Journal of Basic Physical Research ISSN: 2141-8403 Prints, 2141-8411 Online
Vol.13, August, 2024, pp. 32 - 41. Available online at www.jbasicphyres-unizik.org

THE IMPACT OF ARTIFICIAL INTELLIGENCE IN DIGITAL COMMUNICATION AND SOCIAL MEDIA: A REVIEW

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Abstract
*The functions and requisition of Artificial Intelligence are increasing daily. **Artificial Intelligence is** an arm of computer science that deals with the capability of computer system to exhibit human characteristics such as thinking and reasoning intelligently. Its relevance has remarkably progressed within the past few years and the applications have been displayed in virtually every sector of life. In this paper, we explored the various ways in which Artificial Intelligence has impacted digital communication and social media as well as their implications to developers, entrepreneurs and the world at large. Digital communication and social media are among the verse number of domains benefitting from the innovative strength of artificial intelligence. It has tremendously transformed how people interact and communicate online providing them with sophisticated tools for more efficient digital communication experience utomatic content creation/moderation, customized recommendations for internet advertising and so on. From 2021 Statista record, about 4.26 billion people worldwide using social media spend averagely 2 hours, 27 minutes on daily basis and with this heightened number of social media users, artificial intelligence technology is crucial in order to meet the demands of these users with ease.*
***Keywords:** Artificial intelligence, Digital communication, Social media, Technology, personalization, machine learning.*

Introduction
With the recent advancement in technology, Artificial Intelligence has gained ground across every field of human endeavours (Campolo *et al*., 2017) and digital communication and social media domain are not left out in this technological innovations. As work becomes more tasking by the day, People tend to exploit the strength of Artificial Intelligence to ease the stress of workers while increasing their output.

Applying Artificial Intelligence solutions in digital communications is getting more customizable, thus making it possible to optimize digital adverts and algorithm-generated content. Currently, Artificial Intelligence determines the adverts to display through the interpretation of audience level of engagement and comparing them to data acquired from the users' behavioural history. As a matter of fact, applications of Artificial Intelligence technology in digital signage networks or projects has been found to increase content relevancy by up to 50 percent. With the rapid evolution of this technology, it's strength might surpass human ability in the nearest future.

Additionally, organizations are implementing diverse machine learning applications that influence filtration, organization and analysis of online contents. Artificial Intelligence and Machine Learning technologies are now being used by companies to establish better communication and understanding with their online customers, knowing very well that understanding what customers want is very paramount for a successful business. Machine learning helps in analysing customers and sales data to ascertain the consumers' preferences and dislikes. Other examples of the usefulness of Artificial Intelligence and machine learning in digital communication are seen in websites where chatbots are used for customer services and email services making use of spam filters.

Furthermore, with the help of Plus AI tools, one can automatically create, edit and design presentations, analyse competitors' strategies, tag photos and videos for easy visibility of branded contents. In fact, listening tools can also be used to understand the thoughts of consumers pertaining a given brand in real time.

A lot of communications and media companies now embrace Artificial Intelligence, having discovered it is the future of digital communication. It improves the productivity, efficiency and profitability of digital communication. Based on the **Accenture Strategy** research report, about 63 percent of telecommunications executives are of the opinion that incorporation of Artificial Intelligence technology will not only increase revenue but also enforce growth. Following this assertion, 72 percent of these executives included Artificial Intelligence in the top three current business priorities.

Social media, which is now very essential in human activities is also one of the main areas that have greatly benefitted from Artificial Intelligence. It has tremendously improved the performance and efficiency of marketers as they use it as a channel to reach out to the consumers. The emergence of social media has enabled interaction among many people through different platforms such as X (formerly Twitter), Tiktok, Facebook, Instagram, etc. (Sadiku M. N. *et al* 2021). Social media, through the use of Artificial intelligence is currently used in inferring social behaviours and deduction of tendencies, in collaboration with big-data analysis tools (Sarmiento, H. 2020). This is made possible to its ability to gather and analyse data pertaining to people's activities on social media.

