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Journalism and Artificial Intelligence (AI) in the 21ST Century: End of an Era?

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Abstract

Artificial intelligence (AI) is transforming contemporary journalism through automated news production and distribution, data analysis, and new forms of interaction between journalists and sources beyond the newsroom. However, the adoption and implications of AI in Nigerian journalism remain insufficiently understood. This study explores the impact of AI on newsrooms and examines how AI technologies can be more effectively integrated into journalistic practice. Anchored in technological determinism theory and diffusion of innovations theory, the study employed a mixed-methods approach. The findings indicate that Nigerian journalists have yet to adopt AI extensively because of unreliable electricity, limited financial resources for acquiring and maintaining AI technologies, high internet connectivity costs, and inadequate training for AI users. The study also identifies several professional and ethical concerns, including diminished journalistic creativity, insufficient human oversight, algorithmic bias, limited transparency, inadequate fact-checking,

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and potential threats to fairness. Despite these challenges, AI does not constitute a serious threat to professional journalism; instead, it continues to add value to journalistic practice in the digital age. The study concludes that journalists, particularly those in developing countries such as Nigeria, must adapt to technological change while maintaining appropriate professional and ethical safeguards. These findings contribute to understanding AI adoption in developing-country newsrooms and underscore the need for investment in infrastructure, capacity development, human oversight, and responsible AI governance.

Keywords: Artificial Intelligence; Digital Journalism; Journalism Ethics; Newsroom Automation; Nigerian Journalism

Introduction

Something fundamental is changing in the news industry. New technological challenges and opportunities are encouraging a reflection on the deeper meaning and mission of journalism, as well as the shape and ethics of the news industry in the era of Artificial Intelligence (AI). As a result, many realize the urgency to explore innovative solutions to sustain the business of news. Many journalists in Nigeria have little or no knowledge of what AI means, let alone what it can do for a newsroom. AI in its most basic form is a system that makes autonomous decisions, performing tasks that mimic acts of human intelligence like solving problems, understanding language or recognizing sounds and objects. To help computers perform their specific tasks, they need a set of step-by-step instructions that tell them what to do: an algorithm. To feed the algorithm, data is the basic ingredient for every AI. Algorithms and machines can augment the power of journalists, opening up new possibilities and unexplored territories. —AI just does not work on its own, and we cannot expect it to fix all our problems, the best impact can be achieved as a partnership between humans and technology (Mattia 2019). According to the father of Artificial Intelligence, John McCarthy, AI is the science and engineering of making intelligent machines, especially intelligent computer programs‖.

Artificial Intelligence (AI) is a way of making a computer, a computer-controlled robot, or a software think intelligently in a similar manner the intelligent humans think. AI is accomplished by studying how the human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a

basis for developing intelligent software and systems We can say that an artificial intelligent system is a system that thinks like human, act like human, thinks rationally and acts rationally.

At the beginning of the 21st century, it was no longer possible to remove computers from journalism. Each step was done using computers; fast processing of data and words, receiving and storing information, faster and easier communication with news sources, especially with the advent of the Internet and its solutions, have revolutionized journalism. The advent of the Internet and its use in journalism: In the early 1990s, the Internet gradually reached newsrooms and newspapers and was widely used by the American and Canadian media. Since then, other countries have gradually used it to write and edit news and reports, until the Internet became an important tool for gathering information, news and communication, and this trend led to a major change in the performance of the journalistic profession. One of the consequences of the evolution of the Internet in newspapers was the advent of electronic journalism.

In 1991, only 10 newspapers were published on the Internet, and by 1996 that number had risen to 1,600 and in 2000 to 4,000 worldwide. Currently, 99% of the mainstream newspapers in the United States publish their pages on the Internet, and almost all newspapers have a website.

