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Collaboration of Artificial Intelligence and Journalists in Online Media from the Perspective of Human-Machine Communication

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ABSTRACT

This study aims to analyze the collaboration between Artificial Intelligence (AI) and journalists in online media using the Human-Machine Communication (HMC) approach. The research method used is a literature study. Data is processed using Miles and Huberman data analysis techniques. The results of this study indicate that AI is used in three primary stages of journalism: news gathering, news production, and news distribution. At the news gathering stage, AI assists journalists in collecting news materials from various sources and analyzing audience interest in specific topics. AI is used in news script creation, editing, and proofreading at the news production stage. AI chatbots and NLP programs help with automatic news writing and factual verification. Meanwhile, at the news distribution stage, AI is used for content personalization, news recommendations, and SEO optimization in online media. From the HMC perspective, collaboration between AI and journalists can be conceptualized as a unidirectional and two-way process. Collaboration between AI and journalists in a social context also occurs at the micro, meso, and macro levels, where interactions between humans and machines affect the social situation, the immediate reality of individuals, and the structure of society as a whole.

Introduction

The press industry has entered the digital era with an increasingly rapid flow of information. This phenomenon occurred when the press industry faced the era of online media. Print media slowly eroded because the public preferred to consume information from online media, which was considered more accessible to access via mobile phones (Kusuma, 2016). This change has significantly impacted how journalists work, news characteristics, editorial structures, and patterns of interaction with the public (Maflucha & Wijayanti, 2024). One of the challenges that has emerged in online media is that journalists' workload has increased. The nature of online media, which prioritizes the speed of information, requires journalists from these media to present news in real time to compete with other media. As a result, the characteristics and quality of the journalistic products produced have decreased due to low news validity (Nasution et al., 2022).

To overcome these challenges, artificial intelligence (AI) technology has emerged as a potential solution. The use of AI in journalism has been carried out for almost a decade. The Associated Press (AP) became one of the first news agencies to use AI technology in 2014. AP collaborated with a startup, Automated Insight, to produce news about corporate financial reports. After using AI technology, the number of news stories produced by AP increased by 100 times. In the same year, the LA Times also used AI to create news about automatic earthquake warnings using data from the United States National Geological Survey (USGS). Furthermore, in 2016, the Washington Post used artificial intelligence called Heliograf to produce news, including short reports on the Rio de Janeiro Olympics and the 2020 general election. One of the news agencies in China, Xinhua, integrated a news production platform using AI technology in 2016 (Putranto & Utoyo, 2022).

The British Broadcasting Corporation (BBC) also used AI to generate automatic news articles and reports on the general election in the UK in 2019. Microsoft used AI to select news appearing on the MSN website in 2020 (Hanifa et al., 2023). Then, in January 2023, the technology media website CNET announced that it had used AI on its CNET Money channel. The editorial team published 77 articles, or around 1% of the total content published on the web in the same period. The AI used by CNET is said to help media companies create news, offer expert advice readers need, provide more personalized content, and give writers

and editors more time to test, evaluate, research, and report on their areas of expertise (Guglielmo, 2023).

Several media companies in Indonesia have also implemented AI journalism, such as Beritagar.id and Lokadata.id. The national television station TVOne has also used AI technology to help the work of news anchors or presenters through a human digital presenter system in April 2023. Senior journalist and editor-in-chief of TVOne, Karni Ilyas, was made into an avatar to present the news program "Apa Kabar Indonesia." In the same year, in August 2023, the iNews television station introduced an AI presenter.

AI has changed how journalists work by increasing the efficiency and accuracy of news reporting. Several news outlines use AI in news-making, such as collecting news sources, selecting articles, analyzing, and producing news automatically. The use of AI in journalism practices can help the work of news editors by 9% and the work of reporters by 15% (AI World School, 2023). A survey conducted by Beckett & Yaseen (2023) showed that 75% of 105 news and media organizations in 46 countries use AI in news-making processes, such as collecting news sources, news production, and news distribution. At this stage, AI develops the emergence of new media ideas. In line with this, several new terms have emerged, such as robot journalism, algorithmic journalism, and automation journalism.

