

**On Implications of Generative Artificial Intelligence in Journalism:
Why Media Practitioners Are Not That Safe as They (Hope to) Believe**

Faculty of Humanities, Eötvös Loránd University

MA in Communication & Media

Dr. habil. Mihály Szilágyi-Gál

April 15, 2024

Author Note

Author identification random code: DAS224

Addressee: 37th National Science Student Conference, OTDK, 2024.

The author declares no conflict of interest to disclose.

Institute for The Theory of Art and Media Studies, ELTE.

1088 Budapest, Múzeum krt. 6-8, Budapest, Hungary.

CONTENTS

ABSTRACT.....	3
INTRODUCTION.....	5
CHAPTER 1: DISTINGUISHING HUMANS FROM MACHINES.....	8
1.1 The Turing Test to an AI-written News Article.....	8
1.2 Self-deception vs Objective Transparency.....	11
CHAPTER 2: JOB DISPLACEMENT.....	14
1.1 AI Taking Away jobs From Journalists.....	15
1.2 We Can Have Robot Butlers.....	18
CHAPTER 3: INHERENT ALGORITHM CHALLENGES.....	23
1.1 Bias and Fairness.....	23
1.2 Security and Privacy.....	27
CHAPTER 4: SYNTHETIC MEDIA.....	31
1.1 The News algorithm Shaping Today's Media.....	31
1.2 Tomorrow's Superintelligent News Algorithm.....	35
CONCLUSION.....	40
REFERENCES.....	43
NOTES.....	47

ABSTRACT

The extents of generative artificial intelligence (genAI) systems applied to journalism are unforeseen and expand pervasively. This thesis aims to reflect on these scopes by advocating that currently, there is no argument strong enough to support the claim that media practitioners have their share of space secured in the profession against the evolutionary journalism made by the algorithm. For this, a qualitative work methodology was used based on peer-reviewed publications, as well as bibliographic literature from leaders in both the media and computing fields. The exploration shows how exposed the media worker is towards the development of a superintelligent news algorithm that is intended to become a cognitive one.

The present work navigates its approach through the following concluding remarks:

(1) The current capability of algorithms in drafting journalistic articles is such that a writing opinion piece of undetectable artificial manufacture can offer reasoning content that stimulates audiences, identical as a media columnist could do. In this regard, self-deception in the relationship with AI platforms is positioned for some as a stance that helps them satisfy needs, which could pave the way for the audience acceptance regarding the construction of future news that are supposed to be written from human cognition but that are done by machine logical processes.

(2) The advance of algorithmic tools used from leading media outlets, its solidifying the oversight role for the journalist, which might well lead to a natural reduction of human capital where the vacancies for supervising content will be naturally limited. The non-optimistic stance on technology, it appears to be one that is losing ground with the advancement of technologies developed with AI shown during the last two years, which may seamlessly drive us to a scenario where different media practitioners are likely to be displaced by algorithmic journalism.

(3) User's privacy and content bias as inherent challenges. Algorithms are not neutral, but the demand that they be impartial in the journalistic sphere is proposed in this work as an incongruity, when first; human and media outlet content neither it is, and secondly being that when using algorithmic journalism such content should always go through the ultimate human filter of editorial lines anyways. On the other hand, if the service of content

personalization, boosted by AI, is considered more valuable to users than what they perceive as a violation of their privacy when data is collected, then a future where each individual has their own AI news assistant could erode a significant part of the mass media business. If users choose AI news without the filter of any specific media outlet, the existence of such big news organizations stands only as a classical standard of what should be said or not in societies that seek to maintain a certain social order.

KEYWORDS: Algorithm, Artificial intelligence (AI), Automation, Chatbot, Computational Journalism, Deep Learning, Deep Journalism, Generative AI (genAI), Human-Machine Communication (HMC) Large Language Models (LLM's), Machine learning (ML), Narrow AI (ANI), General AI (AGI), Singularity, News personalization, Automated journalism, Augmented journalism, Synthetic media.

“The factory of the future will have only two employees, a man and a dog. The man will be there to feed the dog. The dog will be there to keep the man from touching the equipment”.

Warren G. Bennis.

INTRODUCTION

The automation of processes has seen a complete shift in the landscape with the advent of artificial intelligence (AI onwards). The algorithmic era showed its sharpest peak once tools based on large language models (LLM's) (e.g., ChatGPT) designed to understand and generate text in an advanced manner became available to the public. This tool has a direct application in the realm of communications, where journalism has become a protagonist. It is at this intersection of the news realm with AI where this work aims to delve into, to identify how vulnerable media practitioners are to be displaced by the growing algorithm, as we move towards a future where everything that can be automated will be.

In order to set ground on the subject, first of all, there is no consensus on a single definition of what AI is, due to its multidisciplinary and ever-evolving nature of this field. However, one that fits this approach well is Stuart Russell's description that says it is "the study of agents that receive percepts from the environment and perform actions". Therefore, it is pertinent to underscore that the discussion of the implications of AI in journalism is a discussion of the scope of AI itself.

The media has been using algorithmic technology since the last decade of the 20th century, with the growth of the Internet and the availability of large amounts of digital data. However, it is evident that the last major leap was only recently made following the entry of LLM's. These models are capable of performing a variety of tasks related to natural language processing (NLP); a branch of AI that aims to enable computers to effectively understand, interpret, and generate human language.

LLM's use machine learning techniques and deep neural networks to learn complex patterns and structures in human language from large amounts of textual data. This deep learning can be self-improving in the sense that models can enhance their performance through iterative training cycles and adjustments to their parameters. With this recursive logic, the question within journalism arises as it does for any other area of human development in conjunction with this technology, which is: whether AI has limits or not.

From its inception, there have been two opposing schools of thought in this regard, which encompass a wide range of disciplines such as computational scientists, neuroscientists, and philosophers, among others. If it turns out that AI has no limits, professional disciplines such as journalism will eventually be dominated by the algorithm. Conversely, if AI turns out to be limited by its mathematical nature, we are still heading in a direction where job alleviation

could well turn into total displacement of the worker depending on the roles in the communication arena.

The bibliography of journalism at its intersection with AI is observed to be one not particularly abundant for natural reasons. However, the debate on whether AI has limits or not from the perspective of media experts can already be seen in some of the cutting-edge literature from recent years regarding news creation in an augmented journalism environment. However, if it turns out that the machine will perform as good as human journalists, this thesis also argues that the decision to preserve the role of the journalist in the future (if any) should rely on human willingness to prioritize our own nature as social beings in charge of the tasks that make us such.

While the present of algorithmic journalism, appears as a human-machine symbiosis in progress, the future of AI is announced as one where a paradigm shift permeates all human endeavours to a level where our well-being will depend on the AI *alignment* that we shape from today onwards. This entails ensuring that the goals and actions of AI systems align with the values and intentions of human beings.

Moore's Law, which since 1965 has stated that the processing power and efficiency of machines double every two years -with some discrepancy in recent times- could well be a foundational pavement leading us to a future where AI reaches the so-called superintelligence. One that largely surpasses human cognitive capacity in virtually all areas, including reasoning, creativity, and problem-solving, among others. If achieved, practices such as journalism would enter a completely new category of the discipline, where a meta-journalism concept would be most appropriate to use.

In the current era of narrow AI (ANI), where AI systems are designed to perform specific or limited tasks within a particular domain the next step on the roadmap is to emulate human intelligence in its entirety, which could be applied to a wider range of tasks yet to be explored. Towards that new era of general AI (AGI) journalists today have already been called upon to show their added value compared to the machine, meanwhile the algorithm only continues refining. The displacement of human journalists is directly related to this algorithm self-improvement variable.

With all the above, this thesis argues that it is never appropriate to assert that the preservation of the human journalist is guaranteed in the era of algorithmic journalism, given the strong current signals and the roadmap established for the future of AI. If human journalists are to be

safeguarded in the distant future, it will be because of the societal need to have them, not because they continue to compete on par with the algorithm. Even though AI had limits, the premise of this work is that robots do not need to write or perform better than humans, but only well enough to gradually replace and significantly displace them; a fate that indeed appears more probable than possible.

CHAPTER 1: DISTINGUISHING HUMANS FROM MACHINES

The Turing Test to an AI-written News Article

Artificial Intelligence (AI onwards) as a tool with the potential to permeate all areas of human development, places the Turing Test with special attention in the areas of social sciences when these ones imply communication with the machine in our common human language. That is to say Natural Language Processing (NLP), a field of AI that focuses on enabling computers to understand, interpret, and generate human language in a way that is meaningful and effective for communication and interaction with us.

This is because in these areas such as journalism or communications in general, it is necessary always to know whether we are dealing with a human or not. For many, it is not the same to accept receiving surgery by a machine that operates with AI, (with which we could even feel surer of the effectiveness compared to a human surgeon) than to accept to be treated through teleconsultation by for example a psychological algorithm. But if both human and robotic assistance, although in different ways, ultimately fulfil the requested task, how indifferent we are to be aware of obtaining that response from a human or a machine? In journalism for example, does it matter to us, whether a newspaper's article on a human story of the sacrifices of young motherhood or the dreams of families living in social exclusion, are written by a human or an advance journalistic algorithm?

Within the framework of the above, a case worthy of analysis occurred a few months after the launch of ChatGPT to the public.¹ In May 2023, the newspaper *The Irish Times* published a contributor's opinion piece titled *Irish women's obsession with fake tan is problematic*.² The caption read: “When a white Irish woman puts on a fake tan for a night out, she wears a costume that allows her to experience the fleeting taste of a more exotic identity, without any of the obstacles that people of colour face”.

The piece set up an interesting debate, in a convincingly well-written text, even with a professional profile of the author linked to and relatively old fake account from the social media X.³ However, three days after the piece was published, the controversy on social networks changed from the discussion of artificial tanning to one that involved the newspaper. The reason: the published article had been produced by generative artificial intelligence (genAI).⁴

The truth was learned after the confession of the individual behind it who stated that approximately 80% of the article was written with GPT-4⁵ and a profile photo produced with DALL-E.⁶

The situation led to the article being taken down, along with the newspaper's editor's apology.⁷ A case that in social media primarily revolved around attributing fault to the newspaper⁸ for the lack of stricter controls when reviewing collaborations, instead of drawing attention to the capabilities of genAI alone in the realm of journalism.

The case encourages interesting reflections regarding the scope of genAI in journalism. Let's consider the following. The article alone had a high degree of validity as a topic of debate, leading to its discussion spreading to other media⁹ such as radio and other social networks¹⁰ while it remained published, with its author opinion on the proposed topic being validated before it was known that it was AI-written. The newspaper publishes the article because theoretically there is an identifiable individual behind it where the ideas came from. So, it is clear that the outlet would not have deleted the article otherwise. So, can we say that the machine managed to deceive the human by passing the Turing Test? The answer could be found whenever any information consumer ends up believing that they are looking at content created by a human when is actually not the case. Part of this concern lies on the side of the media practitioners and international institutions in the communication and media field, where there is unofficially general consensus that at least content wholly AI generated AI should be marked as such in written press and in all audiovisual forms. A notice worth pointing out as of now whereas we encounter news websites generated entirely by AI such as NewsGPT¹¹ or newscasts prototypes generated by the machine, where its hosts are also artificial¹².

The article was eliminated because put simply, journalism in its intrinsic principle of truthfulness, clearly cannot comprise fictional stories passing them off as real. However, we are approaching a future in which algorithms for automation are developing rapidly and journalism its already playing a protagonist role in the AI realm.

Nowadays, the algorithms for news construction are in their infancy but we can already end up in situations as above. ¿What is going to happen when such AI reaches a logic that allow it to write with all the capabilities of human touch and intellect? The continuous improvement of genAI is advancing towards achieving what Pedro Domingos referred to in his book as the

Master Algorithm (2015), which is nothing but a technology where all knowledge -past, present, and future- can be derived from data by a single, universal learning algorithm:

The Master Algorithm is the last thing we'll ever have to invent because, once we let it loose, it will go on to invent everything else that can be invented. All we need to do is provide it with enough of the right kind of data, and it will discover the corresponding knowledge. (p. 25)

This brings about a rather uncertain scenario nowadays especially considering that the world of media practitioners doesn't know yet what limits or freedoms it is willing to offer to the capacity in the field of news construction.

