



## Integration or Replacement: Journalism in the Era of Artificial Intelligence and Robot Journalism

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**Abstract:** Journalism technology is constantly changing with new products and tools, the need to acquire technology is an ongoing process, as new idioms emerged such as: Robot journalism, and news automation, due to the changes brought about by modern technologies, in addition to the environment of journalistic work in general.

This study tries to deal with the impacts of new technologies on journalism in general, specially the robotics and artificial intelligence technology, and what media institutions is using these technologies and how?, trying to answer the question: is Artificial Intelligence (AI) will replace humans in media industry? Or it would help them to improve their career? And use it to do their work fast, accurate and more efficient?

**Keywords:** Robot Journalism, Artificial Intelligence, Technological impacts on journalism, Automated Journalism.

### 1. INTRODUCTION

Perhaps one of the most important pivotal stations in the development of journalism in the world after the invention of printing was the technical uses of computers, which paved the way for qualitative changes that revolutionized all aspects of media process.

A new idiom "Robot Journalism" was created recently, meaning the use of robots in making journalistic content. 75% of media platforms, according to a study prepared by Reuters, have started using artificial intelligence in a real way to create content that forms the backbone of the media<sup>(1)</sup>, The developer of one of the first robot journalist story writers, Kristian Hammond of Narrative Science, predicted that 90 % of the journalistic stories would be written by robots within 5–10 years. Ray Kurzweil predicted that by the year 2040 computers will outsmart the human brain, at a point known as the "technological singularity"<sup>(2)</sup>.

After using the computer for press editing in all its stages, including archiving and reorganizing the journalistic work, the internet has opened a wide field for research and communication in new forms, and in journalistic writing patterns, which paved the way for the birth of electronic journalism that distinguished from paper journalism with multiple characteristics, especially after the widespread use of mobile journalism and the emergence of robot journalism with artificial intelligence technology.

There is a divergence in the concept of communication technology in general, as the literature review dealt with technology as a compound idiom with two syllables, (Techno), which is a Greek word meaning: craft, profession or art, and (Logy) which is a suffix means science.

There are those who considered that the first part of the word is derived from the English word (Technique) as it means technology or applied performance, based on the link between the Greek and English words in terms of linguistic derivation, and also the meaning, the craft at the end is a technical or application for a particular idea<sup>(3)</sup>.

(1)Kamli, Hatem (2018). *How Artificial Intelligence Will Change the Content Industry in Media and Digital Marketing*, retrieved April 12, 2020 from <https://cutt.us/s1rC5>.

(2) Latar,Noam (2015). *The Robot Journalist in the Age of Social Physics: The End of Human Journalism?.* In *The New World of Transitioned Media*, Springer, Cham, p76.

(3)Essani, Rahima (2010). *Modern Technical Multimedia and its Impact on the Audiovisual Media*, Riyadh: The Cooperation Council for the Arab States of the Gulf, p24.

But this concept is general, and it seems from a scientific point of view a limited concept, especially if technology is linked to means only, like using computers and modern devices such as smart phones and digital cameras, the technology meant in this study exceeds the technical use of the machine, and goes beyond that to a new way of working, and new thinking in the media environment in a comprehensive way.

Idiomatic definitions of media technology says its "a set of different technologies, tools, means, or systems that are used to treat the content of mass communication process, through which information, visual, audio, written, or visual information and data are collected, store, retrieve, publish, and transfer it from one place to another and exchange it<sup>(1)</sup>.

Since the eighties of the twentieth century, the field of media communication witnessed major changes resulting in particular from an unprecedented development in technology that imposed the speed of news, live broadcasting and receiving<sup>(2)</sup>, due to technological development, which is defined as "the accumulated knowledge and experience available and tools, material, and organizational means used by man In performing a job in his daily life to satisfy the material and moral needs<sup>(3)</sup>.

France Stuart says technology is constantly changing with new or improved products and new tools for old materials, and with new technology in production, the need to acquire technology is not once and for all, but rather it is an ongoing process<sup>(4)</sup>.

## 2. STUDY AIMS

This study aims to reveal the impact of technology on journalistic process, and how journalism used computers, especially in editing process. It also deals with the emergence of artificial intelligence technology and the concept of robot journalism, and their impacts on journalism environment and the uses of artificial intelligence in journalism, as statistics show that 127 billion dollars is expected to be spent on artificial intelligence investments in journalism the study tries to answer a simple question: is using artificial intelligence in journalism would replace human journalists or it would enhance their work?

## 3. METHODOLOGY

The researchers used qualitative methods such as observation, analysis of documents, and systematic review of the literature, data was collected from books, news articles, websites, published and unpublished studies.

## 4. TECHNOLOGY AND JOURNALISM

Journalism benefited from the rapid technological developments, even journalism arose due to one of the most important technological developments in the history of mankind, the invention of printing. The use of technology in the modern era has gone through two stages:

### 4.1. Using of Electro-Mechanical Computers in Writing

With the beginning of the Second World War, governments supported many experiments to develop computers, which opened the way towards the electro-mechanical properties of machines<sup>(5)</sup>, and the use of computers in journalism in the united states began in the fifties to collect, and write, and its use extended to storing a large amount of information, classification, organization and speed retrieval<sup>(6)</sup> and its ability to communicate with other sources of information, and interact with them, especially in sending and receiving information<sup>(7)</sup>.