Literature Review

Artificial Intelligence (AI) and Journalism

Technology has played and is still playing a vital role in the way journalism is practised. According to Vaglis and Bratsas (2017), dramatic change in the field of journalism is connected directly to advanced technology tools. Therefore, the use of Artificial Intelligence (AI) technologies has become an indispensable part of the field of journalism that has led to radical transformations (Galily 2018). Omebring (2016) see technology as an objective alliance to change the professional practices of journalism, along with changing journalist skills. Technology has become an essential requirement of contemporary media production. How does technology fit into news production? According to Mark et al (2017), AI increasingly assists in reporting, content creation, distribution, and audience interaction, to name a few examples. Recently, crowdsourcing, brainstorming and fact-checking tools have been developed to aid data information

gathering and, particularly, to structure relevant data. Among contemporary newsrooms, automation is a key tool in competing favourably in the news industry.

Today, according to Waleed and Mohamed (2019, p.43) readers can read articles written entirely by a journalist who does not have a human form. In this context, the Washington Post has developed its technology, an artificial intelligence called" Heliograph ", to support its editorial team during the 2016 Summer Olympics in Rio. Since then, the Washington Post has been using "Heliograph "to spit out 850 articles, which focused mainly on political and sports news. In a recent Reuters report "Media, Trends and Technology Expectations in 2018", which included a survey of quite a few media outlets, Newman (2018), notes that nearly three-quarters of respondents said they use artificial intelligence in their production. On the other hand, they also develop projects to boost their use in terms of content improvement, increased marketing efficiency and economic feasibility, automation of information validation within the information material, or speed up the classification of information contained within a massive stream of data.

In 2017, Jung et al (2017) in the study entitled: Intrusion of Software Robots into Journalism: The Public's and Journalists' Perceptions of News Written by Algorithms and Human Journalists, pointed out that the audience tended to trust the journalistic materials written by software more than those written by journalists. In sum Zangana (2017) points out that the relationship between technology and content creation in modern newsrooms is synthesized in the following basic idea: This tendency in journalism proves the changing character of the newsroom staff, where programmers are working steadily more closely with journalists, and where journalists become programmers and vice versa.

Technology-Aided Transformation of Journalism

Loosen (2018) highlights new four forms of journalism, which can be considered as a transformation process journalism faces today not only at the level of the basic stages of news production and consumption but also affects journalism at its core.

i. Data journalism: Data journalism refers to the process of extracting useful information from data, writing articles based on the information and embedding visualizations in the articles that help readers understand the significance of the story. As Lindén (2017, P.24) notes, the digital revolution has expanded the supply and availability of data that can be used for computational journalistic processes, along with the expectation of events to a larger extent than before. However, data journalism represents the convergence of several

fields which are significant in their own right from investigative research and statistics to design and programming (Bradshaw 2010).

ii. Algorithm Journalism: This type of journalism happens when there is an intersection between journalism and data technology‖ (Gynnild 2041). Besides, it can be "the combination of algorithms, data, and knowledge from the social sciences to supplement the accountability function of journalism" (Hamilton and Turner 2009).

iii. Automated Journalism: The focus of this term is, according to Graefe (2016) to emphasize the increasing amount of content that is being produced automatically and using technologies being developed by providers of automated content solutions. In other words, it is algorithmic processes that convert data into narrative news texts with limited to no human intervention beyond the initial programming‖ Carlson (2015).

iv. Metrics-Driven Journalism: Refers to the varied attempts to make sense of an ever-growing amount of audiences' digital traces with the potential to influence decision-making processes at all stages of the news production process (Tandoc and Thomas, 2015).

