise about whether machines will be able, at some point, to replace journalists (a fact that today seems very distant) or the loss of employment that journalism professionals may suffer, therefore, a transformation and a paradigm shift in the journalistic profession that allows them to adapt and face an increasingly digitized, interconnected, and data-based world is necessary.

Today, AI is a collaborator of the journalist, not a competitor, and the bet for the automatic generation of texts is already on the table. RTVE also intends to eliminate the coldness that these systems can generate through the personalization and edition of texts, messages, and even formats adapted to each territory, this is the focus of the project that will be launched in the 2023 elections and that, without a doubt, will be a step forward between journalism and artificial intelligence.

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