At the beginning of the twenty-first century, it's impossible to dispense with computers in all journalistic work; every stage of journalistic work is accompanied by the use of computers, due to its

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(1) Ibid, p26.

(2) El-Qaableh, Idriss (2003). *Press and its Development*, Modern Dialogue, No. 580.

(3) Alameddin, Mahmoud (1990). *Information Technology and the Mass Communication Industry*, Cairo: Al-Arabi for Publishing and Distribution, p10.

(4) Abu-Osba, Saleh (1989). *Studies in Media and Arab Development*, Dubai: Bayan Foundation publications, p217.

(5) Saad, Saad (2019). *Electronic Journalism*, Riyadh: Dar Al-Khwarizmi Scientific, p25.

(6) Salama, Abdel Hafiz (1996). *Communication and Technology in Education*, Amman: Dar Al Fikr for Printing and Publishing, p36.

(7) Ibid, p36.

high speed in word processing, in getting results, in high accuracy in coordination and storage, and communicating with others with great ease and a short time<sup>(1)</sup>, especially with the emergence of the Internet and its applications in the world of journalism.

### **4.2. Emergence of the Internet And Uses in Journalism**

In the early nineties; The Internet began to enter the newsroom extensively in the American and Canadian newspapers, and in many other countries for use in writing and editing, until the Internet became a primary means of gathering information, news and communication, which resulted in a major shift in journalistic performance and practices, and journalists found themselves in front of a new means forced them a new challenges<sup>(2)</sup>.

One of the results of the Internet revolution was the emergence of electronic journalism, which according to some historians goes back to "Simon Pines" as a result of cooperation between BBC, and IBA (Independent Broadcasting Authority) in 1976 as part of the Teletext\* service, and in 1979 a second, more interactive service known as the Videotext\*\* Service appeared<sup>(3)</sup>.

Newspapers are increasingly turning to electronic publishing. In 1991, there were only 10 newspapers on the Internet, then this number increased to 1,600 in 1996, and the number of newspapers in 2000 on the Internet reached 4,000 newspapers worldwide, and about 99% of large and medium newspapers in the United States of America publish their pages on the Internet, and today; Almost all of the newspapers have their own website.

The emergence of the phenomenon of electronic journalism and its tyranny over the Internet stimulated the atmosphere for the launch of another new form of journalism called (news websites), despite the indications of this name; It has not gone out of being an integrated newspaper in terms of its contents, subject to the same electronic determinants<sup>(4)</sup>, as well as newsgroups, which are a group of people with common interests, it can be described as a round table that includes a number of individuals so that anyone can look at messages from one person to another<sup>(5)</sup>, and has evolved to blogging, and blogs\*\*\* have emerged remarkably, especially with the emergence of social networks that have come to control the content and quantity of the written material. For example, "Twitter" site imposes a certain number of words.

These networks are no longer merely personal impressions, and translations of the behavior of individuals and groups, but rather an important source for many newspapers and news channels, and writing has entered into another stage completely different from the previous one, with special characteristics, such as links, hypertext, comments, sharing, and interactivity.

## **5. TECHNOLOGICAL IMPACTS ON JOURNALISM**

world of journalism has witnessed in recent years, many changes and transformations that affect the core of journalistic work, whether in gathering information process, editing and publishing news, managing the journalistic work, or in the nature of the parties involved in the journalistic process.

These changes have reflected on the relationship between the journalist as a producer of news and the public as a consumer and recipient, The journalist is no longer the only producer of information, news

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(1) Mahdi, Ali Abdullah (1998). *Computer and Modern Approach*, Riyadh: Dar Al-Kutub, p65.

(2) Turban, Majed (2008). *Internet and Electronic Journalism*, Cairo: AldarAlmesriaAlibnania, p228.

\*Non-interactive systems that TV companies broadcast on some of their channels when normal transmission is stopped, and they are received either by television or computer screens.

\*\*Systems displaying texts and graphics in a form similar to an e-book, has many features represented in the preservation and retrieval, as well as entry between information particles on the system, and this system is has the ability to store a large amount of information, and update information easily and quickly, it is available to anyone who owns a phone line and suitable receiver screen.

(3) Alameddin, Mahmoud (2008). *Principles of Journalism in the Twenty-first Century*, Cairo: Dar AlnahdaAlarabia, p19.

(4) Al-Dulaimi, Abdel-Razzak (2011). *New Media and Electronic Journalism*, Amman: Wael Publishing, p214.

(5) Underdahl, Brian, & Underdahl, Keith (1998). *Internet*, Cairo: Dar El-Farouk, p484.