Ways Artificial Intelligence Can Help Journalism

Chase Davis, editor of interactive news at The New York Times, highlighted the ongoing promises around the melding of technology and journalism: To help reporters find and tell stories that were previously out of reach or impractical. Mark et al (2017), suggested that many activities where AI can be particularly helpful in the newsroom fall into three categories:

i. Finding needles in haystacks: In those outlying or special cases that might elude human identification because of the scale or complexity of the data, AI can be a breakthrough tool. This role fits neatly into standard newsroom processes because even if it discovers cases the human eye could not, the findings can be fact-checked via standard human investigative techniques.

ii. Identifying trends (or departures from trends): The massive computing power of AI can help provide characterizations of aggregates of data, perhaps grouped in time or by geography or demographics. Alternatively, it can quickly identify outlier data.

iii. Examining an application of AI or computation as the subject of the story itself: Because they are built by humans, algorithms harbour human bias and by examining them, we can discover previously unseen bias. How are these complex truths being found

through these tools? What happens when these tools are applied to the operation of our neighbourhoods or cities or nation?

Tom (2018) outlined 10 ways AI is having an impact on journalism including:

i. AI is already automating the newsroom

ii. AI is augmenting journalists

iii. AI is creating new forms of investigative reporting

iv. AI is helping to verify and fact-check

v. AI is creating a personalized user experience

vi. AI should be transparent to build trust

vii. AI is creating ethical implications

viii. AI is redefining copyright rules

ix. AI is forcing journalists to refocus and retrain

x. AI is not the way to cut costs and jobs

AI is already automating the newsroom

By using machine intelligence in the newsroom, we can increase efficiency in our creation processes. Since journalists have to serve different audiences on different platforms, it is not unusual to hear them complain about repetitive, monotonous tasks they have to perform. These tasks can be reduced by AI. Some news organizations like Bloomberg and the Associated Press are using Wordsmith by Automated Insights, a tool that mines data and is capable of producing reports about sports results and company earnings. AI-generated smart templates help them to produce this commodity news‖ on a much larger scale than before, up to 12 times in the case of AP.

AI is augmenting journalists

There is a big concern that using machine intelligence will demote the role of journalists to database managers. Experiments and implementation of AI in large news organizations like the AP show the opposite is true, freeing up to 20 per cent of the journalist's time. This way, they can focus on content and spend more time on their core expertise: reporting. Many examples of augmentation are already available. Speech-to-text-powered transcription tools like Trint or Recordly can make our lives so much easier, instead of spending hours transcribing interview recordings. Companies like Clarifai or

Vidrovr are using computer vision to automatically recognize content in photos, tag it and find similar concepts, speeding up the workflow of image editors.

The production of video news packaging can also be automated by AI. The Israeli company Wibbitz created a text-to-video platform using image recognition to create videos that can match with text automatically, speeding up rough cuts that can later be refined by human editors. Again, this tool is augmenting, not replacing traditional video production. Tools like Newswhip or Graphext can help us find new topics, by applying machine learning to social media data. Reuters' News Tracer is analyzing tweets in real-time and has already uncovered several stories before other media reported them.

AI is creating new forms of investigative reporting

AI can be leveraged to power new forms of reporting, by analyzing data and identifying patterns at a much larger scale than ever before. For example, it can take investigative journalists days, months, or years to sift through millions of documents in a corruption investigation. With Natural Language Processing (NLP), they can go through these documents, and discover entities from the data and the relationships among them. It is effectively playing the role of a magnifying glass that can see things that are not visible to the naked human eye. This way, AI can surface stories that have not been told before.

AI is helping to verify and fact-check

As trust in news has been eroded by disinformation and misinformation distributed on social media, AI can offer a solution to detect and diminish it. Journalists can leverage AI for fact-checking and analysis of text, pictures and video. Think of Chequeabot, a tool made in Argentina, which automatically finds fact-checkable claims in news text and sends them to the newsroom. Similar automated fact-checking applications are Claimbuster and Factmata.

AI is creating a personalized user experience

AI can help to serve content tailored to each user, depending on who you are, where you are, or what mood you are in. By creating unlimited versions of an article, it can help newsrooms develop a more engaged audience. It can also improve the quality of dialogue with our audiences. Chatbots, like those created by Quartz Bot Studio, allow users to text questions about news events, people or places. They immediately receive feedback.