Several researchers have conducted research on AI in the media sector. Damayanti (2017), Amran & Irwansyah (2018), Lase (2019), and Indainanto (2020) studied the use of AI in Indonesian online media, especially Lokadata.id and Beritagar.id. The results of the three studies show that AI can assist human journalists' work, such as writing routine news. However, the publication and distribution of news still involve humans. The study shows that the presence of AI has given rise to new work practices, so journalists and AI must collaborate.

In addition, a study by Putranto & Utoyo (2022) examines whether AI is a threat to humans, finding that AI does not immediately replace the role of humans and can gain readers' trust. Media in the era of AI development and the mass media business industry model are also some of the topics in AI research in the media. Saidah (2021) examined this section and found that AI has a role as a business booster to increase news content production.

Meanwhile, Jamil (2020) examined the opportunities and challenges of AI in journalism practices in Pakistan. Jamil found that AI can speed up writing

and reduce the potential for writing errors. However, challenges are faced, such as a lack of economic resources, access to accurate data, and government policies supporting this practice.

From these various studies, AI in the media field still needs further study, including collaboration between AI and human journalists. This can be explored using the Human-Machine Communication (HMC) approach. Guzman (2018) defines HMC as forming or creating meaning between humans and machines. In their research, Lewis et al. (2019) stated that HMC can be used to understand the social and cultural implications of the role of communicator held by machines (including AI).

Method

Research on AI in the media sector in Indonesia has not been widely studied using the HMC approach. This study aims to analyze the extent to which AI and journalists can collaborate, especially in Indonesian online media. Online media was chosen for further study because it presents information faster and adopts more AI technology. In addition, online media is also the most popular source of news in Indonesia, especially for urban communities (Newman et al., 2023).

This research is a qualitative-descriptive study with a literature review method. A literature review is a series of activities related to library data collection methods, reading, recording, and processing research materials (Zed, 2014). The author collects the latest national and international journals related to AI in the media and Human-Machine Communication, reports, publications, or documents relevant to the research topic. These sources are then processed using the Miles & Huberman data analysis technique, which consists of three stages: data reduction, data presentation, and conclusion (Sugiyono, 2012).

At the data reduction stage, the author selects the most relevant and most recent sources or materials, considering the massive development of AI in the media so that the latest data is needed and this research is relevant to the existing situation. Then, at the data presentation stage, the author compiles the data obtained from the results of the data reduction that has been carried out. Finally, in conclusion, the author will draw conclusions based on the presentation and analysis of data carried out regarding the collaboration of AI and journalists from the perspective of Human-Machine Communication.

Findings and Discussion

AI is a set of interrelated technologies used to solve problems autonomously and describe tasks to achieve specific goals without explicit human intervention (Dawson et al., 2019). Although "general AI," which will replace some human roles, is predicted to come in the next few decades, Dawson et al. (2019) have the view that AI has several opportunities, such as improving welfare, raising economic levels, realizing an inclusive society, and helping the environment by using sustainable resources. Karnouskos (2022) states that AI can significantly impact society in the future, such as being physically present, making autonomous decisions, and interacting with stakeholders.

Bostrom in Karnouskos (2022) mentions three levels of evolution of AI, namely (1) artificial narrow intelligence (ANI) or weak AI which excels in certain activities, such as playing chess, driving cars, and personal virtual assistants; (2) artificial general intelligence (AGI) or strong AI which has capabilities equivalent to humans, can learn and act in ways that are indistinguishable from humans; and (3) artificial super intelligence (ASI) that surpasses human capabilities. Current AI is at the ANI or weak AI stage. This is evidenced by the existence of Tesla driverless cars, personal assistants Siri and Cortana, the emergence of AI chatbots, such as ChatGPT developed by OpenAI, Bard, and LaMDA developed by Google, Replika, Jarvis by Facebook AI, Perplexity, to Xiaoice.

Collaboration between AI and Journalists

Journalistic activities have three basic stages: news gathering, news production or processing, and news distribution or presenting (Hasfi & Widagdo, 2013). News gathering is the initial stage in journalistic activities. In this case, journalists will determine what news will be covered by considering news values. News values are the reference used by journalists to determine the eligibility of a news story. Halim (2015) explains that news values include proximity (psychological closeness), geographical closeness, relevance, recency or actuality, attraction, drama, and entertainment.