\*\*\* Blogs began in the mid-nineties of the 20<sup>th</sup> century, with the American blogger "George Bar Garvey" in 1994, with the site "Drag Report", and he was behind the publication of the "Monica Levinsky" scandal, the private secretary of former US President "Bill Clinton" in 1994.

and opinion, while audience is no longer just a passive recipient of it, but has become an active participant in the journalism process, this has led to many transformations related to the identity of journalism, its mission, roles and practices<sup>(1)</sup>.

Contemporary journalism found itself facing new challenges, whether in abundance of information sources or in the speed of its transmission<sup>(2)</sup>, It has become possible to transfer information very quickly and on a large scale which led to almost a revolution in media<sup>(3)</sup>.

The technological developments that reached the world of journalism created an alternative to newspaper, the Internet was the environment that publishers preferred to be the new space for journalism, because internet added new features to journalism that was favored by readers, and publishers took that advantage<sup>(4)</sup>.

News writing in electronic journalism has become a mixture between journalism, Radio and television, using hypertext and multimedia which enabled the recipient to live the event directly.

Modern technologies have brought a qualitative shift in journalism, speed of transferring news, editing news, through two features that characterize electronic journalism editing: focus and abridgement, also using events pictures instead of personal ones, and use of short sentences because online reader always in a hurry and don't have time to read a long sentences<sup>(5)</sup>.

Therefore, two perceptions in writing and editing of electronic journalism can be found:

### 5.1. Combining Writing, Editing and Design<sup>(6)</sup>

Poynter Institute\* introduced this new perception of journalistic editing, which indicates the merging between writing, editing and design, as a necessity to produce any media material, whether printed or electronic, this perception assumes that if integration and merge between these elements rise, it helps to obtain instant innovative releases.

### 5.2. The Concept of Procedural Writing

This concept requires from electronic news editor the skill to deal with the communication environment which has a diverse elements and vocabulary, and the skill to link these elements, and combine them in a new form of writing that benefits from digital media<sup>(7)</sup>, therefore it's a new concept of writing and building information in a computer environment<sup>(8)</sup>.

Journalistic editing has changed, it's no longer the same as in traditional newspapers, technological developments have forced journalistic editing to a set of variables to be balanced and intersecting with requirements of electronic newspapers, that means articles must consider the following:

#### 5.2.1. Editing Articles According to Hypertext Concept<sup>(9)</sup>

Hypertext relates to another set of texts associated with it through specific signs; it is marked within the original text, when it is activated; it opens to other texts, which may be text, audio, visual, or all together, whether they are available within the newspaper website or at another websites, the user can

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(1) Bakhit, Elsayed (2008). Roles of Websites Users in Creating Media Content, *Egyptian Journal of Public opinion*, 9(2) July - December, p3.

(2) Abdul Amir, Al-Faisal (2006). *Electronic Journalism in the Arab World*, Amman: Dar Al-Shorouk for publication and distribution, p32.

(3) Khattab, Amal (2010). *Modern Communication Technology and its Role in Developing Journalistic Performance*, Cairo: Dar AlaalemAlarabi, p34.

(4) Abdul Majeed, Laila, & Alameddin, Mahmoud (2004). *Art of Journalistic Editing of Newspapers and Magazines*, Cairo: Al-Sahab for publication and distribution, p2.

(5) Abu Aisha, Faisal (2010). *Electronic Media*, Amman: Dar Osama for Publishing and Distribution, p109.

(6) Alameddin, Mahmoud (2008). *Principles of Journalism in the Twenty-first Century*, Op. cit. p221.

\* American institute specialized in journalists training, has published several brochures, offering training scholarships for students and journalists.

(7) Alameddin, Mahmoud (2008). *Principles of Journalism in the Twenty-first Century*, Op. cit. p221.

(8) Abdul Majeed, Maha (2004). *Egyptian Public Uses of the Daily Electronic Newspapers on the Internet*, Master thesis, Cairo university.

(9) Ghali, Mehrez (2009). *Journalism Industry in the World, Challenges of the Current Situation and Future Challenges*, Cairo: AldarAlmesriaAlibnania, p95.

navigate and benefit from the articles that interest him, and these words in hypertext called "active words".

### 5.2.2. Editing Articles According to Multimedia Concept<sup>(1)</sup>

The concept of multimedia indicates to a system that provides the editor an opportunity to express information in various forms, including: text, sound, and image, interactivity is the most multimedia's advantage, allowing the reader to search words by keywords and signs, through a huge amount of information and this feature has created an important shift related to the editor's work in the electronic newspapers, in addition to audio and video; the editor in the electronic newspapers can rely on texts and pictures, this indicates that in the presence multimedia, the value of using words decreases in traditional journalism.

## 6. ROBOT JOURNALISM AND ARTIFICIAL INTELLIGENCE TECHNOLOGY

The idea of teaching computers to understand human language emerged as a field in the 1950s as part of machine translation, as when IBM and Georgetown University demonstrated a computer that could translate Russian sentences into English in 1954<sup>(2)</sup>.

