

Applications of Artificial Intelligence in Media Institutions

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Abstract:

This study explores the most significant applications of artificial intelligence (AI) in the media sector, highlighting the primary AI-driven tools and techniques utilized in journalism and media content production, from both positive and negative perspectives. With the rapid proliferation of AI technologies across various professional fields, concerns have grown regarding their impact on traditional jobs, including those in journalism. Numerous Western studies indicate that AI could potentially eliminate approximately many professions in the United States and Europe, including media-related roles, if its development continues at the current pace. This is particularly notable as a large number of media institutions have begun adopting AI technologies for content production.

The study aims to address the central question: How can AI technologies be employed in media institutions? Additionally, it seeks to identify the most prominent AI tools and applications relevant to the media industry.

Keywords: Media Institutions; Artificial Intelligence Applications; Artificial Intelligence Driven Media.

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1. INTRODUCTION

The world today is witnessing a remarkable acceleration in the adoption of artificial intelligence (AI) technologies across all domains. These technologies have become an integral part of our daily lives, both at individual and societal levels. As their usage expands, AI plays a pivotal role in various sectors, particularly in the economic sphere. However, this rapid development has also sparked growing concerns about its potential impact on traditional human activities. While AI is viewed on one hand as a promising opportunity to achieve unprecedented levels of efficiency and innovation, it is, on the other hand, regarded as a source of challenges and apprehensions related to the future of work and human employment.

In this context, digital media has undergone a profound transformation over the past two decades due to the integration of artificial intelligence (AI) technologies in media content production. Investing in these technologies has become an urgent necessity for media institutions to keep pace with rapid advancements, particularly in the news industry. Major corporations such as Google, Microsoft, and Facebook have taken the lead in utilizing AI to reshape media content and target audiences more efficiently. This has led to the emergence of a new concept known as "algorithmic journalism" or "AI-powered journalism."

With the advent of Web 5.0 technologies, a new phase in media production has emerged, powered by advanced AI applications that provide autonomy and proactivity in disseminating media content. This progress has been accompanied by advancements in robotics, particularly the development of "humanoid robots," which are now capable of deeper interaction with humans and performing actual roles in media content production. This has given rise to the concept of "robot journalism." These humanoid robots possess innovative capabilities that enable them to work independently across various media functions without the need for direct human intervention.

With this rapid development, significant challenges have emerged, raising concerns among experts about the impact of artificial intelligence and robotics on human presence and their role in replacing traditional jobs. In the media sector, as in other industries, humanity now faces a complex equation where the advanced capabilities of machines intersect with the need to preserve the human element in media production. This intersection has sparked critical discussions about the future of the media sector amidst these accelerating technological transformations.

Study Problem

This study aims to shed light on the role of artificial intelligence in media work and to explore the most significant technologies employed in this field. It also seeks to provide a comprehensive perspective on these technologies within newsrooms, covering the process from news gathering to audience engagement. Accordingly, the study poses the following central questions:

- How can AI technologies be effectively utilized in media institutions?
- What are the most prominent smart applications and technologies used in the media sector?

Study Objectives

- To highlight studies related to artificial intelligence in general.
- To enhance the future of media activities and journalism by improving performance and skills through the adoption of AI technologies and other modern innovations.
- To examine the relationship between artificial intelligence and media work.
- To study and analyze the most critical applications and technologies contributing to journalistic practices.

2. Conceptual Definitions of the Study

2.1 The Concept of Artificial Intelligence

Ian Rich defines artificial intelligence (AI) as the science that

explores how to enable computers to perform tasks typically carried out by humans, but with less effort. The field of AI aims to understand the nature of human intelligence by developing computer programs capable of simulating intelligent behavior. This involves the ability of a program to solve problems or make decisions in specific situations. The program identifies the appropriate method to address a problem or reach a decision by drawing on a range of inferential processes that have been integrated into it.⁽¹⁾

– The term "artificial intelligence" refers to the capability of systems and machines to learn and evolve based on their previous experiences. These systems aim to simulate human intelligence by improving their performance in various tasks through repeated processes, executing them more efficiently over time. In essence, artificial intelligence involves systems or devices that can emulate human intelligence in performing diverse tasks and enhance their performance by learning from the information they gather.⁽²⁾