AI should be transparent to build trust

Journalists and news consumers must always be informed when a story is authored by a machine or a human. Newsrooms must be open and honest about this. To work properly, AI systems rely on our trust. And to build trust in AI, it's crucial that it is transparent and can explain how it made its decisions. Just as verifying the reliability of a news source has become obvious, there is a need to verify the reliability of any smart machine system. No doubt, there will be hiccups when introducing AI, but constant monitoring can diminish mistakes. To achieve more trust in AI, journalists and users should be allowed to experiment with the technology, by adjusting the parameters of an algorithm to see how the results change, for example. The Wall Street Journal is already testing this, as a way to audit AI.

AI is creating ethical implications

AI will not change the fundamentals of journalism; AI cannot succeed in a newsroom environment if the same journalistic and editorial standards that have been around for decades are not applied. Algorithms are prone to bias and can make mistakes, just like the humans who created them. But unlike humans, algorithms cannot be held legally accountable. Therefore, human accountability must be embedded in all stages of the content value chain. As newsrooms implement AI, they should install an ethics board that can develop an ethical checklist for using AI in a newsroom environment.

AI is redefining copyright rules

Copyright laws are challenged by the rise of AI in the newsroom. AI is learning from human-created expressive works like articles or videos, each with specific rights owners, to create its own output. This can pose a new conflict, as it can violate the copyright of traditional media outlets. The legality of contents will become an important issue.

AI is forcing journalists to refocus and retrain

Because of the rise of AI in newsrooms, the role of journalists will change. Journalists will become more like gatekeepers. Therefore, the newsroom management will need to invest more in training its journalists. This is the only way journalists can become more at ease operating in a technology environment. The more journalists know about AI, the more effectively they can use it. There will also be a need to foster closer collaboration

between news organizations and the technology industry. Collaboration is crucial in an AI-assisted newsroom. Journalists should be encouraged to experiment and share best practices with colleagues. AI will also create new jobs like automation editors, necessary for maintenance and supervision, watching for errors and correcting them. Academic training of new journalists will involve teaching more coding skills.

AI is not the way to cut costs and jobs

Living in an era of turbulent news markets, there is fear that some senior newsroom managers might look at AI as a way to cut operating costs and work with fewer journalists. It may be tempting, but that will be making a big mistake. Journalists should play an even bigger role in putting the pieces together, verifying and adding a human touch to stories. Without journalists as gatekeepers with strong news judgment, AI will be doomed to fail.

Challenges of Artificial Intelligence Utilization in Journalism

As with any complex system, errors happen and with AI those errors can have serious consequences. This highlights the importance of keeping humans close and rigorously checking the work of AI systems. Robots cannot be held accountable for any mistake. Some scholars have identified two kinds of challenges: Professional and Ethical Challenges.

Professional Challenges

i. It Undermines Creativity: Creativity is the core concept in journalism that reflects the human way of thinking including creative writing and interpreting, etc. In this respect, Latar (2018, p. 24) notes that AI algorithms cannot think out of the conceptual framework created for them by their human algorithm designers, they are unable to attain the highest level of creativity that requires the ability to mentally cross into new unexpected conceptual frameworks. For instance, AI algorithms cannot manufacture the requisite atmosphere to inspire readers' emotional reactions, such as laughter (Aljazairi 2016), responding to an accident scene, interviewing people on the street, or conducting any investigative work. Therefore, analytical skills and creativity are still the major advantages of journalists against the algorithms (Van Dalan 2012).

ii. The absence of Monitoring: Journalism is an essential force to maintain the survival of the social system, due to its great impact on society. Therefore, it is essential to preserve journalism as a public good in the digital age. As Latar (2018) notes, AI algorithms cannot be expected to understand and monitor unexpected alarming developments: They lack the human capacity to make connections not previously experienced.

iii. Bias: The most significant challenge in the field of automated journalism is that biases can be created within AI systems, such as gender bias (Larson, 2017) and race bias (Koolen and Van 2017) From this perspective, AI algorithms are not free of human influence, implying that they are inherently influenced by the values of their designers. Osoba and Welser (2017,p.25) state that "the error and bias risk in algorithms and AI will continue as long as artificial agents play increasingly prominent roles in our lives and remain unregulated". In 2015, Google had to apologize after the algorithms powering its Photos app tagged two black people as gorillas perhaps because its training dataset did not have enough pictures of black people. In 2016, an investigation by ProPublica found that COMPAS "AI-driven software" that assesses the risk of criminals in the US was biased against people of colour, in particular, black criminals, even though the white criminals had more serious criminal records (Angwin et al 2016).