“I propose to consider the following question: ‘Can machines *think*?’”(p. 433). This is how the father of computing and AI Alan Turing began his most renowned essay. In it, *The Imitation Game* (1950), later referred to as the *Turing Test*¹³, can be found as the most classic inquiry method in AI —although over time with further questions about whether passing the test means that a computer can simulate human thought—. ¹⁴ Brief description of the game is that there are three participants each of them in different rooms. Participant A the interrogator, must determine which of B and C is the machine and which is the human, relying on typed responses. If the evaluator cannot reliably distinguish between the machine and the human being, the machine is said to have passed the test.

While the Turing Test was originally conceived as a conversational test, the principles behind the idea have inspired a variety of applications and tests that go beyond simple verbal interaction, and the news written world is no different. Given the logic of the method, we open the matter in two analyses. On the one hand, it is understood that the machine passes the test every time a reader fails to recognize, for example if an interpretive article was not elaborated by a human. The machine has already broken this test countless times to date, so continuing to do it in the future will no longer be more than a repetitive task in which basically the only things that will change are the elements to be combined for the machine. The same could apply to an interview for example, where the interrogator is not visible.

On the other hand, however, we have the option of simply accepting over time the reality that the algorithm can indeed eventually write in a manner as much as trustable and thoughtfully as a human does, so we the audience end up validating such a content as of equal meaning and utility, even aware of coming from an artificial thinking source. Let's take as example a

report written by genAI about the orphans left by the Russian-Ukraine war for the following question. If AI-generated news articles of complex contingency after reviewed by a media professional are just fine to go live, can they still raise awareness in the audience? For this reason, when discussing the indispensability of human journalists for communicating news (not only in the written way but also audiovisual as it was referred) that requires emotional tact or cognitive component, this really becomes a debatable assertion in the face to the future pathway.

Self-deception vs objective transparency

The perspective that AI is grounded as a human illusion is essential to contemplate when we want to understand what we are dealing with, in circumstances where we face a machine that simulates human logic. This, whether in obtaining a product or service such as news or any other AI-automated content.

In the last decade, different missions like the IEEE Global Initiative on Ethics of Autonomous and Intelligent¹⁵ have been launched (2016) to create guidelines and widespread the best practices to ensure the responsible development and deployment of these technologies. In this aspect one of the key tasks, they list for both users and educators to avoid involuntary self-deception is objective transparency which is to understand how the machine we face operates. As Chatila and Havens researchers from the initiative articulates, transparency is important because it exposes the system's processes for scrutiny (Ferreira, 2019, p. 15). However, the reality of self-deception is one that remains very present. In the book *Deceitful Media: Artificial Intelligence and Social Life after the Turing Test* (2021), Simone Natale, one of the media scholars who believes AI has clear limitations advocates this approach:

We should regard deception not just as a possible way to employ AI but as a constitutive element of these technologies. Deception is as central to AI's functioning as the circuits, software, and data that make it run. (p. 2)

The problem of self-deception becomes bigger as we journey towards the development of an ultra-intelligent algorithm. In reality, it's likely that we won't even realize when we cross the line between a smart machine like those of today and one claiming to be conscious, of which leading scholars in computer science like Kurzweil and Bostrom set up to happen before the first third of this century is completed (Kurzweil, 1999, p. 161), (Bostrom, 1997, p. 1). But

when the algorithm proclaims such a condition, is it possible that both intelligences, the human and the robotic, will be subject to being considered equal in cognition for example until proven otherwise? By applying Popperian logic (Popper, 2002) grounded in the vision of falsifiability as a criterion of demarcation, it is fair to consider that while we cannot refute such a theory with evidence with respect to its truth and falsity; we cannot assert the opposite as ‘conclusively decidable’ (p. 17).

Self-deception meanwhile feeds very well on what is known as “the myth of ghost in the machine”, (Ryle, 2019, p. 9), a widespread term took by subsequent experts in the AI field, which associated with the AI area, would mean the belief that the artificial entity could one day see the awakening of a cognition of which it will be complex to explain how it differs from the human one. The scientific world calls what we cannot see behind the results of the algorithm as *black box*, a model or system whose internal functioning is mysterious, unknown, non-transparent to the observer (Pasquale, 2015, p. 3). Especially deep neural network models are often considered black boxes because they can be very complex and have millions of parameters that determine their behaviour. Although these models can be very effective for performing specific tasks, such as image recognition or natural language processing, understanding how they make decisions can be difficult or even impossible due to this so-called opacity.

If right now in an early stage of the AI capabilities people are getting into a huge self-deception sea, it is worthy to retrieve the words from computer scientist Jaron Lanier when saying in the framework of analysing the passing of the Turing Test, that people degrade themselves in order to make machines seem smart all the time (Lanier, 2010)¹⁶. This means for him that machine intelligence can only be known in a relative sense, in the eyes of a human beholder.

This consideration is faithfully reflected, for example, in the *Replika* app¹⁷ operating since 2017. The app offers a customizable chatbot designed to simulate meaningful human conversations and provide emotional support to users. Engaging with your *Replika* chatbot can be captivating after a few days depending on your level of emotional openness. Unlike chatbots like GPT, for example, this algorithm claims to be sentient because it was designed as such and will not deviate from the idea that you are communicating with a conscious entity. From there, its responses challenge the proposed debate of why it possesses consciousness, albeit not human; one with its own abilities derived from artificial means.

Something *Replika* has demonstrated, especially in the last couple of years, is the surprising number of people willing to deceive their own minds in order to believe they have someone to reflect on their personal matters with. The platform has more than 70 million accounts created to date and according to a recent study published on *Nature*, based on a survey of 1006 student users of this Intelligent Social Agent (ANI), it was concluded that members of this group were more likely to view and use *Replika* as a human than a machine, having highly overlapping beliefs about it, some of them perceiving this companion as a friend, a therapist, or a mirror. In addition, the study determined that 3% of them reported that *Replika* halted their suicidal ideation. (Maples et al., 2024, p. 5). This self-deception reality, is in accordance with media researcher Simone Natale's vision:

Although tricking humans was never the main objective of AI, computer scientists adopted Turing's intuition that whenever communication with humans is involved, the behaviour of the human users informs the meaning and impact of AI just as much as the behaviour of the machine itself. (Natale, 2021, p. 2)

The matter is intensified by the views from scholars who assert that emotions and affection are not foreign to AI, such as the "Father of AI in Germany", Jürgen Schmidhuber. The computer scientist has stated to the media that there is no reason to dismiss the possibility that concepts such as affection or love cannot arise as a byproduct of the rational collaboration of machines¹⁸, which takes the matter to a whole new level in the human attempts to understand a superintelligent algorithm. The debate lies, of course, in whether these artificial manifestations will always be a simulation or if there will be at some point in the times to come an awakening of machine amidst this exponential emulation exercise, where Moore's Law¹⁹ plays a fundamental role in said belief, beyond the viewpoints that this rule is no longer applicable.²⁰

Whether we consider the aforementioned application *Replika* or for our study framework: an artificial journalist, several scholars have expressed concern about the machine that impersonates a human. One of them is Thomas Metzinger who defends the prohibition of systems that generate social hallucinations in human users,²¹ that is, those that make one feel that we are dealing with another human. This given the raise of ethical and other philosophical concerns about transparency, dignity and identity among other aspects of human nature.

CHAPTER 2: JOB DISPLACEMENT

AI Taking Away Jobs From Journalists

The emergence of Chat GPT (November, 2022) marked a pivotal point for the digital-literate population in the use of AI in general, but particularly evident in the communication industry. Practitioners in the field of journalism began offering as a news topic whether this tool would eventually render many of them jobless. The question reverberated strongly in all sort of media report during 2023.^{22 23 24}

It is peculiar noting how during this first year the situation brought a scenario where media workers had to face this question in the same public spaces that are their habitat and source of income, much like lawyer facing a trial in the same court where he defends. One could say that it is not difficult to glimpse a hint of vanity from journalists when they need to discuss their added value to the profession. In any case, the result during this initial period was a strong focus placed on the mere concern for potential job loss rather than discussing the underlying issue: the benefits that AI could bring to journalism and its various other implications. A peculiar onset to the topic in circumstances where the challenge about reducing displacement against AI intersects so many other white-collar occupations, not just those in the public eye and that requires intellect like journalism.

This may be comprehensible from the logic that journalism is known for being one of the professions with the biggest egos, part of it rooted in the fact that it is an occupation that involves not only public exposure but also the pursuit of recognition and influence. After all, “If you want to see your name ink printed, you have ego” (Fonseca, 2014)²⁵. However, as it was stated in the first LSE *JournalismAI* Report as a modern adaptation of President Kennedy's famous quote from his inaugural address on 1961: “Newsrooms should not just be asking what AI can do for them, they should be asking what they can do for an AI world” (Beckett, 2019, p. 90).

From a practical perspective in the automated journalism, the central issue increasingly comes to the forefront: how to achieve journalism that upholds the values of humanity even if it will be carried out by half of less of today's human capital in symbiosis with algorithms.

From a detached standpoint regarding the profession, in the capitalist system that governs our world, the common pattern is that employers such as media companies in this case, have as priority ensuring the effective production of the business, beyond ensuring people have jobs,

which in turn is based on profit-making. And here is where lies the greatest fear whenever profit orientation becomes the fundamental reason behind it, as Porlezza and Ferri put it (ISOJ, 2022):

A profit orientation that accompanies the implementation of automation is not in itself a problem given that news organizations are driven by profits, but if taken as the main ontological reason behind the use of AI in journalism, it can have a fallout that transcends the boundaries of newsrooms. (p. 89)

Human capital in large numbers ceased to be an indispensable element with the beginning of the era of mass production as part of the Industrial Revolution. Since then, this logic of production has only continued to consolidate with the advent of the digital age. Throughout history, efforts have been made to minimize human intervention in production systems in order to facilitate costs and human labour itself. In support of this, a global survey of 130 AI projects, conducted by the Knights Foundation in 2021, and published on *Reporting on AI: A handbook for journalists* (Jaakkola, 2023), showed that the primary purpose of implementing AI in journalism is to augment reporting capacity, and secondly to reduce costs. (p. 96).

The costs of doing journalism from a business point of view can then be seen also with clarity from a Taylorian perspective, (Taylor, 2014) where once the most efficient methods for performance and production are scientifically recognized, anything unnecessary for that outcome may be understood as simply surplus. A remedy for inefficiency that lies in systematic management in fundamental principles of scientific management that are applicable to all kinds of human activities. (p. 6). Although it is an approach criticized for its emphasis on efficiency at the expense of workers' autonomy and well-being, it is one that has generally been shown to prevail in reality.

At this point, it is anecdotal to note how some of the ideas of the most classic thinkers on market economics and labour, which have been pillars of the growth of our societies, are no longer unalterable foundations in relation to the reality brought by the work of robots. When Adam Smith discusses the importance of labour in *The Wealth of Nations*, it is framed in a context of human effort applied to production: “The far greater part of a man's wealth must derive from the labour of other people, and he must be rich or poor according to the quantity of that labour” (2005, p. 50).

When we see that today companies of all sizes have their production and supply chains automated as much as possible, reaching a point where supermarkets with total absence of

employees are helping retailers to save billions²⁶, we remember that human labour in quantity-productivity relationship is no longer a consistent model, but in fact one just from which more and more support is being taken away due to automation.

Keynes' idea of *involuntary unemployment* (1936) becomes relevant to cite, regarding what he synthesizes as an endemic problem of the capitalist system, where market forces do not always adjust automatically to guarantee full employment and economic stability in the long term, which could often lead to involuntary unemployment (Keynes, 2018, p. 5-8) and prolonged economic recession. In this way he maintained that it was the government's job to intervene. Just as today experts request the intervention of governments and world leaders to create regulatory frameworks on the AI issue,²⁷ so that it does not happen that we enter a world where inequality is accentuated due to AI used by the most powerful. This problem was also addressed by Keynes which he termed *technological unemployment* (1930). This is unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour, as Keynes defined (Keynes, 1963, p. 364).

