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The Impact of Artificial Intelligence Applications on Media Industries: A Prospective Study

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Abstract

Much development has been so far observed in the role of artificial intelligence applications in media. We in this research made an attempt to predict the future impact of these applications on media. To this end, interviews were conducted with several university professors, asking them about their opinions in this regard. We asked them several questions (e.g. How can we describe artificial intelligence applications in media? Are they a new form of media with old technology, a new form of media with new technology, or a new form of media with old technology?). We reached several results, the most important are that transformations will occur to artificial intelligence applications in the future. Recommendations have also been discussed.

Keyword: Artificial intelligence applications; media; communication; technology.

1. Introduction

The Fourth Industrial Revolution, which produced the artificial intelligence applications, combines all areas of real life with the digital systems. As a result, unlimited capabilities are produced that help gather and implement tasks based on some information and a huge amount of data in a flow manner and across different networks. Various artificial intelligence applications perform tasks more accurately and faster than human mind. Using these applications in the field of health, education, and economic management has notched up

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success and helped to solve many problems related to those tasks, and to achieve results with a higher level of efficiency and accuracy.

The profound influence of media (communication) industries in boosting the society's knowledge, trends, and behaviors, compounded with the creative nature of the field of work, media the artificial intelligence applications have gained much significance. The use of these applications in media environment, although limited and in its infancy, has been accompanied by rapid developments in media.

We in this research want to throw light on the future effects of artificial intelligence applications on media and communication practices. Moreover, we want to investigate these effects on the mechanisms by which media (communicative) contents are produced, received and interchanged by the public. This purpose can be summarized in the following question:

What is the impact of media artificial intelligence applications on media (communication) industries?

2. Research questions:

Q1: How can we describe artificial intelligence applications in media? Are they a new form of media with old technology, a new form of media with new technology, or a new form of media with old technology?

Q2: What are the most prominent features of artificial intelligence applications in media?

Q3: What is the potential role played by all the following applications: (algorithms – cloud computing - drones - Internet of things - robots) in bringing about specific transformations of mass communication?

Q4: What are the professional transformations that the applications of artificial intelligence in media may cause to each of (communicator - communication medium - content - audience)?

Q5: The potential transformations in artificial intelligence applications will affect which media function the most?

Q6: What are the challenges facing the use of artificial intelligence applications in media globally and the Arab world?

Q7: What future scenario, among the proposed scenarios below, do you predict regarding the use of artificial intelligence applications? Why?

• First scenario: Directional or linear, which assumes the means of communication will remain unaffected by the applications of artificial intelligence in media.

• Second scenario: Reforming, which assumes artificial intelligence applications will make changes in the current means of communication without causing radical changes in their work, and their organizational or structural structures, thus resulting in an improvement in their method of work, whereas their functions and effects will remain unaffected in the society.

• Third scenario: Transformational, which assumes artificial intelligence applications in media will bring about radical transformations in the means of communication in terms of form and content. This in turn will result in significant changes in the forms of media practice by the communicator in those media and the formation of a new system that governs the communication process functionally and structurally due to changes in the patterns of producing and receiving media (communicative) contents. Consequently, patterns of exposure, receiving, and interaction of the public with the new content will be inevitably affected.

3. Objectives of the study

1. To provide an accurate description of the applications of artificial intelligence in media;

2. To determine the features of artificial intelligence applications in media;

3. To identify the potential roles that artificial intelligence applications may cause in media;

4. To identify the professional transformations that the applications of artificial intelligence in media may bring about in the components of media (communication) industries.

5. To identify the media (communication) function that is most affected by the applications of artificial intelligence in media.

6. To identify the challenges facing the use of artificial intelligence applications in media globally and in the Arab world.

7. To present a future scenario for the potential impacts that may occur due to the use of artificial intelligence applications in media.

4. Research Significance

The importance of the study is reflected in the following:

• An innovative topic: This study addresses a modern topic, given that these applications are still in the early stages of their use in the production of media content;

• This is a prospective study that adopts a rarely used media research method: the descriptive method; and

• This study helps media decision-makers develop plans that ensure the optimal use of this technology in the development of media industries.