2.2 Media Institution

A media institution is an entity comprising a set of activities carried out by specialized individuals according to specific rules and standards. These institutions serve as a bridge between members of society, focusing on addressing public issues that concern various segments of the population. They are characterized as open spaces that allow participation from all societal groups, while also connecting different sectors and fields. Their relationship with media authority revolves around meeting both collective and individual needs and desires.⁽³⁾

(1)- Saad Saad, Journalism in the Era of Digital Technologies, Journal of Human Sciences, vol. 4, no. 5 (2020): 200.

(2)- Fayadhi, H. E. Artificial Intelligence and the Future of Humanity. Arab Scientific Community Organization Journal, 2023.

(3)- Ghodbane, H. A.-D., & Qarun, N. An Analytical Study of Media Institutions' Challenges in Dealing with the Digital Media Environment: A Case Study of Al-Shorouk Media and Publishing Complex. Journal of Human Sciences, vol. 22, no. 2, 2022, p. 343.

In the context of this study, a media institution refers to the administrative and service system overseeing a group of journalists and media professionals working across various media sectors, including print media (e.g., newspapers and magazines), audio media (e.g., radio stations), and audiovisual media (e.g., television channels and digital video platforms).

2.3 The Concept of Media Artificial Intelligence:

Media artificial intelligence refers to the application of AI technologies in media and news institutions, leveraging the diverse features of these technologies to support routine journalistic tasks. This includes providing alerts on current events, automating content scheduling, and generating stories and news articles using algorithms such as GPT-3. AI can also perform complex tasks by analyzing vast amounts of data and expanding media coverage in areas that are difficult for journalists to access, such as war zones and regions affected by natural disasters, using technologies like drones (autonomous aircraft).⁽¹⁾

2.4 Artificial Intelligence and Its Role in the Media Sector:

The media industry has undergone significant transformation through the adoption of modern and advanced technologies to keep pace with rapid changes and the challenges it faces. Among the most prominent of these technologies is artificial intelligence (AI), which refers to machines and systems capable of learning and evolving in a manner similar to how the human brain processes data.

– Supporting Routine Journalistic Tasks: AI-powered devices can perform routine tasks commonly associated with journalism, completing them significantly faster than a human. Moreover, these machines often execute such tasks with greater accuracy and efficiency than humans.

(1)- Al-Qadhi, B. Employing Artificial Intelligence Journalism in News Organizations. Arab Scientific Community Organization Journal, 2021.

– Providing Notifications and Alerts on Events: Thanks to the capabilities brought by AI technologies, these systems can deliver instant and regular notifications or alerts about events occurring worldwide, ensuring timely and systematic updates.

– Automated Content Scheduling: Users of AI-powered devices can schedule the publication and sharing of posts, news, or information they wish to disseminate automatically. This allows journalists to prepare their work in advance, with the system executing the publication and sharing at precise times set by the user.

– Automatic News Story Generation: A notable example of this capability is the use of natural language generation algorithms, such as those employed by The Guardian in collaboration with OpenAI, to create news stories automatically.

One of the most notable examples of artificial intelligence (AI) applications in the media sector is its use in automating electronic newspapers. Smart devices equipped with AI capabilities can automatically search for and verify news. Additionally, they can organize and format news content according to specific patterns defined by specialized writers. Furthermore, these devices can publish and share newspaper content routinely, mimicking the work of human staff. AI technology can also be employed in various other areas, such as proofreading for typographical and spelling errors, linguistic corrections, and more.⁽¹⁾

Leo Leppanen, a computer science researcher at the University of Helsinki, believes that AI-powered journalism will help reduce subjective interpretation of data. Machine learning algorithms are trained to account for variables that improve predictive accuracy based on the data utilized. Statistics from Research Markets in 2019 indicate that the global AI market was expected to grow from \$28.47 billion in

(1)- Bel-Sahih, A. S. Artificial Intelligence and Its Role in the Media Field. Mofeed, 2022, <http://mofeed.com/ai-and-its-uses-in-media>.