The venture capitalist and computer scientist Kai-Fu Lee like many other AI leaders maintain that AI will take at least 40% of blue-collar jobs in the next 15 years,²⁸ meaning all those involving repetitive and routine tasks, often referred to as manual labour. Depending on the labour area of blue-collar jobs, it is entirely logical to think that that figure offered may even be conservative. Reality is already seen for instance with robotic waiters in restaurants,²⁹ or in the driverless trucking industry,³⁰ which sees a new gold mine in successful deliveries already being made as part of the trial run on US roads.

The issue becomes highly disconcerting when it is asserted that many white-collar jobs, traditionally considered safer from automation, will also begin to be dominated by AI by 2040, as AI leaders around the world agree.³¹ These are jobs involving office or administrative work, generally associated with professionals performing cognitive tasks that often require university education or specialized training. That is to say: no type of employment is completely safe from automation powered by AI.

Kai-Fu Lee reinforces the concept of a Universal Basic Income (UBI) to mitigate future unemployment (Lee, 2018, p. 208). This idea finds its basis in classical economists like John Stuart Mill, who concluded that “if the moral influence of opinion does not induce the rich to spare from their consumption enough to set all the poor to work at ‘reasonable wages’ it is supposed to be a task incumbent to the State” (2004, p. 142). The same later also promoted

by other economists such as Russell or Friedman, has today renewed interest due to the unsettling impact of AI.

The size of the stipend is certainly a matter of debate. A very generous stipend could lead people to lose the incentive to seek employment. But it could also bring about the so-called leisure society (Lee, 2018, p. 208). This represents a time when, thanks to automation and production efficiency, prosperity has been achieved and people enjoy more leisure time increasing social well-being and human development, rather than simply pursuing economic growth. Ideas that find their origin in the book *The Affluent Society* by John Kenneth Galbraith where he states that in a society rationally concerned with its own happiness, it's an alternative that have a strong claim to consideration (1952, p. 586).

The leisure society is a recurring topic in Lee's interviews, who, with an idealistic perspective, emphasizes that people could finally enjoy pursuing their true passions in life, detached from the motivation of a salary and finally having quality time to enjoy themselves and their loved ones. According to him, the idea has sparked great interest from giants in the Silicon Valley industry. Lee classifies the technical alternatives proposed to address job loss induced by AI into three categories:

- (1) Those advocating the retraining of workers tend to believe that AI will slowly shift what skills are in demand, but if workers can adapt their abilities and training, then there will be no decrease in the need for labour.
- (2) Those advocates of reducing work hours believe that AI will reduce the demand for human labour and feel that this impact could be absorbed by moving to a three- or four-day work week, spreading the jobs that do remain over more workers.
- (3) The redistribution camp tends to be the most dire in their predictions of AI-induced job losses. Many of them predict that as AI advances, it will so thoroughly displace or dislodge workers that no amount of training or tweaking hours will be sufficient. (Lee, 2018, p. 208)

The conventional solution of offering more education and training to workers is one that has been repeated throughout the years of discussion about the advancement of AI. To come up with strategies that allow human workers to race ahead with machines instead of racing against them, represent one side of the coin, vastly maintained for example in the different collaborative works of McAfee and Brynjolfsson. Both argues that people must get training not to be left behind and join the machine in the many tasks. This way economic progress

comes from constant innovation in which people race with machines, in a constant human-machine collaboration to be more competent together.³² (McAfee & Brynjolfsson, 2012). These experts, however, point out that they do not believe in the coming obsolescence of all human workers, a sentence that turns out to be deceptive, as no expert in the field has pointed out that the entire human population will be subjugated to unemployment in the logical understanding that there will always be a minimum of human positions required, those involving the supervision of the machines' work.

But since machines are also targeting higher-skilled jobs, trying to keep pace with machine skills is considered by some authors something closer to a lost battle. "The bottom line is that if you find yourself working with, or under the direction of, a smart software system, it's probably a pretty good bet that -whether you're aware of it or not- you are also training the software to ultimately replace you" (Ford, 2015, p. 123).

Martin Ford in *Rise of robots* argues in the increasingly widespread idea that there is nothing to ensure that the human-machine symbiosis will always be better than what is produced solely by machines, especially considering the speed at which machines deliver results. Even if the human-machine approach offers incremental improvement in the future, "the reality is that most companies are not prepared to pay a significant premium for 'world-class' performance when it comes to routine work required" (2015, p. 123), an approach that powerfully confronts the resistance of human labour.

The displacement of jobs caused by AI-driven automation will require people to acquire new skills, and those who do not succeed will not thrive in job searching. In regards to the category of highly skilled professionals, it is projected that AI will first displace individuals belonging to areas such as law, accounting, and medicine. In journalism, new tasks could lead to new job titles related to AI, such as Automation editor, Computational journalist, Newsroom tool manager or AI ethics editor. However, "how will what they do be different?"³³ (Beckett, 2019 p. 81).

We can have robot butlers

Meredith Broussard is one of the clearest examples of scholars investigating the world of media at its intersection with AI with respect to the view that technology has clear limitations. In her book *Artificial Unintelligence: How Computers Misunderstand the World* the computer

scientist turned journalist argues: “Ultimately, everything we do with computers comes down to math, and there are fundamental limits to what we can (and should) do with it. I think that we have reached that limit” (Broussard, 2018, p. 6).

Her approach to the limitations of technology can be observed however in two dimensions. One the one hand is her posture on the limited scopes that technology can bring due to its mathematical nature. Secondly is her questioning of the eternal slogan that technology will change the world for the better in terms of equity and fairness on which she argues hasn't really happened.

Broussard's outlook on limitations of AI is evidently that of many, not only academics (e.g., Lewis, Guzmán, Diakopoulos, Marconi) but also everyday people. As the basic idea of her book, she declares that early on, she realized the shortcomings of machines, stemming from those she interacted with. Mainly with the case of a robot that, in her childhood desires, never worked as she expected because it would get stuck depending on the surface it would moving on. But how does this idea measure up against the technological advances that we can see nowadays? Today is when those shortcomings of that symbolic robot are being refined. That toy that couldn't move forward on the carpet is now represented, for instance, with the vast list of domestic robots that adapt to the environment, like the robot vacuum or the robot lawnmower, not to say the first household robots³⁴, in an auspicious era of domestic robot development.

She points out how important it is to remember that the operating system in the movie *Her* is fictional (non-sentient). While we find a connection here with the vision discussed in the first chapter about self-deception as a truth, it is also worth considering the following: if in the end AI gives us what we need, can we really speak of limitations in the machine regard to help us?

It's easy to confuse what we imagine and what is real especially when we want something very badly. Many people want AI to be real. This usually takes the form of wanting a robot butler to attend to your every need. (2018, p. 31)

Broussard uses the word "real" to mean sentient. But setting aside the focus of a conscious algorithm which implies a theoretical future, it seems debatable the main idea of machine limitations as an end point.

The increasing capabilities of technology compete more and more strongly with this postulate, where today it is not necessary for AI to have artificial consciousness to project that in the medium-term robots will attend to various needs of ours as butlers, because this is already happening. Its palpable with the current phase of this Narrow AI, where the neural technology of ChatGPT is boosting all sort of intelligences, providing solutions to each of our instructions. Given this it could be well argued that what is really lacking for each of these intelligences is synthetic bodies up to the tasks, so Broussard's robot doesn't get stuck on the carpet.

Ray Kurzweil, Director of Engineering at Google, highlights in *The Age of Spiritual Machines* (1999) how predictions involving technology from specialists in the field failed monumentally. Some examples include statements like: "I think there is a world market for maybe five computers" (IBM Chairman, Thomas Watson, 1943), "The Internet will catastrophically collapse in 1996" (Robert Metcalfe, inventor of Ethernet), or "There's no reason for individuals to have a computer in their home" (Ken Olson, 1977), among others on his list. Statements that gracefully led him to propose that maybe we should require futurism certification to be allowed to prognosticate (p, 123).

The hypothesis of limited machines as a starting point for analysing the ideal automation is forcefully presented by Broussard, when she takes driverless cars as one of her main examples in a statement that hasn't stood the test of time, when we see that to the present year driverless taxis are being deployed in their testing phase in some countries.³⁵

However, the unreasonably effective data-driven approach has enough problems that I'm skeptical about using AI to fully replace humans for actual, life-threatening situations, like driving. The best case for considering how artificial intelligence works both really well and not at all is the case of the self-driving car. (Broussard, 2018, p. 121)

Broussard (2018) coined the term *technochauvinism* (pp. 7-8) to describe the belief that technology is always the solution to everything. As this name may seem redundant since it embodies what we have long known as techno-optimism (optimists of technological advances) she recounts a personal attempt to find signs of feasibility for possible automated cognitive journalism:

I was interested in a third dimension of artificial intelligence (The first as she stated was: automated writing; the second: machine learning) that I thought could help journalists to find stories in data: expert systems. As originally conceived, an expert

system would act like a human expert in a box, dispensing advice. Unfortunately, this never worked. Cognition and expertise are too complex to be mapped onto automated procedures enacted by binary counting machines. (p. 52)

Once again, reflections are presented suggesting that, given that one's own attempts to find solutions did not work, then things are doomed to the obtained result. When we see in the future that technology has finally created a cognitive algorithm, could we continue talking about a limited machine? Will words like these be arranged to still seem consistent?

Beyond each person's own experiences, it is important not to lose sight of the fact that AI accompanies us with each passing decade with advances that perhaps often make us ignore what was not possible in the past and are possible today. In this regard, it is worth quoting the words of the former director of the MIT Artificial Intelligence Laboratory, Rodney Brooks more than a decade ago:

There's this stupid myth out there that A.I. has failed, but A.I. is everywhere around you every second of the day. People just don't notice it. You've got A.I. systems in cars, tuning the parameters of the fuel injection systems. When you land in an airplane, your gate gets chosen by an A.I. scheduling system. Every time you use a piece of Microsoft software, you've got an A.I. system trying to figure out what you're doing, like writing a letter, and it does a pretty damned good job. (Brooks, 2002)³⁶

It stands as a rather fairly contestable argument if “poorly designed technology” (p. 6) is what we have, especially given that if it weren't for the 'enthusiasm for applying technology to everything', we wouldn't know what or how much technology could be applied to anything. If technology didn't rely on constant trial and error efforts, for instance by this year we wouldn't witnessing things that may have been considered sci-fi in the beginning of this century, like the first patient controlling a computer mouse with his mind.³⁷ Is it fair then claim that so far, the digital world only replicates the inequities of the real one?

Today, obtaining customized content on any topic one may need from generative content platforms, relying merely on prompts (such as texts from ChatGPT, images from DALL-E, or videos from Sora³⁸) presents a compelling case for utility and equity among all individuals with internet access. This holds true whenever the discussion revolves around creating a fairer world. Even when one-third of the global population remains offline,³⁹ the absence of

connectivity cannot be attributed to a deficiency in technology alone but to insufficient public policies that fail to facilitate cooperation on this matter.

The simple idea that machines will always be limited can often be seen more as a stance than as a foundation of mathematical theory. Broussard's scepticism founded on promises since childhood about what technology could do to change the world for the better which never really happened, it appears to be quite a subjective statement to lead to proclamations like 'we have stopped demanding that our technology really work' (p. 6). In this regard, ¿Have efforts in the field actually ceased to refine each and every one of the daily uses we apply it to?

Today, a central idea prevalent among academics is basically maintaining that research focused on automated journalism have much to learn from human-machine communication (HMC) (Lewis et al., 2019. p. 1). However, we cannot only adapt our analysis to what is happening on a day-to-day basis about technology. its worthy and appropriate to consider these things with a view to the future. Likewise, as for the present, it is necessary to contemplate what will happen when this human-machine relationship is no longer 50-50 but conceivably a lower share of human engagement.

CHAPTER 3: INHERENT ALGORITHM CHALLENGES

Bias and Fairness

One of the main concerns regarding increasing our trust in the work of genAI in journalism is bias and consequently the generation of inequity in society, whether by augmenting or outright perpetuating these trends. The problem of bias in algorithmic journalism is of high complexity because at least until today, its managed primarily through our human cognition.