5. Research Design and Methodology

This study, as a prospective study, aims to identify the different directions and possibilities of a particular phenomenon (Abd Al-Hay, 2002: 13). This is also an exploratory study aiming to identify the expected, possible future (Zahar, 2004: 113; Khoma & Vdovychyn, 2021; Lisha & Abdullah, 2021). In this domain, the visualization approach that is based on the predictive use of the visualization will be adopted by studying alternative scenarios and exploring their construction. The predictive use of the visualization allows decision-makers to answer questions, such as what happens when this or that scenario happens (Gabr, 2009: 357)?

We will adopt the visualization approach as an appropriate means to address the questions and objectives of the study.

6. Research Design

1- In this study, we will analyze stakeholders and experts' opinions. That is, stakeholders and experts are interviewed either in person or online. Thus, the Method Delphi was adopted in which the respective academicians in various disciplines are interviewed for once (Al-Saadi, 2011, p. 167).

For this study is connected with the field of media, academicians' contributions were used as the most appropriate means for making expectations. Moreover, the nature of this study requires the use of the qualitative method, not the quantitative one, to address various aspects of media phenomena. We avoided the qualitative method as it is not appropriate for prospective media studies investigating cognitive data and mechanisms of human mental awareness (Abdul Hamid, 2004: 127).

Scenario technique: It is a description about a future situation or an event, among other events, that resulted from a basic situation and illustrates a future situation (Al-Jubeir, 2008: 41).

7. Data collection

1. Primary data: The primary data were collected through a structured interview aiming to elicit specific answers for the questions we developed (Al-Jizan, 2004: 104). A group of experts reviewed the interview questions.

2. Secondary data: The relevant literature was investigated to define the concept of artificial intelligence and to describe the reality of using artificial intelligence applications in media.

8. Research population

Considering the novelty of this study, we chose academicians, and at the same time supporters, specializing in communication, media, and computer sciences who were from various Arab universities.

9. Research sample

To select participants, the following criteria were considered:

• Diversity of specializations: all the relevant fields of media and computer sciences;

• Geographical diversity; and

• Relevant research interest.

Note: For participants were from different countries, the interview with them was conducted via e-mail.

10. Time framework

We investigated a 20-year future period (2020-2040).

11. Research Terms

Artificial Intelligence Applications

As computerized machines, artificial intelligence applications have the characteristics of human intelligence and the ability to detect, process, and make decisions.

Media (Communication) Industries

Through these industries, communication and media contents of various forms are produced by the communicator and broadcasted through mass communication means, in order to exercise an influence on the audience, and to obtain the functional nature of this industry, away from its economic and financial aspects.

12. Underlying Theories

1. Technological Determinism Theory

This theory assumes that medium determines the quality and impact of communication, and that the means of media communication in a given society determine the nature of that society and reshape the way people think and act (Hijab, 2010: 262).

13. Media Practice Theory

This theory identifies the types of media practices through real actions. Each practice has a stable nature and is distinguished from other practices (Coldrey, 2014: 67).

The first section: Artificial intelligence and its applications

Although there are multiple definitions of artificial intelligence, all of them agree that machines simulate human intelligence and carry out tasks otherwise performed by human mind. Yet these machines perform those tasks more effectively and more efficiently than humans, therefore overcoming the environmental influences (Ottomaina, 2019: 262; Salomäki et al., 2022).

The most important features of artificial intelligence are as follows (Al-Khayat & Faydi, 1998: 16-19):

- Representation of knowledge: It refers to the ability of artificial intelligence to describe the components of knowledge, including facts, relationships, rules, and frameworks;

- Symbolic data processing: Artificial intelligence software is able to interact with numerical and non-numerical symbols;

- Deduction: Artificial intelligence software is characterized by its ability to deduce possible solutions to problems;

- Acceptable solutions: It means the ability to devise acceptable solutions to existing problems.

Artificial intelligence performs such important functions as detection, communication with others, planning, movement, and meeting the desired requirements (Arnos, 2008: 10). Future estimates point to an increasing use of artificial intelligence in health, agriculture, environment, and education. Because artificial intelligence helps complete tasks fast and efficiently, it may significantly contribute to the global economy to reach +15.7 trillion US dollars by 2030 (Mohammed bin Rashid Al Maktoum Foundation and the Development Program of United Nations, 2019: 13-14).

In the following, we will present the most prominent forms of artificial intelligence applications used in accomplishing tasks in all areas of life (Khalifa, 2017: 63-64):

1- Robotics: They have a physical structure designed and programmed to perform certain tasks. Robotics are flexible and can be adjusted to different situations.