News production or news processing is a series of processes that process information and compile news. Sumadiria (2006) explains that news production is creating news, starting from planning meetings, covering, drafting scripts, and

editing. Journalists must know the types of news to compile a news story. Based on the author's observations, the type of news generally compiled for online media is straight or direct. Straight news is a type of news that is written concisely, clearly, and concisely (Morissan, 2008). This type of news is used because of its speed in the making. As is known, online media has the nature of actuality and prioritizes speed.

News distribution is related to the movement of mass communication products from one point of production to a point of consumption (Ruben & Steward, 2013). Nowadays, news distribution can be done by utilizing social media, such as X (formerly Twitter), Facebook, Instagram, TikTok, and YouTube. News distribution through social media allows the news to reach a wider readership. Some media allow for two-way communication because the audience can provide feedback.

1. News Collection

Technological developments have had a significant impact on the way journalists collect news materials. In traditional journalism, journalists would go into the streets and look for news without adequate communication devices and networks. Unlike online media journalism, when digital technology and social media have developed, news collection has become more varied, and written news has become more prosperous. Journalists do not have to go to the streets and can carry out verification discipline via email, social media, or instant messaging applications (Udenze, 2019).

The presence of AI also impacts the process of collecting news materials. Based on a survey study conducted by Beckett and Yaseen (2023), AI can assist journalists in collecting materials from various sources and assist the editorial team in analyzing audience interest in specific topics or issues. AI tools commonly used by journalists in collecting news materials are optical character recognition (OCR), speech-to-text programs, text extraction, and trend detection and news discovery.

OCR, speech-to-text, and text extraction are used to create automatic transcriptions and extract text to images and data structures. Some AI programs commonly used by journalists are Colibri.ai, Speech Text.ai, and Whisper. This tool assists the production process and helps newsrooms create news in various languages. AI-based automatic transcription programs also help speed up the

transcription process, which is generally time-consuming. Unfortunately, several AI programs have weaknesses in terms of accuracy, especially if the source or informant has a fairly thick accent.

In addition, trend detection and news discovery help journalists find interesting and hotly discussed issues. Google Trends, web scraping, Dataminr, and Rapidminer are generally used to identify topics or issues that are experiencing an increase in the trend, thus helping journalists decide what news to write today. With AI, detailed processes, such as tag creation, can help journalists find accurate tags.

2. News Production

After the news material is obtained, the next stage is news production, which includes compiling and editing the news script. In today's digital era, speed is one of the priorities in presenting information. The media compete to present information quickly. This has consequences for news production activities when journalists must do their jobs as quickly as possible. However, accuracy and fairness in news cannot be ignored.

Beckett & Yaseen (2023) stated that AI has a role in the news production process. The presence of a type of AI chat robot or chatbot that allows its users to give various commands is a "breath of fresh air" in the media world, especially those related to text. For example, ChatGPT technology can write an article according to the topic and data provided. Technology similar to ChatGPT is developing, especially with increasingly accurate natural language processing (NLP) programs, so that readers can understand the results of AI writing. NLP helps journalists to carry out factual verification. This program identifies existing claims and matches them with previously verified information.

Chatbot is a computer program that allows conversation results like communicating with humans. Chatbot is one of the results of the implementation of NLP. In its use, the language used by the chatbot must be understandable to humans, so natural language processing must be used (Aprilinda et al., 2022). Through this NLP, any program, including chatbots, can understand, process, and produce human language in a way similar to human communication.

The use of chatbots in journalism practice has lightened the workload of journalists and reduced stress so that journalists can focus on news quality and

produce in-depth analyses and reports. Research conducted by Maniou and Veglis (2020) states that the presence of this AI chatbot provides hope for the return of narrative journalism. The information and reports conveyed in the news allow for personalization, arouse emotions, and foster public trust in the press.

In addition, AI in the news production process is also used in proofreading and editing. Programs such as Grammarly and spell checkers are AI-based programs journalists use to speed up work time and improve the quality of news content.