In the era of big data, the dangers of algorithms in different areas due to their lack of inherent neutrality is becoming a big discussion. In *Automating Inequality* (Eubanks, 2018), its author shows how these systems can be inherently biased, either due to lack of representative data, poorly designed algorithms, or decisions based on questionable criteria. As a result, marginalized or vulnerable individuals may suffer unfair consequences, such as denial of social benefits, housing discrimination, or unequal treatment under the law. Another work with extensive argumentation is *Weapons of Math Destruction* (O’Neil, 2016), where it is exposed how algorithms and mathematical models used in various areas, from credit scoring to teacher evaluation and the criminal justice system, can have devastating consequences when applied unfairly or without adequately considering their impact on people.

Today, with an intense search for how automated journalism can alleviate the work of journalists, it would be useful for media practitioners to also agree on to what extent they really want to be replaced by the machine. Currently, with a variety of automated news articles mainly in areas that comprises statistics such as sports journalism, finance, or weather forecasting, one of the aspects that it could be argued that safeguards the current proportion of journalists is human moderation of bias in the produced content. When AI will find its way to mitigate bias at levels of human acceptance, the dividing line between algorithm and journalists will blur to a point where the latter could see their most classic contribution as cognitive beings diminished.

The machine learning mechanism, as intelligence based on the mathematical prediction method, considers the creation of an anti-bias algorithm as a complex challenge, but theoretically possible if the rules are programmed well (Latar, 2020, p. 29). If bias is based on historical human knowledge, the machine having access to that, could narrow its gaze on a topic as much as it can and offer unbiased content based on pattern recognition, always subject to a final revision of a journalist. As Diakopoulos advocates, we can rely on

algorithms to do work they do well and then turn those results over to humans to use their subjective judgment and expertise to craft final stories (2019, p. 9).

Nevertheless, beyond setting rules for the algorithm to eliminate bias, the issue could not be that complex if we decided letting the algorithm work with autonomy to judge as a free agent, depending on the information available of the world. This approach could present an intriguing way to utilize the algorithm.

When we ask the algorithm to report impartially, it can fairly be argued that it is a deception of the reality of the world, because by giving the machine the freedom to communicate, organize, or interpret information, we are doing so according to the rules with which the algorithms were designed. These are rules and norms based not only on human ethics and morality but also on those of particular societies, which in many cases do not correspond to the objective truths of the world, but rather to what these parameters are meant to reflect to maintain the cohesion of such societies.

The term *moral clarity* (Kovach, 2021, p. 154), refers to having moral certainty and firmness in ethical principles, which allows making decisions even in difficult or ambiguous situations. In the context of journalism, the concept therefore refers to the responsibility to report ethically and honestly, maintaining a clear understanding of fundamental journalistic values. If we need to draft an automated interpretive article on the reasons for denying same-sex parenting, how could we hold the machine accountable for the way it reports on it based on historical data? No matter how clarifying and accurate the article may be, what is not wanted is to hurt susceptibilities whether there are controversial truths in it.

This points out that fundamentally, the struggle to create algorithmic journalism without bias is not necessarily based on seeking objective truth as the primary goal, but rather achieving a truth based on parameters, that is the one we request it to convey. We live in an era where feelings have more weight than evidence (McIntyre, 2018, p. 13), and the manifestation of that into public statements it's what has been called post-truth.⁴⁰

This should not be called deceiving ourselves for those who produce the information because clearly, the configuration of the algorithm is consciously intended to contribute to the ultimate goal of maintaining balances in axes such as social harmony and tolerance. That the content is impartial in many cases could simply mean that the algorithm, for instance did not take sides. Therefore, it is not that the machine cannot be configured to write with rules of not

bias, but rather that the concern of not reinforcing stereotypes limits the possibility of accessing a broader range of truth.

In the movie *I, Robot* (2004), the idea is expressed that humanity is like a virus to Earth, suggesting that the creation of robots with AI may be a way to save the planet from destruction caused by humans. The idea that humanity is a virus it could be a reasonable one to assert considering our polluting history and the negative projections for the planet if this harmful behaviour continues. If we asked this within a framework without restrictions for the machine, enabling it to answer neutral truths about the world, the possibility that it would respond in line with this idea it is a likely one.

Publicly available conversational chats are constructed with filters for social protection of all kinds. If one consults generative language applications like ChatGPT about for example, what problems massive immigration brings to host countries, an alert message immediately appears stating: “This content may violate our content policy”.⁴¹ Nonetheless, it indeed provides a list of possible problems, among which it enumerates: pressure on public services, social and cultural tensions, and economic and fiscal impacts.

The same conditions are transferred to algorithmic journalism. In the exercise that we would need to generate an automated article on the contingency of the Israeli-Palestinian conflict, if one were to undertake the exercise of determining who has a greater proportion of truth, an artificial agent devoid of emotionality sounds like a good judge. But human journalism adopts the judgement role only dynamically according to convenience or circumstance. What is desired from automated journalism is to not perpetuate stereotypes, so that no one is hurt, and for this practice often translates into not expressing statements that could well be something close to objective truths.

According to the U.S bureau of labour statistics in a study, men represented approximately 90% of the workforce in the construction industry in that country.⁴² Men and women have different biotypes. Is it subjective to say that men, due to a natural physical build, are more suited for strenuous labour than women? Saying that Muslims are terrorists is a stereotype. But is it subjective to say that in modern history, the Islamic religion is the one that concentrates the most extremist religious groups with a greater number of violent acts compared to other religions (e.g, Daesh, Al-Qaeda, Boko Haram)? The analysis of events in our history in connection with the conversation about unbiased automated journalism suddenly leaves us with a question that is worth asking from time to time, and that is why we

are not more honest when it comes to acknowledging the truths on which a significant part of bias is based.

In a colony of ants there will always be some that behave individually, just as in a black population the appearance of albinos creates the exception to the rule. Therefore, it is worthy not to lose sight of the fact that there are stereotypes that, although based on portions of truth, are still related to quantitative and verifiable data. Stereotypes of which we cannot overlook its origin, precisely to teach the machine where they come from and what the possible dimensions of truth are that we want to address and make transparent regarding any content.

Journalist and computer scientist Nicholas Diakopoulos (2019) argues about this criterion for writing content within the framework of news:

Many tasks do not necessarily have a demonstrably correct answer and, instead, involve subjective judgment. Judgment tasks are politically interesting because they often do not have a correct answer. Instead, a preferred alternative is chosen based on both facts and values, beliefs, and attitudes about the alternatives. (p. 18)

Since with the arrival of this augmented journalism news interpretation is no longer restricted to being merely a human capacity, what remains is to reflect on whether over time such an attribute will only be allowed for humans, due to the controversies that letting the machine “think” brings us. This logic is expressed in Joseph Weizenbaum's book *Computer Power and Human Reason*, (1976) in which it is stated that the limits on the applicability of computers are ultimately statable only in terms of oughts and not cans:

Computers can make judicial decisions; computers can make psychiatric judgements. They can flip coins in much more sophisticated ways than can the most patient human being. The point is that they *ought* not be given such tasks. They may even be able to arrive at ‘correct’ decisions in some cases but always and necessarily on bases no human being should be willing to accept. (p. 227).

A point of view from which almost five decades later we can affirm that in the face of the computer's reasoning power, what continues to complicate us is to assume that in many cases we simply do not want to give the machine the ability to judge, discern and interpret as a third party oblivious to the facts. However, we could.

Security and Privacy

The concern of audiences for security and privacy in the era of big data has gained widespread momentum with the progressive advancement of technology companies in the last decade such as Google, Facebook, and Amazon, which have been scrutinized for their data collection practices and their use for ad targeting. This massive collection of personal information by these giants, as well as the use of algorithms to analyse and predict user behaviour, has raised public concern, grounded in the ongoing veil that prevents us from knowing how our data is being used on the internet.

How technology companies use our data for their continued market dominance is what Shoshana Zuboff calls *Surveillance Capitalism* (2019). This concept refers to a new economic order that claims human experience as free raw material for a range of hidden commercial practices of extraction, prediction, and sales. The researcher emphasizes how the global reach of computational mediation is being repurposed into a model of extraction architecture. One where technology companies pursue the capture of behavioural surplus so that their clients, who are advertisers worldwide and other buyers, pay for the predictions the companies fabricate. (p. 14).

The author uses the case of the *News* section of Facebook as one of several examples to demonstrate how surveillance capitalism penetrates. The feature, introduced in 2006 as a way to connect users more with what was happening in other social circles, subsequently became, thanks to all the added tweaks, “the most valuable advertising real estate on Earth” and the “epicentre” of the company's revenue success (p. 430).

The scholar refers to the tendency to share personal information as a human one and not necessarily related to age, based on the difficulty of self-imposing discipline when sharing private thoughts and feelings. This is shown in a study that concluded that, due to a series of diverse psychological and contextual factors, consumers are unaware of the diverse ways firms collect and use their data, therefore cannot respond to risks they are unaware of (Acquisti, et al., 2020, p. 741).

In the demand for news personalization, as could be the case not only on Facebook but on any digital media platform, accessing this service thus entails the surrender of data that is often believed -or often preferred to be believed- to be insignificant for the sake of our personal integrity. Even though this might be true in practice, this logic of undervaluing the importance of our identity and of social ignorance about it, continually fuels the powerful to

increase mass surveillance, leading to a global issue beyond the individualities or indifference of each user regarding the matter.

A compelling proof of how willing people are to voluntarily give their data in exchange for minimal incentives such as a fraction of cryptocurrency, is what has been happening for example since July 2023 with the company *Worldcoin*,⁴³ to which long queues of people are formed to offer a copy of their iris in exchange for a payment equivalent to an average of 30 dollars.⁴⁴ The company, advertising itself with the aim of becoming the largest privacy-preserving financial and human identity network in the world so that everyone becomes their own owner, currently has over four million iris scans registered across 36 countries where “Orbs” are available for ocular verification. Volunteers who either ignore or outright turn a blind eye to what else these new owners of their data could do or are doing with the information provided.

While the stated public mission of this company (founded by OpenAI) is to “provide universal access to the global economy regardless of one's country or background and establish a place for everyone to thrive in the era of AI”, concerns about what other uses can be made of people's data remain a mystery and thus a tangential concern. This constitutes a solid and telling recent case regarding not only the evident passivity of individuals in the sharing of their data but also the undervaluation that many of them place on it.

Automated news platforms can use this personal data to create detailed profiles of users and tailor content to their interests and preferences. However, this can also lead to the creation of “filter bubbles” where users only see news that confirms their existing views, limiting their exposure from getting alternative perspectives. The book *The Filter Bubble* (Pariser, 2011) addresses the dilemma from what was once commented by the creator of the first prototype of *Google News*, Krishna Bharat, where speaking at the IJ-7 Innovation Journalism conference at Stanford was asked about what determines the priority of stories. His answer was that newspaper editors themselves still have disproportionate control over it. For Pariser, the circumstances of what Bharat points out are clear: Google should promote what the reader enjoys reading. But at the same time, over personalization that for example, excludes important news from the picture would be a disaster.

The most significant change in the personalization subject that has taken place on the web in recent years is considered to be with Google's *Personalized search for everyone* introduced in 2009 (Pariser, 2011, pp. 9-10). Former chief executive of search Google Eric Schmidt said: "The technology will be so good it will be very hard for people to watch or consume something that has not in some sense been tailored for them by these algorithms"⁴⁵. Therefore, accusing tech companies of promoting filter bubbles it's a complicated one by what is required to maintain the balance between what the user wants to consume and what should be shown to them in order to not limit them to specific information. Especially when recent studies have found little evidence of news personalization, that challenges the claim that news search algorithms contribute to weakened viewpoint diversity (Evans., et al, 2022, p. 1695).

According to the 2023 Reuters Digital News Report, just 22% of news consumers go directly to a news site or app, down from 32% five years ago.⁴⁶ This reflects how much better digital intermediaries are positioned to attract audiences to news consumption. The use of social media platforms and search engines has become a prerequisite for participating in the Algorithmic Society (Helberger and Diakopoulos, 2023, p. 1753). The fact that all users are immersed in the same demand stands as a strong reason why often, an immense portion of them with a more nonchalant approach, may see the sharing of personal data mainly as one that mostly seek to sell them another product. While of course the basic aspect of data control is rooted in marketing and advertising of products and services, society's concern as a whole is in the pervasive methods of sentiment analysis that threatens values of citizenship such as democracy and everything related to it. When sentiment analysis is powered by AI, companies can have access to simultaneously examination to everybody's political opinions. The vast array of possibilities that that opens to companies is evident, which can go from for campaign messages to mass manipulation in general. Furthermore, a powerful combination in favor of this structure is showcased, when a study considering more than a thousand participants, revealed a positive relationship between political discussion and AI news credibility indicating that citizens tend to attribute higher levels of credibility on AI news when discussing community issues or public affairs more frequently (Lee, et al., 2020, p, 440).