2019 to \$40.74 billion by the end of 2020, reflecting an annual growth rate of 43.39%. This surge was driven by the COVID-19 pandemic and the increased reliance on machines and robotics. The market is projected to reach \$400.2 billion by 2027, with a significant portion attributed to media software, public relations, and the entertainment industry.⁽¹⁾

2.5 Examples of Leveraging Artificial Intelligence in the Media Sector

A few years ago, Kristian Hammond, a professor of computer science and AI expert at Northwestern University, predicted that a robot might win the Pulitzer Prize, one of the most prestigious awards in journalism. The use of artificial intelligence in journalism, media, and content creation began as early as 2010, when the company Narrative Science developed AI-driven tools for crafting news stories. Similarly, since 2012, BBC News Labs has been utilizing AI through a tool called "Juicer" to enhance its operations.

3. News Aggregation and Content Classification

The British Broadcasting Corporation (BBC) leveraged its vast repository of data, along with external sources, to implement advanced AI tools. Similarly, in 2014, the Associated Press produced one billion pieces of content using a tool developed by Automated Insights to generate economic news stories on U.S. corporate earnings. In 2015, The New York Times utilized artificial intelligence and machine learning through the tool "EDITOR" to assist journalists in editing content, refining articles, improving headlines, and optimizing keywords.

In 2016, The Washington Post deployed an automated robot called "Heliograf," which was initially used to cover the Rio de

(1)- Abdel-Hamid, A. M. The Utilization of Artificial Intelligence Applications in Media Content Production and Their Relationship to Credibility Among the Egyptian Audience. Media Research Journal, vol. 55, no. 5, 2020, p. 2816.

Janeiro Olympic Games. Following enhancements, the tool was subsequently used to report on the U.S. presidential elections, producing over 500 articles and earning the publication more than half a million clicks.

The Dutch news agency ANP also incorporated AI technology to summarize and rewrite news stories into simplified formats for feed services. In 2020, BBC introduced AI-generated voices to read articles published on its website.

These examples are merely the tip of the iceberg, as artificial intelligence has proven capable of performing a wide array of tasks in journalism, media, and content creation.⁽¹⁾

For instance, Associated Press increased its story output by 12 times by adopting AI programs to write short news stories about economic events, enabling its journalists to focus on producing more in-depth articles. The Robot Cameraman has served as a substitute for traditional photographers in television studios, while Drone Cameras are employed to capture events and provide neutral, professional reports from conflict and war zones.

Japan's NHK Broadcasting Corporation developed an automated voice generation system for weather programs that mimics a professional broadcaster's style. This system revolutionized the process of automated production in March 2019, delivering daily weather forecasts, temperatures, and precipitation reports.⁽²⁾

3.1 Utilizing Key Artificial Intelligence Technologies in Media Activities

Artificial intelligence (AI) applications have become some of the most prominent tools currently used in digital media, thanks to the substantial benefits they offer in media content production, both in

(1)- Al-Ansari, A. A. How to Use Artificial Intelligence Tools to Support Your Journalism Work and Content Creation. INET, 4 Oct. 2022, retrieved from INET.

(2)- Abdel-Hamid, op. cit., p. 2817.

terms of quantity and quality. These technologies have contributed to improving the quality and enhancing the standard of media output, prompting many global digital media outlets to adopt and expand their use.

AI technologies have demonstrated remarkable efficiency in reducing the effort traditionally required for media content production. They have also significantly minimized the time needed to complete media-related tasks, as the speed of AI-driven work far surpasses the time previously required by human journalists.