Ethical Challenges

i. Transparency: This term essentially refers to being open about the way data is collected and used, as well as eschewing unnecessary data collection. However, transparency is very important to ensure reader trust, which would involve making the underlying data available and allowing people to interact with it. Leppänen, et al (2017) defined transparency as the "trust in the system that transforms the data into an article". Thus, the publisher should first make the distinction between the subjects which items were written by a human journalist and which were written by a smart algorithm (Ombelet et al 2016).

ii. Fact-Checking: In this aspect, the readers should have information on how the raw data is chosen, which reasoning was employed while choosing the data, how the data was checked, whether the personal data of the readers are being processed, how credibility and objectivity of the used sources are ensured (Clerwall 2014).

iii. Fairness: Fairness means to avoid harmful biases and stereotypes in people's lives. Thus, AI considered being the core challenge for journalism, in particular with the use of data as a tool for invading privacy, social manipulation and oppression. In October 2018,

the International Conference of Data Protection and Privacy Commissioners (ICDPPC) released the Declaration on Ethics and Protection in Artificial Intelligence. The declaration states that unlawful biases or discriminations that may result from the use of data in artificial intelligence should be reduced and mitigated.

iv. Data Utilization: Currently, data utilization is one of the ethical problems related to AI in the field of automated journalism due to the lack of ad hoc laws and rules. Wang and Siau (2018) argue that the security and privacy of data pose significant risks not only for users but also for developers and governments. Regarding this issue, Monti (2019) in his study entitled: Automated Journalism and Freedom of Information: Ethical and Juridical Problems Related to AI in the Press Field, points out that ethical duty should be the necessity to use correct, objective, and accurate data.

v. Data Quality: One of the main bigger concerns of the current use of AI in newsrooms is the quality of the data used that can lead to misleading results, including the source and the accuracy of data. In this regard, the European Parliament (EP) has approved a report on Robotics which establishes an Ethical Code of Conduct, which includes several fundamental principles, notably; protecting privacy and data use.

Prospects of Artificial Intelligence Utilization in Journalism in Nigeria

Journalists in Nigeria are not using AI in their newsrooms. Experts say it will take Nigeria a minimum of Eleven years to level up on AI globally (Olanrewaju. 2018; Ndiomewese, 2017) Reasons for this assertion are not far-fetched. Among the challenges bedevilling the introduction and adoption of AI in newsrooms are that of electricity to effectively power the AI applications; lack of adequate infrastructure; finance to purchase and maintain these equipments. Cultural and socioeconomic barriers to adoption, the cost of Internet connection and the training of AI handlers also pose a problem.

In fact, Nigerians are still struggling with basic needs. Furthermore, Nigeria is slow in adopting technological innovations as evident in her inability to successfully have a digital switch-over system introduced for many years now. The fact is that AI has come to stay thus investment in the introduction, training and retraining of editors and reporters are very crucial. As AI tools enter newsrooms, journalists need to understand how to use these new resources for storytelling not only ethically, but also efficiently. Developing and

promoting the use of shared guidelines among journalists and technologists around the ethical use of data and public disclosure of methodology is a must.

Existing AI tools should be used as opportunities for thinking about how to apply editorial values and standards to the early stages of new journalistic technology. Since tools are programmed by humans, there is a need for a concerted and continued effort to fight hidden bias in AI, often unacknowledged but always present. Journalists must strive to insert transparency into their stories, noting in familiar and non-technical terms how AI was used to help their reporting or production.