2- Drones: As unmanned aerial vehicles, they perform certain actions based on different uses.

3- Three/Four-Dimensional printers: These printers can be connected with other machines to carry out complex procedures, such as producing models that can assemble themselves.

4- The Internet of Things: It refers to the communication of machines and tools with each other to exchange information and make decisions with no need for human interference.

5- Voice assistance programs: It is the ability of machines to carry out commands through the user's commands.

6- Controlling the search results (news filters): This is done by algorithms offering news and topics in a certain area.

7- Learning machines applications: These applications gather information and elicit the relationship between it without prior programming.

8-Follow-up and comprehensive monitoring applications: Follow-up and comprehensive monitoring applications work to follow up, monitor, and identify potential errors by distinguishing the movements of individuals, identifying their identities, and sending warnings of potential dangers from these persons.

9- Automated response systems: It means that the artificial intelligence systems respond to the customers' questions and potential inquiries.

10- Anticipating the needs of the customer: Some applications of artificial intelligence can anticipate the needs of customers based on

the previous purchase experience of that customer or even the current goods. This is done by analyzing the data of the purchasing transactions of that customer.

14. Uses of artificial intelligence applications in media industries:

Media and communication industries are witnessing a noticeable increase in the use of artificial intelligence applications, and despite the diversity and multiplicity of the distinctive features of these industries, we mention the most prominent patterns of using artificial intelligence in media industries:

1. Journalism: Artificial intelligence applications perform several tasks in journalism, most notably (Al-Sharif, 2018; Sumague & Briones, 2022):

• Keeping track of breaking news and alerting journalists with relevant new information;

• Extracting data and information links and converting them into graphic forms;

• Automatic spelling and grammar correction;

• Generating news, short reports, and articles on topics based on statistical data; and

• Detecting fake news and any manipulation of photos or videos (Shehab, 2019);

2- Radio and television: The most important contributions of artificial intelligence to radio and television are as follows (International Telecommunication Union, 2019):

• Improvement of the audiovisual quality division process;

• Achieving the efficiency of the frequency spectrum in television and radio distribution;

• Producing new programs based on the data extracted from archives; and

• Directing the content by analyzing the behavior and viewing patterns of television programs (Layadi, 2018: 56). BBC has created a tool to analyze the audience's reactions during television programs and get benefit from a big data analysis in developing television content on the one hand and consolidating television shows that agree with those tendencies of the audience (Houdhaifa, 2019).

3- Advertising and marketing: Artificial intelligence performs several tasks in the field of advertising and marketing, most notable are the following (Hisham, 2019):

• Analyzing potential trends for advertising campaigns;

• Analyzing the efficiency of smart advertising and changes in the future;

• Enhancing the targeted advertising;

• Analyzing the clients' market and their experiences; and

• Automating the marketing and enhancing the content marketing.

The second section: interviews and analysis of results

Having conducted the interviews with the sample group, we reached several results which can be summarized as follows:

1. Description of artificial intelligence applications in media

Most participants agreed that artificial intelligence applications in media can best be described as new media with new technology. Al-Haddad, however, believes that these applications can best be known as smart media. He offered this description as these applications are able to learn, infer, and react in non-programmed areas of the machine, because these applications are able to perform media functions automatically (Al-Haddad, 2020).

Features of artificial intelligence applications in media

Participants mentioned several features of artificial intelligence applications in media, most notable are the following:

1- Rapid development, flexibility, low error rate, complex operations (Ibrahim, 2020);

2- Dependence on huge data that are suitable for the informational nature of media work - complex technical processes that are programmed to suit the professional performance (Murad, 2020); and

3- The more significant role of the three components (inputs, outputs, and technical processes) (Al-Haddad, 2020).

3. Possible roles of artificial intelligence applications in media

Participants listed several potential roles for the applications of artificial intelligence in media, which are as follows:

• Algorithms: Developing audience measurement methods (Gharbi, 2020), and proposing logical solutions, and playing the role of a gatekeeper (Abu Al-Hamam, 2020). Through the press automation process, the algorithm scans large amounts of available data, chooses

from a variety of pre-programmed articles combinations and command key points, and then inserts details, such as names, places, amounts, ratings, statistics, and other data, and the audio display can also be customized to suit a voice, a certain tone or a style of reading (Sadiq, 2020).

• Cloud computing: They provide instantaneous sources and endless information, and they represent an unlimited archive for communicators (Gharbi, 2020).