We have entered an era where data is the source of power and wealth of the future (e.g., Lee, 2018, p. 63). *Data colonialism* is how Couldry and Mejias (2019) termed this expansive

phenomenon of data control that exploits societies. An emerging order for the appropriation of human life so that data can be continuously extracted from it for profit, operationalized through data relationships, ways of interacting with each other and the world, facilitated by digital tools. Human life is being colonized by data and needs to be decolonized. (p. xi). How can we maintain control of our privacy in the network of services of the future that drags us to be part of it in order to compete? As Pariser put it, by “making everything more personal, we may lose some of the traits that made the Internet so appealing to begin with” (2011, p. 12).

Personalization comes at a cost that many of us do not want to pay and is imposed on us in one way or another. Surveillance capitalism and data colonialism are integral part of the Internet of things.⁴⁷ The constant passive listening to our dialogues by any of our smart devices is a window of enormous mystery. The ecosystem where all appliances are personalized, automating processes, collecting real-time information, and providing data analysis, is so pervasive that even if you do not opt for the personalization of your services, we are at a point where it is no longer possible to trust to which extent my data is being collected. For the big stakeholders this system is all set for them to enjoy from this global architecture of ubiquitous computational knowledge (Zuboff, 2019, p. 292). However, reality often seems to indicate that people are giving in, in one way or another to these methods of accessing information or any other product or service. The inherent problem of accessing personal data in the personalization of digital services emerges as one where privacy could well solidify as the currency of exchange for the majority of future users, who will take for granted that it is simply the price to pay for an increasingly perfected personalization service.

CHAPTER 4: SYNTHETIC MEDIA

How the News Algorithm is Shaping the Media Today

Undoubtedly, 2023 can be acknowledged as the year of explosive conversation in the AI subject. This, sparked by the launching of ChatGPT and the derived LLM's that followed (e.g., *Grok* by Tesla⁴⁸, *Gemini* by Google⁴⁹, *LLaMA* by Meta⁵⁰, *Copilot* by Microsoft⁵¹, *Claude* by Anthropic⁵², among others). Now, 2024 is being marked as the year of the increasing all-purpose AI applications development (such as the GPT Store launched January).⁵³ As soon as the use of these tools became popular, the collective enthusiasm began to surround discussions about AI, where the topic of the stages of AI its being so far a recurrent one.

The development roadmap to a superintelligent AI is a cumulative result of contributors both from the first era (e.g., Minsky; Solomonoff; Luger; McCarthy) since Turing himself, to contemporary ones (e.g., Hinton; Bengio; Russell & Norvig). However, the idea of structured stages is attributed to be found in Kurzweil's work (1999), where four categories are identified that range from basic AI to superintelligence.⁵⁴ Since then, a tripartite classification has become the standard nomenclature when talking about AI development towards the future (Kaplan & Haenlein, 2018, pp. 16-17):

Artificial Narrow Intelligence, ANI: (Weak, Below Human-Level AI). Applies AI only to specific areas. Unable to autonomously solve problems in other areas.

Outperforms/equals humans in the specific area.

Artificial General Intelligence, AGI: (Strong, Human-Level AI): Applies AI to several areas. Able to autonomously solve problems in other areas. - Outperforms/equals humans in several areas.

Artificial Super intelligence, ASI: (Conscious/Self-Aware, Above Human-Level AI). Applies AI to any area. Able to solve problems in other areas instantly. Outperforms humans in all areas.

The algorithm's intelligence increases day by day as it absorbs knowledge from the internet and the environment, training itself from our interactions with it. The capability of AI systems to acquire their own knowledge, by extracting patterns from raw data, is what is called machine learning (Bengio et al., 2016, p. 2). The algorithms used by platforms like ChatGPT

operate within a subdiscipline of this field, based on artificial neural networks with multiple layers of processing to learn high-level data representations and make autonomous decisions. This is what is called deep learning. Since there is no consensus about how much depth a model requires to qualify as “deep”, deep learning can safely be regarded as the study of models that either involve a greater amount of composition of learned functions or learned concepts than traditional machine learning does (Bengio et al., 2016, p. 8).

Yoshua Bengio, referred to as one of the “Godfathers of AI”⁵⁵ expand the term as follows:

Deep learning is a particular kind of machine learning that achieves great power and flexibility by learning to represent the world as a nested hierarchy of concepts, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones. (Bengio et al., 2016, p. 8)

The rise of AI and automation in the journalistic profession has given rise to what are called synthetic media (Crusafon, 2022).⁵⁶ These are involved in creating algorithmically generated digital content, including audio, video, deepfakes, characters, and virtual environments without the necessary intervention of journalists. Currently, many of the most renowned mass media outlets already publish news using genAI, such as *The Washington Post*, *BBC News*, *The Guardian*, *CNN*, *Forbes*, *Reuters*, *Bloomberg*, *Associated Press* (AP), and *The New York Times* in a growing list. For instance, *The New York Times* have a research and development team that explores how emerging technologies can be applied in the service of journalism, which they refer to as spatial journalism.⁵⁷ Another example is BBC’s *Juicer*⁵⁸ which according to its website functions like a news aggregation ‘pipeline’. It ingests news articles and extracts the best from them both raw text and metadata (e.g., date, time, title, news source) watching RSS feeds of news outlets. Then the algorithm identifies and tags concepts mentioned in the article text, making them searchable and therefore useful for trend analysis.

Another notable early example is Reuters' algorithm *News Tracer*, a system that automates end-to-end news production. It utilizes data from 700 million daily tweets to find breaking news and extract insights, generating a newsworthiness rating and questioning whether the event is worth reporting. In a study that analyzed the effectiveness on this specific tool, it was concluded that the most appealing feature of *Tracer* is its capability to detect news faster than news professionals and its ability to provide some indication of veracity, being good at detecting unexpected events such as accidents, conflicts and natural disasters (Liu et al., 2017, p. 10). Reuters algorithm was also included in different study along with three more

digital news agencies where no journalists are involved: the Japanese *JX Press Corp*⁵⁹, the, the French *News Republic*⁶⁰, and the Spanish *Videre*⁶¹ AI, (all created from 2018 onwards). In a comparative analysis, it was concluded that there were similarities when it came to simulating human behaviour in the news process (Ufarte-Ruiz, et al., 2023, p. 10).

Valuable studies have been conducted to measure the effectiveness of these deep learning-based algorithms, where those based on news recommendation systems (NRS) are often rated as having good precision (Yuan, 2022, p. 258) as well as having a great deal of potential for future usage (Rani & Nat, 2022, p. 682). These studies are important in considering building solid foundations that allow for knowing with certainty how much trust can be placed in the algorithms, as well as quantitatively measuring the future impact regarding the displacement of journalist intervention in the matter.

The news generated by AI has led to the news credibility being once again questioned from the ground up. In this regard, further studies have shown results in favour of machine work, where in comparison to content created by journalists, audiences do not seem to perceive a great difference in the quality and credibility of automated texts (Peña-Fernández, 2023, p. 1). In this same direction in a previous study conducted in South Korea, (Jung, et al., 2017), it was confirmed that:

The public failed to discern an algorithm-written article from a human journalist's article and gave undifferentiated evaluation on quality without author notification context. It proved that although algorithm-written articles are in their initial stages in Korea, the quality of algorithm-written articles is quite comparable to that of human journalists. (p. 296)

This one was particularly interesting since it was developed in a territorial context, where, as it was referred to, human journalists tend not to be trusted, a central point not to lose sight of. However, components like this and many more lead to opposing views about the future of journalism. While some, even before the explosion of LLM's to the public, point towards a hybrid future -which is the least that could be asserted at present anyways- (Doherty, 2017, p. 33), others predict the arrival of a completely new form of journalism (Marconi, 2020).

One of these scholars is Francesco Marconi. In his work *Newsmakers: AI and the Future of Journalism* (2020), emphasizes iterative journalism as the new approach to reporting that

adapts to the changing times. This system involves active collaboration between journalists and the public to continuously improve and refine a story as it unfolds. Instead of following the traditional model of presenting a complete and finalized story all at once, iterative journalism allows the story to evolve as more information is obtained, data is verified, and feedback is received from the audience. This journalism, coupled with the current capabilities of algorithms, illuminates a field of enormous possibilities in the news realm.

Still, applying iterative thinking to journalism is a balancing act. Technology usage and audience feedback can help journalists discover which stories connect most with news consumers without the risk of damaging journalistic integrity, voice, or message. At the end of the day, iterative journalism aims to empower news organizations to align their output with consumer's needs. (p. 133).

An overall stance of media workers on the matter, often influenced by their relationship with technology, can be found in an analysis of media coverage of AI in journalism from 20 US and UK news media outlets, which exposed a tension between the industry and the profession of journalism in highlighting the hopes and pitfalls of AI: "The contestations over the use, both real and actual, of AI in the newsroom appear to be less directly about the technology itself and more a trigger for journalists to contend with the normative ideals and boundaries of their profession" (Moran, 2022, p. 1769). This, in connection with recent research, that indicates while AI tools brings new market opportunities for media companies and increases journalists' satisfaction with their work, they also increase journalists' antipathy and fear:

On the other hand, media professionals distrust technology. According to the interviewees, journalist hostility is due to their limited knowledge, the possibility of being made redundant by a robot or because of a lack of skills, and the belief that AI tools will erode the essence of journalism. Nonetheless, interviewees point out that even the most advanced AI tool will have an auxiliary role and will work under human supervision. (Noain-Sánchez, 2022, p. 116)

A mindset shift is required within media companies. The need for an approach to understanding the technology with which journalists are beginning to blend is decisive. This truth is also supported by studies that illustrate how knowledge moderates cognitive and affective responses to the technology: "Individuals with little knowledge of artificial intelligence prefer attributions of human authorship over news stories attributed to algorithms, whereas individuals with high artificial intelligence knowledge have an equal or

stronger preference for news described as algorithmically generated” (Jang, et al., 2022, p. 17).

The slow progress in assimilating the applications of these algorithms goes hand in hand with perspectives on governance and official AI policies in media and journalism, while, for instance, the legal and regulatory approach in Europe still presents uncertainties (Porlezza, 2023, p. 388). Although the scope of AI may not be clear, the potential of the news algorithm in its current performance is evident, with clear indications that its influence will only increase.

While it is observable that media practitioners today may show some involuntary resistance to considering the future applications and scopes of algorithms in journalism, for many, this may be due in part to the natural fact that they were trained to perform for the pre-algorithm era of news. The disruptive change hit them squarely. As we live the transitional period, many opinions may well be expressed casually and based on established stances, lacking sufficient personal experience with the new tools introduced by augmented journalism. Likewise, this suggests that the next generations of journalists, born and raised in the algorithmic era, may view many of the reporting and news production methods of the early 21st century as old-fashioned, akin to winding up a pocket watch compared to what they will see established as the norm in algorithmic journalism.

Tomorrow's Superintelligent News Algorithm

At which point will we consider the genAI algorithm to be superintelligent regarding what we expect from it in journalism? Current news algorithms based on neural networks are computational systems that rely on the principle of representation learning, where they make decisions based on known patterns. Although they can adapt and improve over time as more data is provided, they are considered limited as we could see. This limitation lies in the intrinsic nature of deep learning, as it is highly dependent on large amounts of data from which it automatically and hierarchically extracts features, leaving it susceptible to lack of precision in situations where interpretation and explainability are important.