Theoretical Frameworks

Technological Determinism Theory

The Theory of Technological Determinism perhaps is one of the popular theories in the field of technology and society propounded by McLuhan (1964) cited in Morah and Okunna (2020). In McLuhan's argument, technology has the power to shape and control the direction and course of human society. McLuhan holds that technology is the major driving force behind every cultural, social, and political change in society. Its autonomous nature, independent of human will and control, is one of the main assumptions of Technological Determinism Theory (McLuhan, 1964). Technology was the autonomous character which developed and progressed without considering the social or cultural context that it was plunged into. McLuhan believed that with each new addition to society, the way people approached others would change, thus making a radical system of social and cultural importance take hold.

Notwithstanding the popularity that has been accorded to the Technological Determinism Theory, there is still considerable criticism for being too deterministic and somewhat overly simplistic in viewing the relationship between technology and society. Critics have somewhat claimed that the theory does not account for how human agencies and social contexts shape the development and diffusion of technologies (Bijker, Hughes & Pinch, 2017). Others also indicate that the theory tends to bypass the interactive, complex relationship between technology and society or culture. According to this theory, technology leads to changes in society and culture. In other words, technology is autonomous and independent of human will, and it transforms society. However, critics notice that too much simplification is done to the relationship of technology to society,

where this theory completely denies human agency and does not explain the full interaction that occurs among technology, culture, and society. According to Williams & Edge (2015), it places technology as an autonomous force and a determinate of society and culture, instead of vice versa. The integration of AI in journalism was, and can still, be argued to be the product of the 21st-century technological revolution. In that respect, technology will continue evolving and eventually impact the practice of journalism. This means that with the ever-increasing incorporation of AI in news production, news production and consumption are bound to change fast. Machine learning algorithms and natural language processing have growing applications in content creation, sifting through large volumes of data, and even personalizing news for readers (Williams, 2021). This quickens the pace at which news is relayed and opens up questions about the reliability and bias in news reporting. As technology evolves, so will the use of AI in journalism and take shapes regarding the shaping of news in the future. Take, for example, news delivery via chatbots. Several media firms are using AI-driven chatbots to deliver news to their audiences in a more personalized and conversational way. An example is the news brand Quartz, which has developed an AI-driven chatbot that facilitates conversations around news and delivers personalized news stories to its users. This enhances the user experience, while at the same time allowing news organizations to engage their audiences in a much more sophisticated manner and gather information about their preferences and reading habits. One of how AI is finding its way into journalism involves chatbots, but it doesn't end there.

Innovation Diffusion Theory

Innovation Diffusion Theory propounded by Everett M. Rogers in 1962 has explained the process of how an innovation is adopted into a society. According to IDT, the innovation diffusion process includes stages of knowledge, persuasion, decision, implementation, and confirmation (Rogers, 1962) cited in Abel and Agwu (2019). The theory assumes that five categories exist in the process: innovators, early adopters, early majority, late majority, and laggards. The innovators and early adopters are normally open-minded, and anxious to try new ideas, while the majority are more sceptical and slower in the adoption of innovation. Nevertheless, criticisms have been faced by the Innovation Diffusion Theory. One such criticism is that the theory assumes that people always act rationally in adopting innovations, which may not always be the case; most decisions concerning people are emotional and irrational decisions (Ogunyemi, 2014). It also overlooks other factors that might affect innovation adoption, such as the cultural and

social norms of a society, political atmosphere, and economic factors that may affect the adoption of an innovation.