There is no doubt that time is a critical factor in media work, as media institutions compete to publish the latest news and keep pace with rapidly unfolding events. In this context, artificial intelligence (AI) technologies have facilitated the performance of numerous tasks traditionally assigned to human journalists, propelling media into a new phase known as "AI-powered journalism." Through this transition, digital media outlets utilizing these technologies have made significant strides in the era of the Fourth Industrial Revolution, with AI becoming the cornerstone of the media production process.⁽¹⁾

Below are the most prominent AI technologies employed in media activities:

3.1.1 News Gathering Stage

In this stage, journalists strive to gather news by accessing diverse and reliable sources to obtain accurate information in a timely manner, enabling them to achieve exclusivity and build the credibility of their media institution. With advancements in artificial intelligence (AI) technologies, newsrooms increasingly rely on the internet and social networks as primary sources for news. Today, accounts of officials and public figures on platforms such as Twitter serve as significant news sources, as many of them post updates directly,

(1)- R. Chaabani, A Guide to Fact-Checking in the Era of Fake News, International Journalists' Network Journal (2021).

eliminating the need to wait for official statements from news agencies.

Moreover, citizens have become a fundamental part of the news-gathering process, contributing massive amounts of content in the form of text, images, and videos—often exceeding in one hour what traditional media institutions produce over several years.⁽¹⁾ AI plays a pivotal role in organizing and analyzing this enormous volume of data. For instance, the intelligent search engine Connexion is a powerful tool for media outlets, allowing them to search thousands of reliable online sources, handle multilingual data, and analyze large datasets to identify trending topics.

The Juicer tool, developed by the BBC, offers an innovative method for automatically aggregating news and sources under the supervision of a specialized team, enabling faster and more efficient news coverage.

3.1.2 Photography Stage:

Traditionally, the images we see in media are produced by photographers or graphic designers, relying on various tools and software. However, most of these processes require skilled human expertise to guide the photography or design process. With the advancement of artificial intelligence (AI) technologies, numerous intelligent software solutions have emerged, enabling automatic photo editing and design, which has led to a fundamental shift in photography methods, particularly in journalism.

Modern technologies, such as AI, have made it easier and more efficient for journalists to capture photos and record videos quickly. Below are some of the most prominent AI-driven technologies used in photography:

- Google Clips: A camera that uses AI algorithms to determine

(1)- K. Taha, The Smart Newsroom, Al Jazeera Media Institute Journalism Journal (2016).

optimal lighting and adjust the scene, making photos more appealing.

- Arsenal: A device powered by AI to enhance image quality quickly, executing all the steps a traditional photographer would take in mere seconds. It is lightweight, weighing only 57 grams, making it ideal for fieldwork.

- RawShorts: A video quality enhancer capable of transforming text into animated video clips.

- DVDFab Enlarger AI: A technology that uses AI to enhance video quality by up to 300%, upgrading it to 4K resolution.

- Dream by WOMBO: A tool that employs AI to transform text or keywords into artistic illustrations, aiding in the creation of caricature-style images for media content.

- Drone Camera: An AI-powered unmanned aerial vehicle designed for capturing journalistic events, particularly under challenging conditions such as disasters, where human photographers are unable to access the scene.⁽¹⁾

3.1.4 Verification of Information

Verification of information is not a recent phenomenon, as it has long been a necessary journalistic practice. However, digital tools and online platforms have made the verification process significantly easier today. Efforts are underway, with pioneering initiatives being implemented by both media institutions and civil society to combat fabricated and misleading news.

While some media organizations have adopted information verification as part of their journalistic practices, others have established dedicated sections for this purpose. Additionally, several specialized platforms have been created to address this issue, such as

(1) A. M. Khattab, The Use of Artificial Intelligence Technologies in Newsrooms: A Study of Development Trends and Transformation Issues within the Framework of Technological Changes, *Scientific Journal of Journalism Research*, 22(1) (2021).

the Falso platform operating in several Arab countries, including Tunisia, as well as platforms like Trustnews and Tunifact, among others. These platforms have taken on the responsibility of combating fake news.

Building on this, the following outlines some AI applications and technologies that assist in journalistic verification:

- NewsGuard: A tool that evaluates news websites based on multiple criteria, such as content verification, responsible coverage standards, and transparency. MBFC (Media Bias/Fact Check): This tool focuses on verifying news based on the political bias of news sources. The Media Bias/Fact Check (MBFC) extension offers an innovative method for identifying fake news. Instead of evaluating news sites based on a variety of criteria, MBFC emphasizes a single critical factor: the political bias of the site.