• Drones: Filming events from angles that photographers cannot reach, collecting information (Tom, 2020).

• Internet of things: It can execute a series of commands related to publishing, broadcasting, distributing, and receiving within the framework of the communication process (Ibrahim, 2020). TVs can also work with smart audio systems, over-the-top content OTT systems, smart lighting systems, and game controlling. For example, American Syfy TV, owned by NBC Universal, has partnered with Philips Electronics to develop smart synchronous lighting technology, whereby Syfy Sync application allows users to coordinate lighting colors with movie scenes that they watch on TV (Sadiq, 2020).

• Robot: It is used in some communication processes instead of humans to produce more creative works (Murad, 2020).

4. Transformation of artificial intelligence applications in media

Participants agreed that all components of the communicative process have been transformed:

Communicator: More control has been exercised over the communicative process in terms of management. Moreover, the work has been facilitated by transferring information more quickly and accurately.

Means: Most participants believe the current means of communication will remain the same, though fundamental developments will occur to the modes of presentation. Professor Gharbi takes an opposing position, however, believing these applications will replace the current means of communication.

Communicative message or content: The content is characterized by ease, speed, and abundance of information in covering events. The content is now more attractive considering the enhanced multimedia and the speed of accessing to it.

Audience: All participants agree that a radical change has occurred to the patterns of exposure, reception, and interaction, where these patterns have become more effective, interactive, and the audience

has become more passionate to them. This is true for both the medium and the new content.

We believe these transformations have occurred on the structural and functional level of the components of the communication industries and their outputs. Moreover, these transformations serve to develop a knowledge and application media system that is different from what is currently prevalent.

5. Media jobs affected the most by artificial intelligence applications in media

Participants' gave contradictory opinions regarding the job that is most affected by artificial intelligence applications in media. Dr. Al-Khalidi, Dr. Abu Hamam, and Dr. Al-Haddad believe all media jobs will be affected by the uses of artificial intelligence applications in media (Al-Khalidi, Abu Hamam, & Al-Haddad, 2020). However, Dr. Tom and Dr. Murad consider the news function is affected the most by these applications because of the capabilities of these applications in producing, publishing, and verifying news (Murad & Tom, 2020). On the other hand, both Dr. Gharbi and Dr. Ramadan believe that the news function, which includes advertising and marketing, is the most affected one (Gharbi & Ramadan, 2020). We attribute this variation in opinions to the academic disciplines of the interviewees.

6. Challenges facing the applications of artificial intelligence in media globally and in the Arab world

The applications of artificial intelligence in media face several challenges according to the participants, which can be summarized as follows:

• High cost.

• The need to qualify the media staff to adapt to the various smart environments related to artificial intelligence, as well as the media means used.

• Lack of control over the sources of information.

• Unacceptance by the public in the Arab region of the continuous acceleration in the development of artificial intelligence applications.

• Unsuitability of legislations regarding the applications of artificial intelligence and their adaptation to the acceleration in the successive updates of artificial intelligence applications.

• The quality of the communication content due to some technical errors.

7. The future scenario for using artificial intelligence applications in media

Most experts believe a transformational scenario will occur in the future regarding the use of artificial intelligence applications in media. In other words, they predict artificial intelligence applications in media will experience substantial transformations in their forms and content. As a result, significant changes will be observed in the forms of media practices and a new system, both functionally and structurally, will govern the communicative process. This in turn will affect the patterns of exposure, receiving, and interaction of the audience with the new content.

Third section: Findings and Recommendations

1. The applications of artificial intelligence in media establish new media with a new technology.

2. The applications of artificial intelligence in media are distinguished in the ability to process big data quickly and accurately.

3. The applications of artificial intelligence in media play a variety of new roles in media industries.

4. Our study suggests that future transformations will occur that impact all components and functions of media industries.

5. The use of artificial intelligence applications in media faces multiple future challenges, including professional, legal, and ethical ones.

6. The use of artificial intelligence applications in media will cause substantial transformations in all aspects of media industries.

15. Recommendations

This study recommends the following:

1. Conducting scientific studies on the professional, legal, and ethical aspects of the uses of artificial intelligence applications in media.

2. Keeping up with the curricula and institutes of media colleges with the technical development of artificial intelligence applications in media.

3. Conducting training courses to qualify the professional cadre to get the optimal use of these applications in media industries.

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