The Innovation Diffusion Theory approaches the adoption process of an innovation as a process of five stages: knowledge, persuasion, decision, implementation, and confirmation. According to this theory, there exist five categories of adopters of innovation, and those categories differ in openness to new ideas and speed of adoption (Morah and Brown, 2024). The theory further explains how innovation can diffuse to society, whereby it is evident that the most open-minded people, which include the innovators and the early adopters, are the first ones to use the innovation, and then followed by the majority, who may be a bit sceptical and hence take more time to adopt. This theory postulates that the likelihood of adopting new technology is driven by some factors such as perceived usefulness and perceived ease of use. Innovation Diffusion Theory thus supports the view that news journalism AI can be encouraged or otherwise in its application in the production and dissemination of news by perceived relative advantages and disadvantages, compatibility or otherwise with existing media practice and routines, and the ease with which the technology can be fitted into the newsroom. The theory is based on the premise that the adoption and influence of AI in journalism would be an outcome of other factors besides mere technological advancement, and that any form of adoption would depend upon a perception by journalists of its utility and compatibility with their work.

Conclusion

Journalism worldwide is undergoing a historic transition, thanks to rapid advancements in digital technology. Importantly, this development is another aspect of technological progress that has led to major transformations in the organizational structures and functions of media companies. In this respect, artificial intelligence is considered the most important revolution of journalism in the digital age, which has reorganized the newsroom as never before. On the other hand, these technologies offer great potential for enhancing journalism today, especially in allowing journalists to process a high volume of data in a limited period, create news stories from structured data and automatically deliver them, as well as more diverse coverage.

It is therefore imperative that journalists especially in developing countries like Nigeria, adjust and embrace these changes. Nigerian journalists should embrace and adopt Artificial intelligence in their newsrooms. Though there are challenges to the adoption, they need to start from somewhere and then improve with time. AI at least for now does not pose a threat to professional journalism. In other words, artificial intelligence technologies have added value to journalism in the digital age, which cannot completely replace journalists, implying that these technologies will enhance, rather than replace journalists' work.

Recommendations

The following recommendations were raised:

i. Journalists should view AI as a supportive tool to enhance their work, rather than a replacement for human journalists. AI can analyze data, provide insights, and automate certain tasks, allowing journalists to focus on in-depth reporting and analysis.

ii. To ensure the responsible and unbiased use of AI in journalism, industry organizations and professional bodies should come together to establish ethical guidelines and principles to govern the use of AI in news production.

iii. News organizations should provide transparency about the algorithms and data used in AI systems, being open about how AI influences editorial decisions. This will help build trust with the audience and avoid potential biases.

iv. Newsrooms should provide training and resources for journalists to develop skills in working with AI technologies. This will enable journalists to leverage AI tools effectively and contribute to newsrooms' technological advancements.

v. News organizations should collaborate with AI experts and researchers to understand the capabilities and limitations of AI systems, particularly in areas like fact-checking, content generation, and data analysis.

vi. Collaborations between journalists and AI developers can lead to the creation of innovative tools that improve news gathering, verification, and investigative reporting. Newsrooms should actively seek partnerships with AI companies to drive these advancements.

vii. As AI relies on data, it is crucial for news organizations to prioritize privacy and security when implementing AI systems. Robust data protection measures should be in

place to safeguard not only journalists' sources but also the personal information of the audience.

viii. News organizations should play a role in educating the public about AI's role in journalism. By explaining how AI is used and its potential benefits, newsrooms can help alleviate concerns about job loss or biases arising from AI implementation.

ix. Journalists should be encouraged to critically analyze and verify AI-generated content to ensure accuracy and minimize the spread of misinformation. They should be given the tools and authority to challenge AI output when necessary.

x. News organizations must actively address the underrepresentation of diverse perspectives in AI development teams. A diverse team can help identify biases and ensure AI systems do not perpetuate existing inequalities or discriminatory practices.

xi. News organizations, alongside governmental and regulatory bodies, should regularly evaluate AI systems' impact on journalism. This evaluation should lead to the establishment of regulations, ensuring accountability and responsible use of AI in the industry.

xii. Collaboration between journalists, AI experts, data scientists, and other relevant disciplines should be encouraged to foster innovation and develop AI applications specific to journalism. This multidisciplinary approach will help navigate the challenges and harness the full potential of AI in the field of journalism.

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