- Fakerfact: An AI-powered tool that evaluates individual articles rather than entire websites to determine their credibility. Unlike other fake news verification extensions, Fakerfact operates with a slightly different approach. Instead of analyzing entire websites, it focuses on examining specific articles and stories using an AI algorithm known as "WALT" (Walk). This algorithm learns the relationships between words and employs neural networks to analyze whether the article's intent is to present facts or evoke emotions. Additionally, the algorithm incorporates user feedback and opinions on whether they believe an article is real or fake, enhancing its performance over time. The extension can be easily installed on Google Chrome and Firefox browsers.

- Hoaxy: An analysis tool designed to identify false and misleading information on social media. Verifying the accuracy of misinformation and disinformation on social platforms and websites is a meticulous and complex process that relies on advanced tools and techniques. This process aims to assess the authenticity of circulated information, evaluate its accuracy, and determine whether it is misleading or false. It also includes mapping the spread of such

information, tracking how misleading news and content propagate across various networks, and analyzing user interactions with it.

3.1.5 Stage of Editing and Processing News Stories

In the ongoing competition among media outlets to deliver engaging and accurate content, the news editing process has become a critical factor. With the integration of artificial intelligence (AI), editors can now utilize advanced tools to edit stories quickly and precisely, allowing them to focus on developing new and creative ideas.

Some of the latest AI-driven applications used in the editing process include:⁽¹⁾

3.1.6 Narrative Science

An AI-powered tool that utilizes artificial intelligence and narrative science to generate news stories by manually inputting key terms. This tool integrates AI with storytelling techniques, enabling it to create distinctive narratives without human intervention. It relies on a set of manually entered key terms provided by the media organization's administrator, allowing it to generate contextually relevant content. Currently, the tool operates in English, but its developers are working on expanding its capabilities to include other languages, such as Arabic.

This tool allows media organizations and individuals to leverage AI to produce fully integrated, high-quality narrative content. Instead of manually writing articles or stories, users can input key terms (e.g., topic, category, or keywords), and the system transforms this information into a complete narrative. This feature saves time and effort, particularly for platforms requiring frequent updates and continuous content.

3.1.7 Automated Insights

This tool generates news stories by analyzing data related to

(1)- Chaabani, op. cit.

public figures or sports events. Using AI technologies, the tool processes vast amounts of data available online, such as press statements, sports statistics, or biographies, to create news content capable of covering detailed and up-to-date information about the targeted individuals or events.

By leveraging artificial intelligence, this tool transforms raw data into fully-formed news stories. For example:⁽¹⁾

– If the subject relates to a public figure, the tool analyzes their statements, interactions on social media, and data about their activities and news to produce a new story covering these aspects.

3.1.7 WordSmith

A program designed to analyze data and automatically convert it into news stories, WordSmith is among the most widely used applications in journalism. This program excels in transforming large volumes of raw data, such as statistics, financial reports, or sports data, into publishable news articles with speed and precision.

3.1.8 Quill

A platform that converts data into publishable news stories using artificial intelligence, Quill helps journalists transform tables and charts into comprehensive texts. It employs advanced techniques for analyzing data and converting it into written news articles, streamlining journalistic production and enhancing the efficiency of media operations.

– Data Collection and Analysis: Quill begins by collecting data from various sources, such as financial reports, market data, sports results, or other relevant datasets. It then uses intelligent algorithms to analyze the data, understand its context, and extract meaningful content.

(1)- A. A. Al-Ansari, How to Use Artificial Intelligence Tools to Support Your Journalism Work and Content Creation, INET, October 4, 2022, retrieved from [INET].

- **Conversion into News Content:** Based on the analyzed data, Quill transforms complex information into simplified news stories written in a style akin to traditional journalistic texts. This is achieved by combining data analysis with automated story writing.

- **Customization and Adaptation:** The writing style can be customized based on the subject matter. For instance, if the data pertains to economics or business, the tone will be more formal and analytical. For sports-related data, the writing will adopt an enthusiastic and detail-oriented style.