The artificial intelligence began with scientist John McCarthy who originally introduced this idiom in 1956, he defined it as "science and engineering of making smart machines" at the Massachusetts Institute of Technology (MIT) in 1958, he started with his partner in Turing Award Marvin Minsky the Artificial Intelligence project, they studied several fields such as: Robotics, computing theory, common sense logic, and human-computer interfaces, he also invented programming language (LIST Processor), which became a preferred tool in artificial intelligence researches and education to this day, its considered as the second oldest programming language after Fortran.

There is a saying that the roots of artificial intelligence researches were in the 1940s with the spread of computers and their use, in 1950s there were a lot of attention on neural networks, the research activity in the sixties moved towards systems based on the representation of knowledge that continued to work during the seventies, and with the beginning of the eighties and after the announcement of the Japanese project which embraced the fifth generation of computers, there was a big breakthrough in artificial intelligence researches<sup>(3)</sup>.

The beginnings of automated journalism were modest. In 2007, Robbie Allen, an engineer at the networking hardware and software company Cisco, set up an online sports network called "Stat Sheet". As he later remarked in a post for Automated Insights, Allen started the company to keep track of – and publish – information on basketball teams<sup>(4)</sup>.

Automated news introduced to newsrooms around 2010 in the United States by software companies Narrative Science and Automated Insights, their software already produces hundreds of thousands of texts for news organizations, including respected media companies such as Associated Press and Forbes. In Europe, automated news is still in the experimental stage: companies in Germany, France and United Kingdom are offering limited services to a few media customers, mainly news on the stock market, weather forecasts and football, In the Nordic region, the Swedish newspaper company "Mittmedia" is producing automated localized weather reports for each municipality in the circulation area and sports news is in the test stage<sup>(5)</sup>.

Now a days Artificial intelligence has many applications, whether it is with general purposes such as perception and reasoning, or tasks with a special purpose such as playing chess or medical diagnosis!

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(1) Abdel-Fattah, Ali (2014). *Electronic Journalism in the Shadow of the Technological Revolution*, Amman: Al-Yazouri Scientific House for Publishing and Distribution, pp72-73.

(2) Whittaker, Jason (2019). *Tech Giants, Artificial Intelligence and the Future of Journalism*. Taylor & Francis, p108.

(3) Saad, Saad (2020). Public Relations in the Age of Artificial Intelligence: Transformations and Uses, Accepted at *Journal of El-Ryssala for Media Studies*, 4(2).

(4) Whittaker, Jason, Op. cit. p110.

(5) Linden, Carl-Gustav (2017). Decades of Automation in the Newsroom: Why are there Still so Many Jobs in Journalism?, *Digital journalism*, 5(2), pp129-130.

Often, experts and scientists turn to artificial intelligence to preserve their life experiences and expertise's, the field of artificial intelligence is a global sphere fits all orientations<sup>(1)</sup>.

At the first quarter of 2017, Associated Press was able to write 4000 stories using its so-called NLG technology, a branch of artificial intelligence technologies, and specifically using the (Automated insights) tool<sup>(2)</sup>.

Early examples of the use of NLG technology to automate journalism are mostly confined to relatively short texts in limited domains, but are nonetheless impressive in terms of both quality and quantity, the number of text documents generated substantially exceeds what is possible from manual editorial processes, automated writing tools are therefore increasingly being integrated into publishing workflows<sup>(3)</sup>.

### 6.1. Definition of Artificial Intelligence

"It's a system's ability to explain external data correctly, learn from this data, and use that knowledge to achieve specific goals and tasks through flexible adaptation", and public relations field its considered "the study and design of smart clients", smart client is a system that absorbs its environment and takes attitude to increase the chance to succeed in achieving missions<sup>(4)</sup>, Ian Rich believes that artificial intelligence is a science that studies how to make computer perform tasks that humans do less.

In the early 1980s, two academics, Avron Barr and Edward Feigenbaum, proposed a definition of Artificial Intelligence (AI) says: is the part of computer science concerned with designing intelligent computer systems, that is, systems that exhibit the characteristics we associate with intelligence in human behavior, understanding language, learning, reasoning, solving problems and so on<sup>(5)</sup>.

So the science of artificial intelligence aims "to understand the nature of human intelligence by making computer programs able to imitate intelligent human behavior", and the ability of a computer program to solve a problem, or make a decision in a situation, or to reach a decision by referring to Many of the various inferential processes, this is an important turning point beyond what is known as information technology.

The appearance of the "Media Robot" has changed the roles of the media industry today and in the future, as it can write a news story in two minutes at maximum, and this is a key factor that enables newspapers to compete in the light of the speed of broadcasting news,

Intelligent machines can turbo-power journalists' reporting, creativity and ability to engage audiences. Following predictable data patterns and programmed to "learn" variations in these patterns over time, an algorithm can help reporters arrange, sort and produce content at a speed never thought possible<sup>(6)</sup>.