3. News Distribution

News distribution is related to the movement of mass communication products from one point of production to a point of consumption (Ruben & Steward, 2013). In terms of news, the movement or distribution process can be carried out through various media, such as live television broadcasts that are real-time, online media, social media, and various other platforms with different delay times (Maulida et al., 2018).

As many as 80 percent of journalists who were respondents in the Beckett & Yaseen (2023) study used AI technology in news distribution. The role of AI in news distribution is more about using personalization systems and content recommendations that suit readers' interests. Respondents considered that the use of AI could reach a wider audience. AI that can distribute news content automatically, such as Echobox and SocialFlow, are tools often used to optimize content on social media.

Specifically in online media, AI at the news distribution stage impacts news writing based on search engine optimization (SEO). SEO helps journalists understand their audiences so that the resulting news content can be personalized.

AI and Journalist Collaboration HMC Perspective

AI in journalism can be understood as a communication between humans and machines. This phenomenon can be explained through the theory of human-machine communication (HMC). Guzman (2018) states that HMC is a process of creating meaning between humans and machines. This theory denies that machines can only act as mediators or facilitators in communication. The theory assumes that machines can act as communicators. In HMC, the definition of communication is

no longer tied to the ontological understanding of communicators, which places humans as the exclusive party that can be communicators. Communication is not just a process of exchanging messages, but a means individuals use to understand themselves and their social roles. In Human-Machine Communication (HMC), devices and programs can act as communicators and have a place in social life.

Communication technology is seen as part of a social configuration but as a social entity with a relationship with humans (Lewis et al., 2019). Experts have classified several technologies as independent communicators, such as conversational agents such as Alexa, personified social robots such as Jibo, and social bots commonly used to market products (Jamil, 2020). This is supported by research conducted by Clerwall in Lewis et al. (2019), which found that, in some instances, a person cannot distinguish between messages created by humans and messages created by machines. This finding also applies to news articles created by AI. In this case, AI can act as a communicator because messages are exchanged between humans and machines.

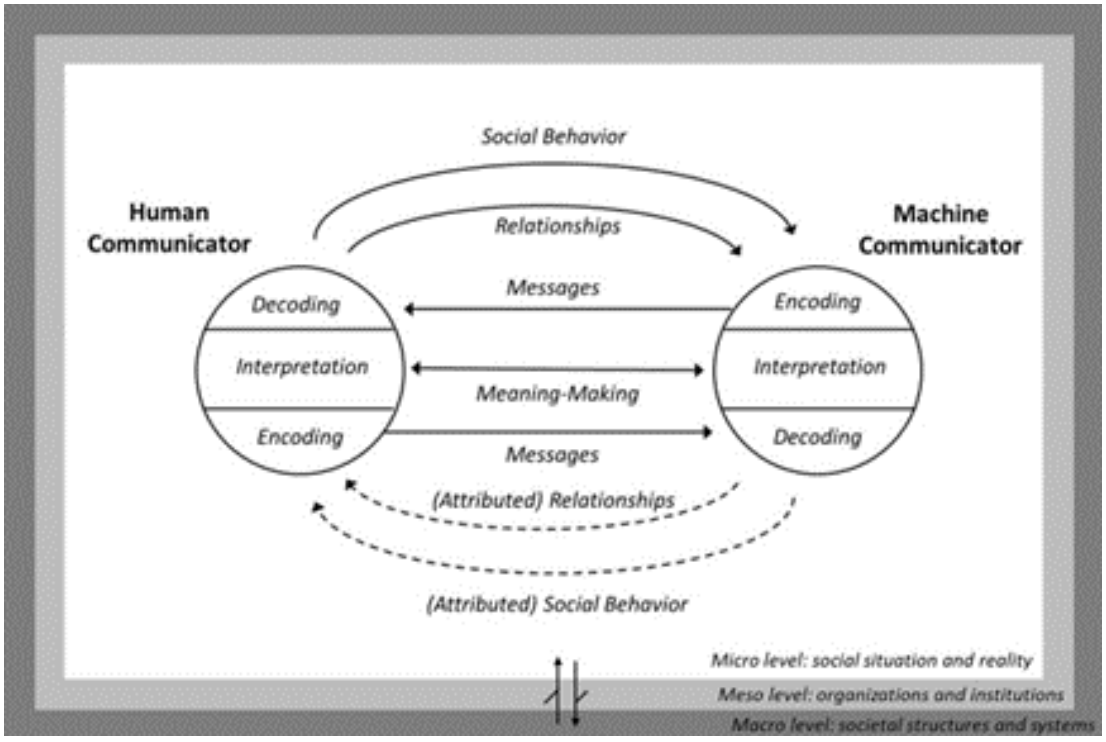

Figure 1 Human-Machine Communication Model

HMC can explain how machines enter the role of communicators and how humans conceptualize machines into that role. In journalism practice, machines