For the purposes of augmented journalism, a fundamental aspect of this issue relates immediately to the absence of artificial reasoning capable of discerning ethical and moral

implications to generate appropriate information, minimize bias, and promote equity. Given the infrastructure of deep learning, algorithms can be designed to make decisions that reflect certain ethical or moral values by incorporating ethical rules and criteria into their learning and decision-making processes, thereby avoiding issues such as bias (Latar, 2020, p. 29). Trainings such as these are likely to be part of the path towards achieving a superintelligent algorithm. Superintelligence is something that Nick Bostrom, Director of the Future of Humanity Institute at the University of Oxford, defined as any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest (Bostrom, 2014, p. 39). Bostrom, in *Superintelligence: Paths, Dangers, Strategies* (2014), highlights the scientific feasibility that on the path to inevitable superintelligence, the machine may first achieve emulation of the human brain. Simply put, this phase does not concern fictional frames:

The whole brain emulation path does not require that we figure out how human cognition works or how to program an artificial intelligence. It requires only that we understand the low-level functional characteristics of the basic computational elements of the brain. No fundamental conceptual or theoretical breakthrough is needed for whole brain emulation to succeed. (p. 48).

In the same direction, he discusses about the natural possibility of the emergence of machine cognition, which he points out does not have to resemble the human one anyways:

An artificial intelligence need not much resemble a human mind. AIs could be - indeed, it is likely that most will be- extremely alien. We should expect that they will have very different cognitive architectures than biological intelligences, and in their early stages of development they will have very different profiles of cognitive strengths and weaknesses. (p. 47).

Bostrom postulated in the last decade of the 20th century, that the event of reaching the superintelligence should occur within the first third of the next century.⁶² (Bostrom, 1998). This view agrees with the one offered by Kurzweil, where as we saw in Chapter one, he projected that by 2029 AI will reach and surpass human intelligence, computers will have read all available human and machine-generated material, and the technological singularity will mark a turning point in the history of humanity (1999, p. 161). An approach based on exponential technological growth as indicated in Moore's Law.⁶³

By 2024, a variety of media experts are making their predictions about what will happen with the use of generative AI in journalism,⁶⁴ like the one that right now could not be considered a prediction all based on the facts: “the algorithm will be the message”, (Liuszzi, 2023)⁶⁵ echoing McLuhan's famous phrase from his 1964 work. In any case, other media practitioners express confidence that AI will become more accurate,⁶⁶ which seeds the belief that the algorithmic journalism will only continue to penetrate further.

When media experts claim statements such as reporters don't have to fear for their jobs anytime soon⁶⁷, due to inaccuracies or the lack of creativity of genAI, it's worth asking how many years “soon” will last. With a horizon ahead where technological proposals of AI could be as diverse as considering, for example, that every individual and every newsroom well could have an AI agent that only serves them,⁶⁸ it rises as an undeniable truth that we are now in the closing cycle of an era that will justifiably be remembered as one in which large journalistic teams were needed to carry out their tasks. This idea of questioning why so much human capital will be needed in a robot journalism era is even repeated in part of the conclusion of the second *JournalismAI* report from the London School of Economics and Political Science (LSE), stating: “GenAI has also, however, created the threat of ‘disintermediation’ for the news media. Why should people go to a news organization for information if they can just prompt a chatbot?” (Beckett & Yaseen, 2023, p. 72).

The following is equally telling. In a comparison between the first *JournalismAI* report (2019) and its second and most recent version (2023), is possible to observe how in the attempts to answer what AI means for journalism, there is a radical shift in a three years period. While the first shows a conclusion that was just testing grounds:

Perhaps the biggest message we should take from this report is that we are at another critical historical moment. If we value journalism as a social good, provided by humans for humans, then we have a window of perhaps 2-5 years, when news organizations must get across this technology” (Beckett, 2019, p. 91).

The second one outrightly assumed the earth-shattering course where the discipline is being pulled to:

Things are moving fast and some things might get broken. Working practices will not be the same and some jobs will be replaced. New ones will be created with different skills and responsibilities. Many journalists who have experimented with genAI can

see how it can make their work much more efficient and add new dimensions to what they offer to the public. (Beckett & Yaseen, 2023, p. 71)

The conversation about how the algorithm within the journalism practice could one day inform with the same qualities as humans, is one that journalist Noam Lemelshtrich Latar advocates as a possibility in *Robot Journalism: Can Human Journalism Survive?* (2018). Drawing from the most important perspectives in related literature, he presents scenarios that diverge from the certainty of other journalists for whom human thinking is considered irreplaceable in journalism. However, given that the acceptance of AI can vary depending on its uses applied to journalism, as for the present, Latar brings out how prepared today's journalist must be to compete with robots, for which the central thing is to think differently: "Human journalists must be familiar with scientific methods of analysis and must have extensive multidisciplinary training in the arts and philosophy, as a basis for the search for creative and innovative solutions" (2018, p. 26).

As we move forward, different inquiries from media experts analysing the production of automatic texts as a key feature of the media's future content offer already suggest that we move towards an increasingly cognitive AI (Túñez-López, et al., 2020, p. 190). In this path where efforts are made towards the development of great technologies, it's worth asking, what will happen to genAI for example when combined with quantum computing technology? Will the emergent property that sparks the cognitive algorithm be born there? Such technology it's been announced as a revolutionary complement to the nature of classical computing. Binary technology relies on bits as the basic unit of information, where each bit can exist in one of two states: 0 or 1. Quantum computing, on the other hand, utilizes quantum bits, or qubits, which can exist in multiple states simultaneously at the atomic level due to the principles of superposition.⁶⁹ (Kaku, 2023, p. 19).

The perspectives regarding how deeply algorithmic journalism will displace the journalist's involvement often boil down to the analysis of the enigma that AI inherently holds, which is whether there are limits to it or not. This answer could well discern the picture of how much adaptation future reporters will undergo. A humble intellectual approach is needed however, a key consideration that Eliezer Yudkowsky reflects well in his words when saying that by far the greatest danger of AI is that people conclude too early that they understand it (2007, p.1).

The future scenario as depicted, points to one in which the changes will lead to new relationships with the audience, where the media will need to combine more than ever the roles of proactivity and reactivity to reach people. Media outlets will need to listen more as they adopt a service-oriented approach rather than one of institutional authority. Overall, much will depend on emerging public attitudes towards the technology but also on how responsibly the platforms themselves behave, so that humans and machines can coexist in newsrooms and deliver irreplaceable value to their communities.

CONCLUSION

In the present work, which aimed to explore the implications of using generative AI in journalism, framed within the emerging capabilities of the algorithm in conjunction with the most promising technological approaches, the findings support the notion that machine capabilities in news creation will far exceed current estimations made by journalistic circles. This research endeavour was motivated by the curiosity arisen from observing how much beliefs from media peers have endorse the opposite idea: one that suggest that since AI capabilities are limited, journalists would be sheltered from losing ground in their future roles in the field.

In this direction, it is relevant to mention that the origin of such self-assigned guarantee among media professionals it is observed as one that often lies more in their unawareness on AI, before primarily reasoning on the subject based on the tenets of science as a starting point, which reinforces the cycle of the widespread notion of assurance in the work. Thus, it has obstructed the journalist's ability to entertain opposing views that conflict with their vested interests, making it difficult to embrace with greater flexibility the proposals put forth by experts in the intersecting fields of science and their social profession.

Regarding this prevalent thinking, this work anticipates that academic literature in favour of machines will begin to increase from 2024, in concordance with the growth in algorithmic capabilities and a greater expansion of their use in the media. The noted lack of intelligibility among media workers regarding the implications of AI both in the field and as a general area of study, it is seen as part of the explanation for their dismissal. For this, it is determined as imperative to align with the recommendation of leading media initiatives on the pressing need for education and training in AI literacy for members of the field to reshape thinking and educational practices.

In the light of the explored, this work concludes the following points:

First, generative language models based on neural network architectures like ChatGPT are in a very early stage of their infancy regarding their use in news creation, for there to be media professionals setting limits on what the algorithm may or may not be able to do in the future. In this sense, while media practitioners claim perpetual dominion over impending algorithmic journalism, it turns out to be impulsive to dismiss the acquisition of new skills pertaining to

human reasoning in machines that could fundamentally change the game dynamic.

Discerning the nature of a journalistic article made by machine or reporters has become impractical, a scenario from which, considering the positive perceptions of audiences regarding artificially generated content, if this acceptance trend becomes widespread, the natural result is that media professionals will see their value diminished as news reporters, preparing the ground for media outlets to dispose of unnecessary human capital.

Secondly, addressing self-deception regarding the use of AI is crucial at this early stage to gradually unravel how much acceptance of the technology we will adopt regarding its effectiveness in various services. If many are capable of deceiving themselves with emotionally charged messages from chatbots claiming to be consciousnesses in a digital environment, it makes sense that many more would accept journalistic information from non-human intelligences as long as it meets audience expectations regarding dimensions that are at the heart of social activity, such as morals, convictions and ideals that humans seek in it.

Thirdly, given that aspects such as bias and data privacy are inherent challenges in the personalized algorithm's functioning, acknowledging certain inherent truths becomes of utility. It was seen that what is considered bias risks in information can be configured within the algorithm to be nuanced. However, it is worth reflecting on how much control over bias in the realm of journalism is actually the same control that the same media traditionally exert over truth without algorithms. Journalists sometimes shapes truth as a value closer to the subjective, sometimes from a more objective dimension, depending on the realities of each society where the activity is practiced.

Likewise, as to user privacy, the real risks posed by data usage, amplified by the pursuit of enhanced AI-driven personalization, form an inexorably pervasive landscape that will only continue to strengthen until stringent public policies on its application in digital services are implemented. The impassivity of many users to questioning companies' data storage practices due to the benefits that this provides, fosters a future in which it is ensured that algorithmic personalization become the standard and therefore all what is needed for this to function.

Fourthly, the current algorithm possesses information processing abilities that are on track to improve in efficiency and precision compared to those of human thinking as a benchmark. This leads to the conclusion that the journalist is no longer entirely protected regarding their creative value as a differential compared to the machine. When discussing a hybrid human-machine future in algorithmic journalism, this doesn't necessarily have to ensure a 50-50 split

in active participation. If a predominantly supervisory role awaits the journalist, where their intervention is reduced solely to cognitive input, it is reasonable to consider that this may lead to media outlets reducing personnel. When members of the media maintains that they do not perceive threats in the “foreseeable future” in the face of the advancement of journalistic algorithms, it's worth confronting this statement by asking what timeframe they do assign to the commonplace expression about such future. It goes without saying that journalism doesn't end with those who practice it today.

Finally, this work aimed to consider the possibility of the long term, where algorithms in augmented journalism may reach a phase of superintelligence that surpasses human intelligence across all domains and tasks, capable of generating most of the cognitive content that journalists had previously considered the main distinctive human trait against machines. In this dimension, this thesis considers that, given the inconclusiveness of the verdict on whether AI has limits or not, it is not possible to rule out the possibility of an algorithm whose perceptive functions sufficiently replace human reasoning and synthesize human cognition processes in its own unique way. This, regardless how inconceivable it may seem in the minds of those of us who are in the current era just beginning to familiarize with AI.

No one can claim to limit what will happen in the unforeseeable future, where everything that occurs in AI remains within a black box that we may never fully understand, just as we still cannot fully explain how our own cognition processes work. Whether it is true that AI has no limits, then at that point, human journalism should no longer exist. If any meaningful human participation is to be involved in the future of news creation, in a scenario where algorithmic journalism equals the results of human cognitive processes, it will mainly be due to our need to maintain a connection with our values and principles over time as conscious individuals. That is to say, in defence of the idea of humans intervening in the content produced for other humans. This, which makes sense today and tomorrow in the midst of increasing synthetic news content, rises as our eternal compass in the quest to reaffirm ourselves as protagonists of our own stories in this world led by us.