### 6.2. Definition of Robot Journalism

The idiom "robot journalism" indicates technologies that use artificial intelligence to generate news articles based on pre-models and huge data that software is provided with, to be analyzed and auto learning, using it produce news, articles and reports at a record speed without relying on humanfactor, (AI Journalism) refers to media use of the techniques of artificial intelligence and innovations of the fourth industrial revolution, such as high-resolution 3D imaging technologies, high-speed Internet, the

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(1) Mohamed, Al-Hadi (2005). *E-Learning via Internet*, Cairo: AldarAlmesriaAlibnaniam, p165.

(2)Kamli, Hatem, Op. cit.

(3) Caswell, David &Dörr, Konstantin (2018). Automated Journalism 2.0: Event-Driven Narratives: From Simple Descriptions to Real Stories. *Journalism practice*, 12(4), p478.

(4)Kaplan, Andreas,&Haenlein, Michael(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), p15.

(5)Barr,Avron, FeigenbaumEdward(1981). *The Handbook of Artificial Intelligence: Volume 1* , New York: William Kaufmann inc., p 3.

(6)Ronderos, Maria (2018).*Artificial intelligence demands genuine journalism*, retrieved May 21, 2020 from <https://cutt.us/R6qHI>.

Internet of things, and robots, to produce its own media content, and perform specific tasks in the news industry<sup>(1)</sup>.

It's also known as robot journalism, or Automated journalism, or Algorithmic journalism, which produce news by artificial intelligence programs, by machines rather than human correspondents, where these programs interpret, organize, and display data in ways that can be read by humans<sup>(2)</sup>.

Narration is now becoming a new field of research by artificial intelligence software writers taking advantage of the vast body of knowledge regarding linguistics and the study of natural language. AI algorithms are being composed that can convert facts and new insights derived from data silos employing data analytics (data mining) into readable stories in a fraction of a second. This is Robotic Journalism<sup>(3)</sup>.

The rise in recent years of “robot journalism” is based on a new and exceptional use of algorithms, artificial intelligence (AI) software platforms and natural language generation techniques, these algorithms are able to generate textual and visual journalistic content automatically and (to some extent) autonomously, and their output “can be fully customized to fit a customer’s voice, style and tone<sup>(4)</sup>.

The performance of the robot wasn’t only editing, but also exceeded it to process data and statistics, as the famous economic magazine “Forbes” offered to its readers its expectations for stock market and the results of economic companies, based on the program “Narrative Science” invented by a small American company in north Chicago, this company is interested in data and news related to money, real estate and sports, relying statistics and analyzes it collects from various sources<sup>(5)</sup>.

This development considered another manifestation of technological progress that will lead to major transformations in the structure of media institutions and its methods of work, and represents a unique case in collecting and writing news, as well as preparing and writing analyzes on various events and issues; this will lead to important shifts in the concept of media, its characteristics, mechanisms and societal impacts<sup>(6)</sup>.

The first and most ambitious endeavor to create a three-dimensional robot journalist that can mingle in a crowd was made by a Japanese team led by Matsumoto of University of Tokyo in 2007. The algorithm was programmed for autonomous exploration, recording of news, and generation of articles<sup>(7)</sup>.

## 7. MEDIA INSTITUTIONS AND THE USE OF ARTIFICIAL INTELLIGENCE<sup>(8)</sup>

Currently, only a few media organizations employ automated journalism, despite their scarce number, they include prominent news players such as Associated Press, Forbes, and the Los Angeles Times. Typically, algorithms characterize stories that use numbers and statistics, such as sports, real-estate market analysis, and weather, it is predicted to expand to additional domains, while performing as a stopgap for understaffed media organizations<sup>(9)</sup>, and slowly, many main stream media institutions are trending towards the use of artificial intelligence and its implementations in the news and media sector, such as:

### 7.1. The New York Times

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(1)Hashem,Zahir (2020).*Robot Journalism, Artificial Intelligence Leads Future Journalism*. Tech Arabia, retrieved May 22, 2020 from <https://cutt.us/Ums17>.

(2)Sadiq, Abbas (2018). Robot Journalism: The Way is Paved for Full Automation in the Media Industry, *Al-Khalij Radio and Television Magazine*, 34(114) September, p50.

(3)Latar,Noam,Op. cit., p66.

(4)Montal, Tal,& Reich,Zvi (2017). I, Robot. You, Journalist. Who is the Author? Authorship, Bylines and Full Disclosure in Automated Journalism. *Digital journalism*, 5(7), p829.

(5)Kamli,Hatem,Op. cit.

(6)Al-Sarayrah,Muhammad, &Tumar,Shorouk (2018).*Robot Journalism Industry and its Professional and Ethical Challenges*, Doha: Al Jazeera Centre for Studies, p7.

(7) Latar,Noam,Op. cit., p70.

(8)Al-Rawi,Taha (2019).*Journalism Automation: Between Threatening Journalists and Enhancing Their Position?*, Retrieved May 21, 2020 from <https://www.noonpost.com/content/30030>.

(9)Montal, Tal,& Reich,Zvi, Op. cit. p830.