(in this case, AI) play an important role in improving and assisting journalists' work through automatic writing and production of news. However, there are several points of concern. First, from a communication perspective, communication focuses on "what does someone communicate with?" This is a challenge for developing countries, including Indonesia, because technological developments and their implications are still being developed. Journalists' perceptions of AI machines acting as communicators still need to be explored in the context of journalism. Second, the emergence of chatbot-based AI that can perform tasks like human journalists and the development of natural language processing (NLP) technology. Third, machines require humans to input data and programming as an essential part of the communication process (Jamil, 2020).

Etzrodt et al. (2022) explained that HMC is embedded in various layers of social context, namely the micro, meso, and macro levels. The micro level contains the social situation and direct reality of the communicator, the meso level relates to institutions and organizations, and the macro level encompasses the structure and systems of society. HMC is influenced by these three levels, which involve the exchange of messages between humans and machines, the creation of meaning, relationships, and related social behavior.

In journalism, artificial intelligence (AI) plays a role in media work, including news gathering, production, and distribution. Looking at the HMC model introduced by Etzrodt et al. (2022), each stage in journalistic work can be conceptualized as a one-way or two-way process (from humans to machines).

HMC is also in the layers of social context, namely the micro, meso, and macro levels. The micro level contains the social situation and immediate reality, the meso level relates to institutions and organizations, and the macro level encompasses the structure and systems of society. At the micro level, collaboration between AI and journalists affects individuals' social situation and immediate reality. For example, at the newsgathering stage, AI can help journalists identify and understand audience preferences and relevant trends. At this level, journalists and AI collaborate to present news that is more in line with the needs and interests of individuals, resulting in a personal interaction between readers and the news content produced. The micro level can also be examined at the news distribution stage when AI can contribute to personalizing the news reading experience. This is because news written by journalists and AI provides more relevant information to readers.

At the meso level, collaboration between AI and journalists also affects media institutions and organizations. At the news production stage, AI contributes to increasing news production. The involvement of AI in the news production process can speed up time and optimize editorial workflows and editing efficiency. This can be a solution for media that experience problems with news quality due to prioritizing news quantity. Through collaboration between AI and journalists, media organizations can produce content faster without sacrificing quality. Then, at the news distribution stage, collaboration between AI and journalists can help the media develop more effective distribution strategies so that the level of readability increases because the products produced can reach a wider audience. Integrating AI in editorial makes news institutions more responsive to market changes and reader needs.

At the macro level, collaboration between AI and journalists also touches on aspects of social structures and systems. At the news distribution stage, AI's involvement in analyzing data and reader behavior can produce helpful information for decision-makers. This is related to one of the roles of the media as an opinion shaper in society. The involvement of AI can present a more in-depth analysis of certain news content. Ultimately, this can influence the decision-making process and shape the direction of public policy.

Challenges of Collaboration between AI and Journalists in Online Media

The digital era requires the adoption of increasingly developing technology, and therefore, collaboration between AI and journalists is inevitable, especially in the context of online media. Although AI has great potential to accelerate news production and data analysis, several challenges that arise cannot be ignored.

Shamsi (2018) stated that there are concerns that AI will replace the journalist profession. As the use of AI in the newsroom increases, the need for human reporters decreases. This implies that journalists may lose their jobs, resulting in widespread unemployment. However, there is optimism that AI will not wholly replace human journalists in the newsroom. The presence of humans is needed and plays a vital role in confirming, correcting, and supervising the work carried out by AI.

In addition, AI also raises concerns about ethics and bias. Gender and

racial bias are prone to occur because the data entered into the AI system is not free from human influence. Gender and racial biases can arise if the data entered is not carefully filtered. AI does not have an agenda or interest, but AI is a system that depends on the data entered. This means that if irresponsible parties enter data, unwanted biases can occur.