- **Publishability:** Once the story is written, it can be published directly across media platforms, including online articles or reports in newspapers and magazines. Quill also offers rapid editing capabilities to align the content with different editorial standards.

3.1.9 Story Discovery Engine

A tool that assists editors in uncovering new ideas for investigative journalism through infographics and data tables that inspire the creation of news stories or journalistic investigations. Using AI and data analysis techniques, this engine relies on a set of algorithms that enable editors to interact effectively with available data and information.

By extracting new insights related to social, political, economic, and other issues, the Story Discovery Engine contributes to the development of fresh ideas for news stories that may not have been previously identified.

3.1.10 Publishing and Distribution Stage

In the era of digital media, it has become essential to publish news on advanced platforms to expand reach and engage a broader audience. Artificial intelligence (AI) technologies enhance publishing and distribution processes by adapting content to meet the standards of each platform, thereby increasing audience interaction with the content.

The following points should be considered in the publishing process:

- Adapting Content to Platform Policies: Texts and headlines should be tailored to align with the specific policies of each platform, using appropriate hashtags and adjusting videos and reports to suit the platform's nature.

- Platform-Specific Content Production: This involves creating content customized for each platform, such as light and informative news, or covering sports and entertainment events. It often includes direct audience engagement through polls or live event streaming.

These technologies demonstrate the rapid advancements in the media industry driven by AI, accelerating media processes from photography and verification to editing and publishing.

3.1.11 Audience Analysis

Social media platforms offer advanced analytical tools to understand the demographics of each platform's audience, including geographic and demographic distribution, interests, and peak activity times. These tools also help identify the most effective platforms for reaching specific audiences and the topics that resonate with them in particular regions.

For example, topics related to the Gulf region are often shared on Twitter to reach Gulf audiences, while Palestinian issues are emphasized on Facebook to engage a broader audience in Palestine. It is equally important to continuously update these data, as audience interests evolve over time⁽¹⁾.

3.1.12 Feedback Stage

Engaging with the audience has become one of the most significant challenges faced by traditional media in the modern era. Media has shifted from a one-sided communication model to multi-

(1)- O. A. Arqoub, The Model of Smart Newsrooms and the Use of Modern Communication Tools in Them, Al Jazeera Media Institute Journal (2019).

directional interaction with the audience, requiring media outlets to effectively respond by evaluating feedback and listening to audience opinions.

AI technologies have facilitated the transition from bilateral interaction to multi-directional engagement, enabling users to connect with audiences directly without relying on traditional media channels. This shift has given rise to the "intelligent interactor" instead of the passive viewer, as the digital audience increasingly prefers active participation and critical analysis of content.⁽¹⁾

Among the tools used by media professionals to maintain constant communication with their audiences are:

3.1.15 NewsLynx

An audience interaction analysis tool designed to measure and analyze how users engage with digital content, particularly news stories. This tool collects data related to audience interactions with articles or news stories online and analyzes it using a set of criteria to help media organizations understand audience interests and behaviors.

4. Features of the Tool

– Data Collection: The tool gathers data about how the audience interacts with news stories. This data includes various indicators that reflect the level of user engagement with the published content.

– Key Analysis Metrics:

- Views: The number of people who read or viewed the article or news story. This metric helps determine the reach and popularity of the topic or story.

- Shares: The number of times the article was shared on social media platforms or with friends. This reflects high interest in and widespread dissemination of the content.
- Time Spent: The duration.
- Comments and Reactions

(1)- Taha, op. cit.

– Data Analysis: After collecting data, the tool processes and analyzes it to provide accurate reports on audience interaction with the content. The analysis may include:

- Identifying Trends.
- Spotting Patterns.
- Behavioral Analysis.

5. CONCLUSION

The significant impact of artificial intelligence on media and journalism cannot be overlooked. These technologies contribute to advancing methods of news gathering, audience segmentation, engagement with followers, and monitoring feedback, thereby enhancing the overall media experience. Smart journalism, which leverages these technologies, will bring about transformative changes in the media landscape and strengthen the competitiveness of media outlets that invest in such technologies, ensuring their survival in an increasingly competitive industry.

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