The New York Times introduced artificial intelligence systems to work for the first time in 2015, as the programmers developed an algorithm known as the "editor" that helps journalists write their articles. When writing an article, the journalist distinguishes some phrases, titles, or key points of the text, over time, the system learns to recognize these semantic signs and to find their location in other articles, making it easier for the journalist to gather news.

The newspaper also used AI systems to respond to comments and combat abusive comments, which led to the expansion of the number of responses and the newspaper's, that's save the of efforts of a team of 14 employees were following up and responding to over 11.000 readers' comments per day.

### **7.2. BBC**

"BBC" is considered as enormous repository of data, from daily news to government and internet news sources in addition to the archive producing a mountain of data, so BBC has used a data mining tool known as "Juicer" since 2012, which provides a great way to link these Data together make it easier and more meaningful at the same time, about 850 news outlets use feeds produced by "Juicer" and certified as a news reference.

### **7.3. Reuters**

In 2016, Reuters partnered with "Graphiq" to provide news publishers with a wide range of free data on various topics, including entertainment, sports, and news, this data is constantly subject to scrutiny and update, making it easier for journalists to easily access the news.

### **7.4. Washington Post**

In 2016, the "Washington Post" launched its experience of automated journalism through the "Heliograf" program, starting in the Rio Olympics, where the system collects news by analyzing data as it appears, and then places it in pre-customized news templates, after which the system creates an appropriate storytelling for the news.

### **7.5. Associated Press**

The agency used AI systems in 2017 to sort and name thousands of news pictures that the agency deals with every day, the system can distinguish images through content and shooting style, and detect whether the images contain violent scenes or not.

### **7.6. The Guardian**

London's "Guardian" newspaper launched "Chatbot" in 2016, to save time browsing and searching for news, this program allows users to choose the type of version, whether for the United States, the United Kingdom or Australia, with a choice of when to receive the news, and the user can specify the type of news, whether sports or political, as well as the system displays articles with content similar to the readers' preferences.

### **7.7. Bloomberg**

"Bloomberg" uses an artificial intelligence tool produced by "Cyborg" Automation Technology, this tool allows reporters to produce thousands of articles per month, now, about a third of the content on the Bloomberg website is produced by artificial intelligence.

## **8. EFFECTS OF ROBOT JOURNALISM ON THE MEDIA ENVIRONMENT**

Artificial intelligence and robot journalism would make a huge effects on media environment in the near future, at many levels such as:

### **8.1. Dealing with Data**

According to Matt Carlson, author of "The Robotic Reporter", the algorithm converts data into narrative news text in real-time, many of these being financially focused news stories since the data is calculated and released frequently, which is why should be no surprise that Bloomberg news is one of the first adaptors of this automated content. Their program, Cyborg, churned out thousands of articles last year that took financial reports and turned them into news stories like a business reporter, Forbes



also uses an AI tool called "Bertie" to assist in providing reporters with first drafts and templates for news stories<sup>(1)</sup>.

### 8.2. Uncover Fake News

Robot Journalism tools also help to detect and uncover misleading information and fake news by subjecting it to analysis and comparison to validate it, monitoring the credibility of content in various mass media, and prepare more accurate and transparent reports, these tools are used clearly in social networks such as Facebook and Twitter to counter the fake news that negatively affected the credibility of content makers, and had broad global social and political implications. Social media platforms make great efforts to fight rumors, fake news and misleading information, using artificial intelligence tools to identify fake accounts, fake news, and for-profit news only<sup>(2)</sup>.

### 8.3. Journalistic Translation

One of the major variants of artificial intelligence is auto translation, foreign reporters usually report in one language and write in another language - for example, conducting an interview in Arabic and writing the article in English, but with a quick auto translation, journalists direct the news in any language they prefer and translate it using artificial intelligence, the reporter checks the final version before presenting the story, although robots make mistakes, they don't repeat the same mistake<sup>(3)</sup>.

### 8.4. Gaining Time

It seems that the development of these applications and the improvement of the capabilities of creative robots is proceeding faster than we expect, as recently published by "China News" that Chinese experts have managed to manufacture the first "journalist" robot in the world capable of writing articles, according to the website: "The new robot named Zhao Nan was able to write an article, and become (robot journalist) in the world that was able to accomplish the task, and wrote a text consisting of 300 written symbols in just one second"<sup>(4)</sup>.

Associated press predicted that an investigative article which takes months of work by a team of investigative journalists would take in 2027 only one day using artificial intelligence<sup>(5)</sup>, the agency estimates that AI helps to free up about 20 percent of reporters' time spent covering financial earnings for companies and can improve accuracy, this gives reporters more time to concentrate on the content and story-telling behind an article rather than the fact-checking and research<sup>(6)</sup>.

### 8.5. Human Resource Development

Artificial intelligence and automation are far from reducing the number of jobs in journalism, as some think, on the contrary, they would provide new job opportunities, as tomorrow's journalists will need to be trained in designing these algorithms, updating and modifying them, verifying their validity, correcting, supervising and maintaining them, media institutions will also need more programmers and computer engineers in order to constantly develop its algorithms and preserve the credibility of the news by combating fake news and preserving newspaper sites from hacking<sup>(7)</sup>.