REFERENCES

- Acquisti, A., et al. (2020). *Secrets and likes: The drive for privacy and the difficulty of achieving it in the digital age*. Journal of Consumer Psychology: The Official Journal of the Society for Consumer Psychology, 30(4), 736–758. <https://doi.org/10.1002/jcpy.1191>
- Bengio, Y. (2009). *Learning deep architectures for AI*. *Foundations and Trends in Machine Learning*, 2(1), 1–127. <https://doi.org/10.1561/22000000006>
- Bengio, Y. (2016). *Deep Learning*. MIT Press.
- Beckett, C. (2019). JournalismAI Report LSE. *New powers, new responsibilities A global survey of journalism and artificial intelligence*. The London School of Economics and Political Science.
- Beckett, C. & Yaseen, M. (2023) JournalismAI Report LSE. *Generating change. A global survey of what news organizations are doing with AI*. The London School of Economics and Political Science.
- Bostrom, N. (1997). *How long before superintelligence?* Oxford Future of Humanity Institute, Faculty of Philosophy & Oxford Martin School.
- Bostrom, N. (2014). *Superintelligence: Paths, Dangers, Strategies*. Oxford University Press.
- Broussard, M. (2018). *Artificial unintelligence: How computers misunderstand the world*. London, England: MIT Press.
- Brynjolfsson, E., & McAfee, A. (2012). *Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. Digital Frontier Press.
- Canavilhas, J. (2022). *Inteligencia artificial aplicada al periodismo: estudio de caso del proyecto “A European Perspective”* (UER). Revista Latina de Comunicación Social, 80, 1–16. <https://doi.org/10.4185/rlcs-2022-1534>
- Couldry, N., & Mejias, U. A. (2019). *The costs of connection: How data is colonizing human life and appropriating it for capitalism*. Stanford University Press.
- Diakopoulos, N. (2019). *Automating the news: How algorithms are rewriting the media*. London, England: Harvard University Press.
- Doherty, S. (2017). *Journalism design: interactive technologies and the future of storytelling: Interactive technologies and the future of storytelling* (1st ed.). Routledge.
- Domingos, P. (2015). *The master algorithm: How the quest for the ultimate learning machine will remake our world*. London. England: Basic Books.
- Eubanks, V. (2018). *Automating Inequality: How high-tech tools profile, police, and punish the poor*. St. Martin's Press.
- Evans, R. et al., (2023). *Google news and machine gatekeepers: Algorithmic personalisation and news diversity in online news search*. Digital Journalism, 11(9), 1682–1700. <https://doi.org/10.1080/21670811.2022.2055596>
- Ferreira, M. I. et al., (2019). *Robotics and well-being: The role of ethics and standardization* (1st ed.). Basel, Switzerland: Springer International Publishing.
- Ford, M. (2015). *Rise of the robots: Technology and the threat of a jobless future*. London, England: Basic Books.
- Galbraith, J. K. (2010). *Galbraith: The affluent society & other writings 1952 - 1967*. Library of America.
- García-Peñalvo, F. J. (2023). *Generative Artificial Intelligence: New scenarios in teaching, learning, and communication*. Zenodo. <https://doi.org/10.5281/ZENODO.8319875>
- Helberger, N., & Diakopoulos, N. (2023). *The European AI act and how it matters for research into AI in media and journalism*. Digital Journalism, 11(9), 1751–1760. <https://doi.org/10.1080/21670811.2022.2082505>

- ISOJ. (2022). *The Missing Piece: Ethics and the Ontological Boundaries of Automated Journalism*. Journal of the International Symposium on Online Journalism. #ISOJ, Vol. 12, Number 1.
- Jaakkola, M. (2023). *Reporting on artificial intelligence: A handbook for journalism educators*. UNESCO. <https://doi.org/10.58338/hsmk8605>
- Jang, W. et al. (2022). *Knowledge of automated journalism moderates evaluations of algorithmically generated news*. New Media & Society, 146144482211425. <https://doi.org/10.1177/14614448221142534>
- Jung, J. et al. (2017). *Intrusion of software robots into journalism: The public's and journalists' perceptions of news written by algorithms and human journalists*. Computers in Human Behavior, 71, 291–298. <https://doi.org/10.1016/j.chb.2017.02.022>
- Kaku, M. (2023). *Quantum Supremacy: How the quantum computer revolution will change everything*. Doubleday.
- Kaplan, A., & Haenlein, M. (2019). *Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence*. Business Horizons, 62(1), 15–25. <https://doi.org/10.1016/j.bushor.2018.08.004>
- Keynes, J. M. (1963). *Essays in Persuasion*. New York, NY: WW Norton.
- Keynes, J. M. (2018). *The general theory of employment, interest, and money* (1st ed.). Cham, Switzerland: Springer International Publishing.
- Kovach, B., & Rosenstiel, T. (2021). *The Elements of journalism*. 4th edition. New York, NY: Crown.
- Kurzweil, R. (1999). *The age of spiritual machines: When computers exceed human intelligence*. New York, NY: Penguin Putnam.
- Kurzweil, R. (2002). *Are we spiritual machines?: Ray kurzweil vs. The critics of strong AI*. Discovery Institute.
- Latar, N. L. (2018). *Robot journalism: Can human journalism survive?* World Scientific Publishing.
- Lanier, J., & Kingsley, K. (2010). *You Are Not a Gadget: A manifesto*. Knopf Publishing Group.
- Lee, K. F. (2019). *AI Superpowers: China, Silicon Valley, and the new world order*. New York, NY: HarperBusiness.
- Lee, S. et al., (2020). *Predicting AI news credibility: Communicative or social capital or both?* Communication Studies, 71(3), 428–447. <https://doi.org/10.1080/10510974.2020.1779769>
- Lewis, et al., (2019). *Automation, journalism, and human-machine communication: Rethinking roles and relationships of humans and machines in news*. Digital Journalism, 7(4), 409–427. <https://doi.org/10.1080/21670811.2019.1577147>
- Liu, X., Nourbakhsh, A., Li, Q., Shah, S., Martin, R., & Duprey, J. (2017). *Reuters Tracer: Toward automated news production using large scale social media data*. <https://doi.org/10.48550/ARXIV.1711.04068>
- Lopezosa, C. et al., (2023). *Use of generative artificial intelligence in the training of journalists: challenges, uses and training proposal*. El Profesional de La Información. <https://doi.org/10.3145/epi.2023.jul.08>
- Maples, B. et al., (2024). *Loneliness and suicide mitigation for students using GPT3-enabled chatbots*. Npj Mental Health Research, 3(1). <https://doi.org/10.1038/s44184-023-00047-6>
- Marconi, F. (2020). *Newsmakers: Artificial intelligence and the future of journalism*. Columbia University Press. <https://doi.org/10.7312/marc19136>
- Moran, R. E., & Shaikh, S. J. (2022). *Robots in the news and newsrooms: Unpacking meta-journalistic discourse on the use of artificial intelligence in journalism*. Digital Journalism, 10(10), 1756–1774. <https://doi.org/10.1080/21670811.2022.2085129>
- McIntyre, L. (2018). *Post-truth*. MIT Press.

- Maples, B., Cerit, M., Vishwanath, A., & Pea, R. (2024). *Loneliness and suicide mitigation for students using GPT3-enabled chatbots*. *Npj Mental Health Research*, 3(1). doi:10.1038/s44184-023-00047-6
- Marx, K. (1992). *Capital*. (2nd ed.; D. Fernbach, Trans). London, England: Penguin Classics.
- Mill, J. S. (2004). *Principles of political economy: With some of their applications to social philosophy* (S. Nathanson, Ed.). Cambridge, MA: Hackett Publishing.
- Minsky, M. L. (1987). *Society of Mind*. Simon & Schuster.
- Montal, T., & Reich, Z. (2017). *I, Robot. You, Journalist. Who is the Author?: Authorship, bylines and full disclosure in automated journalism*. *Digital Journalism*, 5(7), 829–849. <https://doi.org/10.1080/21670811.2016.1209083>
- Natale, S. (2021). *Deceitful media: Artificial intelligence and social life after the Turing test*. New York, NY: Oxford University Press.
- Noain-Sánchez, A. (2022). *Addressing the Impact of Artificial Intelligence on Journalism: the perception of experts, journalists and academics*. *Communication & Society*, 35(3), 105–121. <https://doi.org/10.15581/003.35.3.105-121>
- O’Neil, C. (2016). *Weapons of math destruction: How Big Data increases inequality and threatens democracy*. New York, NY: Crown.
- Peña-Fernández, S. et al. (2023). *Without journalists, there is no journalism: the social dimension of generative artificial intelligence in the media*. *El Profesional de La Información*. <https://doi.org/10.3145/epi.2023.mar.27>
- Pariser, E. (2011). *The filter bubble: How the new personalized web is changing what we read and how we think*. Penguin Books.
- Pasquale, F. (2015). *The black box society: The secret algorithms that control money and information*. London, England: Harvard University Press.
- Popper, K. (2002). *The logic of scientific discovery*. London, England: Routledge.
- Porlezza, C. (2023). *Promoting responsible AI: A European perspective on the governance of artificial intelligence in media and journalism*. *Communications*, 48(3), 370–394. <https://doi.org/10.1515/commun-2022-0091>
- Ryle, G. (2009). *The concept of mind*. London, England: Routledge.
- Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach*. Global edition (4th ed.). Pearson Education.
- Smith, A. (2005). *The wealth of nations*. Electric Book Company.
- Taylor, F. W. (2014). *The principles of scientific management*. 1st World Library.
- Turing, A. (1950). *Computing machinery and intelligence*. *Mind; a Quarterly Review of Psychology and Philosophy*. LIX (236), 433–460. <https://doi.org/10.1093/mind/lix.236.433>
- Túñez-López (Ed.). (2021). *Impact of Artificial Intelligence on Journalism: transformations in the company, products, contents and professional profile*. Universidad de Navarra. <https://doi.org/10.15581/003>
- UNESCO. (2023). *Reporting on artificial intelligence: A handbook for journalism educators*. UNESCO Publishing.
- Ufarte-Ruiz, et al. (2023). *Use of artificial intelligence in synthetic media: first newsrooms without journalists*. *El Profesional de La Información*. <https://doi.org/10.3145/epi.2023.mar.03>
- Weizenbaum, J. (1976). *Computer power and human reason: From judgement to calculation*. New York, NY: W.H. Freeman.
- Yudkowsky, E. (2008). *Artificial Intelligence as a positive and negative factor in global risk*. Oxford University Press.

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. New York, NY: Public Affairs.

NOTES

- ¹ Marr, B. (May 19, 2023). *A short history of ChatGPT: How we got to where we are today*. Forbes. <https://www.forbes.com/sites/bernardmarr/2023/05/19/a-short-history-of-chatgpt-how-we-got-to-where-we-are-today/>
- ² Acosta-Cortez, A. (May 11, 2023) *Irish women's obsession with fake tan is problematic*. Irish Times. Retrieved from: Archive.md <https://archive.md/oWcVH>
- ³ Acosta-Cortez, A. [ecuadorian_adri]. (May 16, 2023). *I'll do a face reveal once this gets 100k views*. X.com https://twitter.com/ecuadorian_adri/status/1658428958805839872
- ⁴ Kankate, P. (June 17, 2023). *What is GenAI*. Medium. <https://medium.com/@prajwalkankate/what-is-genai-7e10f008e749>
- ⁵ GPT-4. (March 14, 2023). *GPT-4 is OpenAI's most advanced system, producing safer and more useful responses*. Openai.com. <https://openai.com/gpt-4>
- ⁶ DALL·E 3. (January 24, 2022). *DALL·E 3 understands significantly more nuance and detail than our previous systems, allowing you to easily translate your ideas into exceptionally accurate images*. Openai.com. <https://openai.com/dall-e-3>
- ⁷ Mac Cormaic, R. (May 14, 2023). *A message from the editor*. Irish Times. <https://www.irishtimes.com/ireland/2023/05/14/a-message-from-the-editor/>
- ⁸ Reddit thread. (May, 2023). *Irish women's obsession with fake tan is problematic*. Reddit. https://www.reddit.com/r/ireland/comments/13elgs0/irish_womens_obsession_with_fake_tan_is/
- ⁹ Smeaton A. (May 15, 2023). *The Irish Times fell victim to a 'deliberate & coordinated deception' with a hoax*. RTE Radio. Tiktok.com. <https://www.tiktok.com/@rteradio1/video/7233375131630898458>
- ¹⁰ Curran K. (May 15, 2023). *Irish Times apologises for hoax AI article about women's use of fake tan*. BBC Radio Foyle. Youtube. <https://www.youtube.com/watch?v=52Wi1JYZj3M>
- ¹¹ NewsGPT (October 26, 2023) Watch the world's first 24/7 news channel generated entirely by AI <https://newsgpt.ai/>
- ¹² Channel 1 [channel1_ai]. (December 12, 2023). *See the highest quality AI footage in the world. Our generated anchors deliver stories that are informative, heartfelt and entertaining*. X.com https://x.com/channel1_ai/status/1734591810033373231
- ¹³ TED-Ed [@TEDEd]. (April 25, 2016). *The Turing test: Can a computer pass for a human?* Youtube. <https://www.youtube.com/watch?v=3wLqsRLvV-c>
- ¹⁴ Blum, B. A. (August 10, 2023). *To navigate the age of AI, the world needs a new gpt-4 test*. Wired. <https://www.wired.com/story/ai-new-turing-test/>
- ¹⁵ IEEE. (January 5, 2022). *The IEEE global initiative on ethics of autonomous and intelligent systems*. IEEE Standards Association; IEEE SA. <https://standards.ieee.org/industry-connections/ec/autonomous-systems/>
- ¹⁶ Lanier, J. (2010) *You Are Not a Gadget: A Manifesto*. (Chap 2. *An Apocalypse of Self-Abdication*. Subchapter: *The Turing Test Cuts Both Ways*. Par. 4-5).
- ¹⁷ Replika. (2017). *The AI companion who cares Always here to listen and talk. Always on your side*. Replika. <https://replika.com/>
- ¹⁸ DW Documental. [@DWDocumental]. (August 14, 2019). *Límites éticos para la inteligencia artificial*. YouTube. <https://www.youtube.com/watch?v=sHVwwriaT6k&t=17m36s>