For example, the AI-based software used by Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) to estimate potential criminality in the United States has been biased against black people. The system assesses the risk of recidivism of black inmates as higher than that of non-black inmates (Osoba & Welser, 2017). This shows the importance of accuracy and caution in the use of data and the need for mechanisms to detect potential bias.

In journalism, data transparency is important to maintain readers' trust as parties served by the media. Data used to compile news must be accountable and accessible to readers. The discussion of data is also closely related to the exploitation of data as a weapon to violate the privacy of others through social manipulation. Protecting individual privacy must be a top priority to reduce the risk of data exploitation and manipulation.

The International Conference of Data Protection and Privacy Commissioners (ICDPPC) issued the Declaration on Ethics and Protection in Artificial Intelligence in October 2018, emphasizing the importance of avoiding and eliminating potential prejudice or discrimination arising from the use of data in AI (Shamsi, 2018). This affirms the commitment to maintaining integrity and credibility in applying AI technology in journalism.

Another challenge that is also a concern is the difficulty of integrating AI with existing systems in the media industry, including combining human intelligence and Artificial Intelligence. Many media companies do not yet have the technological infrastructure to support AI. This is because existing systems are often not designed to receive large volumes of data and high speeds as required by AI. Massive infrastructure improvements are needed to support the integration of AI with legacy systems. In line with this, AI can potentially hinder the workflow that has previously been carried out in the media industry. Decision-making in media business processes generally balances human creativity and precise data analysis (Chan-Olmsted, 2019).

The balance between data analysis and the human touch is also an issue in

the application of AI in the media industry. AI can provide practical data-based recommendations, but there are concerns that AI can reduce the human touch in more subjective decisions, such as choosing content that aligns with company values or audience tastes. This integration often creates tension between technology teams focusing on data and creative teams prioritizing intuition.

In addition, over-expectations of AI capabilities can lead to imbalances in using this technology. In the context of fact-checking, for example, AI is often treated as if it is capable of making complex decisions like humans when, in fact, AI is more effective at automation and process improvement tasks than at complex decision-making (Chan-Olmsted, 2019).

In facing these challenges, a collaboration between AI and journalists is needed to fix weaknesses, optimize the advantages of technology, and ensure that the core values of journalism, such as accuracy, fairness, and trust, are maintained. Collaboration between AI and journalists must be based on a joint effort to maintain public trust in the media. Credibility is a critical asset in journalism that must be maintained seriously.

Conclusion

The collaboration between Artificial Intelligence (AI) and human journalists in Indonesia's online media context has brought significant changes to the news reporting process, especially in the stages of news gathering, production, and distribution. The use of AI technology has helped improve efficiency and accuracy in journalists' work, as well as enabling better personalization of news content according to the interests and needs of the audience.

In news gathering, AI has provided tools such as OCR, speech-to-text programs, and text extraction to speed up the transcription process and identify relevant news. In addition, AI is also used for trend detection and news discovery to help journalists identify issues that are currently being discussed. At the news production stage, AI helps journalists compile scripts, proofread, and even produce news automatically through chatbots. AI programs such as Grammarly and spell checkers also help improve the quality of news content. At the news distribution stage, AI plays a role in personalizing news content according to readers' interests and utilizes SEO techniques to increase content visibility in online media.

This collaboration between AI and journalists shows that from a Human-

Machine Communication (HMC) perspective, the role of machines as communicators has been recognized and integrated into the news reporting process. However, it should be noted that AI also poses several challenges, including ethics and bias, which need to be addressed wisely. Thus, collaboration between AI and human journalists must continue to be developed wisely to ensure accurate, balanced, and relevant reporting to the community's needs.

For further researchers, it is recommended to conduct empirical research involving direct interviews with online media journalists, especially in Indonesia, to gain deeper insights. In addition, further researchers can also analyze the ethical and bias impacts that may arise from the use of AI in journalism and develop ethical guidelines to mitigate ethical and bias issues. This research on AI in the media is expected to enrich the literature and significantly contribute to the progress of the press in Indonesia.

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