### 8.6. Production of News Stories

Artificial intelligence carries a lot of development for the world of journalism in terms of quantity and quality, as it can be used to produce a tremendous amount of news stories compared to what news agencies produce today, by converting data and numbers into texts, as well as converting texts into videos that summarize the event. Artificial intelligence can be used to do multiple templates for the same story, various aspects such as making tweets and titles, a brief summary of the news story and

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(1)Martin,Nicole (2019).*Did A Robot Write This? How AI Is Impacting Journalism*, Forbes, retrieved May 22, 2020 from <https://cutt.us/2ti5w>.

(2)Hashem,Zahir, Op. cit.

(3)Nabil,Mohammed (2019).*Will Artificial Intelligence Replace Media Makers?* retrieved April 11, 2020 from <https://cutt.us/6K3Z4>.

(4)Assem,Dalia (2017).*Artificial Intelligence and the Future of Journalism: Are We Ready?* AlsharqAlawsat Newspaper, No. 14118, retrieved May 20, 2020 from <https://cutt.us/zvxtZ>.

(5)Bin Al-Sharif,Khaled (2018).*What will be the Impact of Artificial Intelligence on Journalisms after 10 Years*, Retrieved May 20, 2020 from <https://cutt.us/FGrRb>.

(6)Martin,Nicole, Op. cit.

(7)Al-Rawi,Taha, Op. cit.

write a summary of the event's characters, artificial intelligence also help journalists to identify names of officials through image recognition techniques<sup>(1)</sup>.

### 8.7. Performance Enhancement

Intelligent robots can increase the momentum of journalists' reports, creativity, and their ability to draw the attention of the audience by following data models, and programming it to "learn" the variables over time, Algorithms can help journalists to arrange, sort, and formulate texts at a speed unimaginable, it is able to organize data in order to find the missing link in any investigative report, It can also identify trends and monitor abnormal among millions of data points that may form the beginning of a great journalistic scoop<sup>(2)</sup>.

### 8.8. Producing a Content Compatible with the Recipient

Artificial Intelligence journalism can develop a "robot" that specializes in all sections of editorial and journalistic writing whose mission is to support cooperation with information networks, and their sources locally or internationally to obtain the interests of the targeted audience, receive information about audience categories and analyze it, and formulate various media messages according to each means, and store that information to support impact campaigns on political or social issues to serve the local audience. Artificial intelligence does not stop at receiving or searching for information, but it makes information, stores and analyzes it, and race to gain audience interests and broadcast the appropriate content that corresponds to those interests in a fast, accurate and more intelligent manner<sup>(3)</sup>.

Now there are 5 uses of artificial intelligence in journalism<sup>(4)</sup>:

- Tracking breaking news to alert journalists with new information related to the event.
- Conducting a search faster and more accurately, linking information quickly and efficiently, and converting it into graphic forms.
- Automatically correct language spelling and grammar.
- Quickly and reliably examine facts and discover fake news, such as the algorithms that Facebook began using in order to get rid of fake news.
- Automatically generate short news on topics based on statistical data.

## 9. CONCLUSION

Finally, is AI will going to replace humans in media industry? Or it would help them to improve their career?

There is no doubt that AI is going to affect the way the media works in many fields, now, there are only 15% of automation in reporters' work around the world and 9% of the editors' work, of course many jobs and tasks will disappear, and robots will do these tasks, but, AI will surely not replace humans in the near future, on the contrary, humans will remain the controllers and supervisors of AI and would benefit of these technologies to do their work fast, accurate and more efficient.

Patrick White, a professor of journalism at Quebec university at Montreal argues that one of the dangers of AI, on the other hand, is algorithm bias, because algorithms are designed by humans, there will always be biases that can alter data analysis and lead to serious consequences. And human verification of content before publication will always remain a safeguard against errors<sup>(5)</sup>.

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(1) Gibbs, Lisa (2019). *Associated Press Experience Using of Artificial Intelligence*, Arab Media Forum (17) Dubai, Retrieved May 20, 2020 from <https://www.arabmediaforum.ae/>.

(2) Al-Okaili, Dalal (2019). *Artificial Intelligence and the Future of Journalism*, Retrieved May 20, 2020 from <https://m.annabaa.org/arabic/informatics/18987>.

(3) Abdel Zahir, Mohamed (2019). *How does AI journalism change the world?* Retrieved May 22, 2020 from <https://cutt.us/IeHoc>.

(4) Bin Al-Sharif, Khaled, Op. cit.

(5) White, Patrick (2020). *How Artificial Intelligence Can Save Journalism?*, Retrieved May 23, 2020 from <https://theconversation.com/how-artificial-intelligence-can-save-journalism-137544>.

There is a widespread consensus that the potential for NLG technology to automate journalistic writing is limited to simple descriptions that are already commonly represented as data, the most obvious examples being the writing of routine sports and financial news, but NLG technology has not yet been shown to be suited to the production of longer-form news articles and it is unable to incorporate the storytelling value of more sophisticated, and more valuable<sup>(1)</sup>.