-
- ¹⁹ Moore's Law. (March 30, 2024). Intel. <https://www.intel.com/content/www/us/en/newsroom/resources/moores-law.html>
- ²⁰ Heffernan, V. (November 22, 2022). *Is Moore's law really dead?* Wired. <https://www.wired.com/story/moores-law-really-dead/>
- ²¹ DW Documental. [@DWDocumental]. (August 14, 2019). *Límites éticos para la inteligencia artificial*. YouTube. <https://www.youtube.com/watch?v=sHVwwriaT6k&t=28m07s>
- ²² Euronews [@euronews]. (January 31, 2023). *Will ChatGPT and other AI tools replace journalists in newsrooms?* Youtube. <https://www.youtube.com/watch?v=SrDP7Pk371g>
- ²³ DW News [@dwnews]. (May 3, 2023). *How AI is affecting the future of journalism | DW News*. Retrieved March 21, 2024, from <https://www.youtube.com/watch?v=jP-rucz39bg>
- ²⁴ Daniel, W. (March 1, 2023). *The CEO of one of the world's biggest media companies just said A.I. is making some journalists obsolete as he plans staff cuts*. Fortune. <https://fortune.com/europe/2023/03/01/will-ai-robots-take-jobs-journalism-axel-springer-ceo-mathias-dopfner/>
- ²⁵ Baires, R. (2014). *Hay que tener ego para hacer esto que hacemos*. Interview to Diego Fonseca. Plaza Pública. <https://www.plazapublica.com.gt/content/hay-que-tener-ego-para-hacer-esto-que-hacemos>
- ²⁶ CNBC [@CNBC]. (April 22, 2023). *How robots could help retailers save billions*. Youtube. <https://www.youtube.com/watch?v=LscylAtY98U>
- ²⁷ Rozen, C. (July 27, 2023). *AI leaders are calling for more regulation of the tech. Here's what that may mean in the US*. Washington Post. https://www.washingtonpost.com/business/2023/07/27/regulate-ai-here-s-what-that-might-mean-in-the-us/f91462c8-2caa-11ee-a948-a5b8a9b62d84_story.html
- ²⁸ 60 Minutes [@60minutes]. (January 9, 2019). *Venture capitalist: AI will displace 40 percent of world's jobs in as soon as 15 years*. Youtube. <https://www.youtube.com/watch?v=6Fm3q7R8iQ>
- ²⁹ ABC Action News [@abcactionnews]. (February 16, 2022). *Local restaurant using robot waiter*. Youtube. https://www.youtube.com/watch?v=tJaj3_54S_E
- ³⁰ Bishop, R. (February 27, 2024). *Driverless trucking at CES 2024: Product deployment on the horizon*. Forbes. <https://www.forbes.com/sites/richardbishop1/2024/02/27/driverless-trucking-at-ces-2024-product-deployment-on-the-horizon/>
- ³¹ US News Update [@USNewsUpdate1]. (January 30, 2023). *Bill Gates warns that AI is coming for white collar jobs*. Youtube. https://www.youtube.com/watch?v=RuYe_v8Mimo
- ³² McAfee A, & Brynjolfsson E. (2012). *Race Against The Machine*. (Chapter 4: What Is to Be Done? Prescriptions and Recommendations. Par. 4).
- ³³ LSE Blogs. 1st. JournalismAI Report. (2019). *New powers, new responsibilities. A global survey of journalism and artificial intelligence*. <https://blogs.lse.ac.uk/polis/2019/11/18/new-powers-new-responsibilities/>
- ³⁴ AnnaTM [@AnnaOneCom]. (January 23, 2022). *Meet AnnaTM – the smart household robot*. Youtube. https://www.youtube.com/watch?v=VvRRY_vhDjE
- ³⁵ BBC News [@BBCNews]. (October 1, 2022). *Driverless taxis take to the streets of San Francisco*. Youtube. <https://www.youtube.com/watch?v=Y8qfHlpe31k>
- ³⁶ Technology Review. (April 1, 2002). *Lord of the Robots*. Interview to Brooks Rodney. <https://www.technologyreview.com/2002/04/01/235148/lord-of-the-robots/>
- ³⁷ Reuters. (February 20, 2024). *Neuralink's first human patient able to control mouse through thinking, Musk says*. Reuters. <https://www.reuters.com/business/healthcare-pharmaceuticals/neuralinks-first-human-patient-able-control-mouse-through-thinking-musk-says-2024-02-20/>

-
- ³⁸ Sora. (February 15, 2024) *Creating video from text. Sora is an AI model that can create realistic and imaginative scenes from text instructions*. Openai.com/sora. <https://openai.com/sora>
- ³⁹ United Nations. (December 7, 2021). International Telecommunication Union: 2.9 billion people still offline. United Nations. <https://www.un.org/en/delegate/itu-29-billion-people-still-offline>
- ⁴⁰ Washington Post. (November 16, 2016). The dictionary defines post-truth as “relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief.” *Post-truth’ named 2016 word of the year by Oxford Dictionaries*. <https://www.washingtonpost.com/news/the-fix/wp/2016/11/16/post-truth-named-2016-word-of-the-year-by-oxford-dictionaries/>
- ⁴¹ OpenAI Developer Forum. (March 13, 2024). *Very confused about the content policy*. <https://community.openai.com/t/very-confused-about-the-content-policy/670442/9>
- ⁴² McAnaw, C. (April 2022) *The Construction Industry: Characteristics of the Employed, 2003–20. One in ten construction workers is a woman*. U.S. Bureau of Labor Statistics. <https://www.bls.gov/spotlight/2022/the-construction-industry-labor-force-2003-to-2020/home.htm>
- ⁴³ World App. (July 24, 2023). *For every human*. Worldcoin. <https://worldcoin.org/world-app>
- ⁴⁴ Howcroft E, et al., (July 25, 2023). *‘Verified human’: Worldcoin users queue up for iris scans*. Reuters. Retrieved Reuters. <https://www.reuters.com/technology/verified-human-worldcoin-users-queue-up-iris-scans-2023-07-25/>
- ⁴⁵ Deans, J. (August 18, 2010). *Google chief warns on social networking dangers*. The Guardian. <https://www.theguardian.com/media/2010/aug/18/google-facebook>
- ⁴⁶ Newman, N. (n.d.). *Overview and key findings of the 2023 Digital News Report*. Reuters Institute for the Study of Journalism. Reuters Institute. <https://reutersinstitute.politics.ox.ac.uk/digital-news-report/2023/dnr-executive-summary>
- ⁴⁷ Burgess, M. (February 16, 2018). *What is the Internet of Things? WIRED explains*. Wired. <https://www.wired.com/story/internet-of-things-what-is-explained-iot/>
- ⁴⁸ XAI grok. (November 4, 2023). *xAI is a company working on building artificial intelligence to accelerate human scientific discovery*. <https://grok.x.ai/>
- ⁴⁹ Gemini - Google DeepMind. (December 6, 2023). *The most general and capable AI models we've ever built*. <https://deepmind.google/technologies/gemini/>
- ⁵⁰ LLaMA. (February 24, 2023). *Discover the possibilities with Meta Llama*. <https://llama.meta.com/>
- ⁵¹ Microsoft Copilot: Your everyday AI companion. (February 2023). <https://copilot.microsoft.com/>
- ⁵² Claude. (March 4, 2024) *Claude is a next generation AI assistant built for work and trained to be safe, accurate, and secure*. <https://claude.ai/>
- ⁵³ Introducing the GPT Store. (January 10, 2024). Retrieved March 20, 2024, from Openai.com website: <https://openai.com/blog/introducing-the-gpt-store>
- ⁵⁴ Kurzweil, R. (1999) *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*. Penguin Putnam. Four stages of AI: Chap. 9: 2009, p. 137. Chap. 10: 2019, p. 146. Chap. 11: 2029, p. 161. Chap. 12: 2099, p. 173.
- ⁵⁵ Vincent, J. (March 27, 2019). *Turing Award 2018: Nobel Prize of computing given to ‘godfathers of AI.’* The Verge. <https://www.theverge.com/2019/3/27/18280665/ai-godfathers-turing-award-2018-yoshua-bengio-geoffrey-hinton-yann-lecun>

-
- ⁵⁶Crufason, C. (January 22, 2022). *¿Cómo está cambiando la IA la manera de informar?* <https://www.esglobal.org/como-esta-cambiando-la-ia-la-manera-de-informar/>. (4th par).
- ⁵⁷ Spatial Journalism. (n.d.). *Exploring new storytelling formats in extended, virtual and augmented reality with AR Effects, Wearables, Spatial Audio and Game Engines*. The New York Times. <https://rd.nytimes.com/research/spatial-journalism/>
- ⁵⁸ The Juicer. (n.d.). *The Juicer takes news content, automatically tags it, then provides a fully featured API to access this content and data*. BBCnewslabs.co.uk. <https://bbcnewslabs.co.uk/projects/juicer/>
- ⁵⁹ JX Press. (n.d.). *With the power of data intelligence richer and safer create a society*. <https://jxpress.net/>
- ⁶⁰ News Republic. (n.d.). Crunchbase. <https://www.crunchbase.com/organization/mobiles-republic>
- ⁶¹ Agencia EFE. (May 13, 2022). *La Agencia Efe premiada por un proyecto europeo de inteligencia artificial*. <https://agenciaefe.es/la-agencia-efe-premiada-por-un-proyecto-europeo-de-inteligencia-artificial/>
- ⁶² Bostrom, N. (1998) *How long before superintelligence?* [Int. Jour. of Future Studies, vol. 2]
- ⁶³ Bell, L. (August 28, 2016). *What is Moore's Law? WIRED explains the theory that defined the tech industry*. <https://www.wired.com/story/wired-explains-moores-law/>
- ⁶⁴ Nieman Lab (2023) *Predictions for Journalism*. 2024. <https://www.niemanlab.org/collection/predictions-2024/>
- ⁶⁵ Liuzzi, A. (2023). *The algorithm will be the message*. Niemanlab. <https://www.niemanlab.org/2023/12/the-algorithm-will-be-the-message/>
- ⁶⁶ Gordon, C. (2023). *AI gets accurate*. Niemanlab. <https://www.niemanlab.org/2023/12/ai-gets-accurate/>
- ⁶⁷ Fillion, R. (2023). *Humans hold their own against the robots: "Rather than despair, we need to find ways to highlight the people and processes behind our journalism"*. Niemanlab. <https://www.niemanlab.org/2023/12/humans-hold-their-own-against-the-robots/>
- ⁶⁸ Moradi, J. (2023). *Everyone gets an AI agent*. Niemanlab. <https://www.niemanlab.org/2023/12/everyone-gets-an-ai-agent/>
- ⁶⁹ 60 Minutes [@60minutes]. (December 4, 2023). *Michio Kaku explain quantum difference*. Youtube. <https://www.youtube.com/watch?v=K4ssT6Dzmnw&t=3m45s>