After all, human mind is a sacramental secret, our relationship with words is a unique and profound relationship; no robot can go through the authorship experience, the writing process is fluctuating, or even confusing, that can be quantified and formulated; but unpredictable, the computer's understanding of life will not exactly coincide with our understanding, whatever its capabilities. In addition, it always stands behind the success of the journalism in the end a wonderful individuals with their ideas and work that are constantly changing and evolving into creativity and inspiration<sup>(2)</sup>.

Certainly, success of these technological implementations in journalism will depend on how journalists apply the new tools, Artificial intelligence is a human invention, and all the ethical, editorial, and economic implications in producing traditional news content are still applied to this new era of enhanced journalism.

This global trend towards more use of AI would force many media institutions to adapt it so quickly and do more effort to train their employees on these programs and technologies, its expected over the next 15 years that robots would produce 90% of business and financial articles<sup>(3)</sup>.

In his book: "Newsmakers" Francesco Marconi, who has led the development of the Associated Press and Wall Street Journal's use of AI in journalism, offers a new perspective on the potential of these technologies. He explains how reporters, editors, and newsrooms of all sizes can take advantage of the possibilities they provide to develop new ways of telling stories and connecting with readers., he tried to answer confusing question, will the use of artificial intelligence (AI), be the end of journalism as we know it, or its savior?<sup>(4)</sup>.

Still, artificial intelligence in journalism remains with mistakes, errors and mislead, many journalists are worried that robot content could discredit reliable media outlets that they write for by not producing quality content, it would take a while until its superiority over humans in emotions understanding and dealing with historical background and sympathy with humans, Artificial intelligence is feared to be unable to cope creatively, critical thinking, emotional perspective, or sense humor.

Human journalists will find it difficult to compete with robot journalists, unless they understand the limitations of AI in journalism. These limitations, once understood, offer human journalists many opportunities to preserve their profession and to use AI algorithms to gain more influence<sup>(5)</sup>.

It's clear that there are numerous significant challenges to overcome before event-based approaches could be used in production editorial environments to automate journalism, These challenges can be loosely grouped into two categories: those relating to the availability of structured event and story data, and those relating to the editorial skills required to author the logic and text fragments of templates, and the text descriptions of activity associated with structured event frames<sup>(6)</sup>.

Waddell (2017) study reveals that news assumed to be written by a machine is perceived as less credible than news declared to be written by a human, it appears that news writing is still largely perceived as "a human's job." Although machine-based automation is commonplace and accepted in fields such as automobile production or clothes manufacturing, it remains relatively novel and unexpected in a domain such as news production<sup>(7)</sup>, Journalists see "robotic journalism" as an

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(1) Caswell, David, &Dörr, Konstantin, Op. cit. p478

(2)Al-Okaili,Dalal, Op. cit.

(3)Al-Rawi,Taha, Op. cit.

(4)Marconi, Francesco (2020). *Newsmakers: Artificial Intelligence and the Future of Journalism*, Columbia University Press, p2.

(5) Latar,Noam,Op. cit., p76.

(6)Caswell, David, &Dörr, Konstantin, Op. cit. p491

(7)Waddell, Franklin (2018). A Robot Wrote this? How Perceived Machine Authorship Affects News Credibility. *Digital journalism*, 6(2), p248.

opportunity to make journalism more human. When routine tasks can be automated, journalists will have more time for in-depth reporting<sup>(1)</sup>.

There is no doubt that technological developments, no matter how changed in the media environment, must be matched by a specialized academic programs, and this is what is required in universities, colleges and departments of the media in the Arab world, given that these transformations would shape the future media landscape.

Perhaps this shift may be delayed somewhat in the Arab region due to the absence of a specialized technical hand, which requires journalism institutions to seek the help of and specialists and developers of software and smart applications as a temporary. In all cases, the future of the media, even if the machine and Artificial intelligence overwhelm it, will depend on the work of journalists, along with new equipment and programs.

Technologists predict that creative occupations such as journalism are the least susceptible occupations to workplace automation<sup>(2)</sup>, as Jonathan Stray has written for Columbia journalism review, artificial intelligence won't replace journalism so much as augment it<sup>(3)</sup>, says: I feel huge sympathies for many journalists who face increased competition from software, but also believe that software is simply incapable, for the foreseeable future, of achieving many of the tasks required of human writers, however, is not a threat to journalism, yet<sup>(4)</sup>.

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(1) Latar,Noam,Op. cit., p76.

(2)Linden, Carl-Gustav, Op. cit. p124

(3)Stray,Jonathan (2016). The Age of the Cyborg, *Columbia Journalism Review*, Retrieved May 23, 2020 from [https://www.cjr.org/analysis/cyborg\\_virtual\\_reality\\_reuters\\_tracer.php](https://www.cjr.org/analysis/cyborg_virtual_reality_reuters_tracer.php).

(4)Whittaker, Jason,Op. cit. p103.

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