Review of related literature

Artificial intelligence originated from disciplines such as philosophy, mathematics, computation, psychology, and neuroscience. Ever since its inception, it is making waves in manufacturing and servicing industries (Ibarra *et al*., 2018; Müller, Buliga, & Voigt, 2020) due to its perceived importance in various fields of human endeavour including providing enhanced communication and information flow.

With an increased availability of monitoring data and the current innovations in computing, network operators can easily automate communication using Artificial Intelligence technology. Also, machine learning, human machine communication and computer mediated communication which are branches of Artificial Intelligence are currently being applied in providing exceptional solutions to various real world problems.

Artificial Intelligence is a polysemous discipline, encompassing different efforts channelled towards better understanding of human intelligence by recreating human mind in machines and implementing technologies capable of performing tasks associated with some level of human intelligence *(Broussard, 2018; Frankish and Ramsey, 2014).*

Applying Artificial Intelligence in digital communication and social media provides organizations with better understanding of customers' viewpoints, feelings, and responses to brands and products in order to effectively reach a good number of people. Artificial Intelligence boosts organizations' efficiency, increases their revenues while reducing their expenses. It also helps in safeguarding the privacy of user data as well as making social media marketing more profitable.

Futhermore, the strength of the current computing technology lies in their sophiscated compendium of algorithms and social media landscape are built on these algarithms. These algorithms play a crucial role in ascertaining how to improve and manage communication, knowledge and networking in an online platform. Presently, social media strongly utilize artificial intelligence based algorithm in order to make the platform more engaging for the

consumers (Ibert O. *et al* 2022). The integration of artificial intelligence based algorithm into social media has remarkably enhanced social media services, making it more palatable for both the producers and consumers.

Social media has been totally transformed by arificial intelligence, as all its basic functions such as searching, predicting, recommending, content creating and filtering are all perfomed through artificial intelligence algorithm (Zhang C and Lu Y. 2021). Researchers have shown that our daily consumption of information on social media is made possible by the use of artifcial intelligence powered algorithms (Kang H and Lou C., 2022, Manoharan S. *et al* 2020).

Javornik A. *et al*.(2022) also stated that content creating and establishment of connection which are part of the needs of social media users are satisfied through the use of face filter, which is an artificial intelligence technology. Artificial intelligence promotes networking among people with similar interests. Some of the properties of artificial intelligence that support networking include 'who to follow' list in X platform and face book recommendation of 'People you may know'.

Another key area where Artificial Intelligence has significantly impacted is personalization. By analysing customer data, Artificial Intelligence algorithms can identify patterns and preferences, thereby making it possible for messages to be tailored to specific target audiences, creating room for greater engagement rates that promotes social media campaigns.

Artificial Intelligence

Artificial intelligence is a term given to computer systems that has the ability to perform complex tasks that only a human could do, such as thinking, decisions making, or problem solving. Artificial Intelligence is presently revolutionizing industries with its wide range of applications such as virtual personal assistants. It comprises of different technologies empowering huge percentage of the services and products used on daily basis.

The main goal behind Artificial Intelligence is to make machines reason as humans but surpassing human ability to work (Misselhorn, 2018). It enables computer system to autonomously assemble and process available information in order to make decisions, resolve problems, and carry out tasks requiring human intelligence and reasoning (Von Krogh, 2018). Its application in daily routine tasks enhances job performance and yields greater productivity (Lee, Davari, Singh, & Pandhare, 2018; Von Krogh, 2018). Artificial Intelligence encompasses other computer-based systems and applications such as machine learning (Chui, Manyika, & Miremadi, 2015), soft computing (Kumar & Thakur, 2012), fuzzy logic (Karatop, Kubat, and Uygun, 2015), robotics (Liu, Shi, & Liu, 2011), and virtual and augmented reality (Abou-Zahra, Brewer, & Cooper, 2018).

Areas of Application of Artificial Intelligence:

Artificial Intelligence is applicable in various industries and fields which include:

i. **Health Domain:** Artificial Intelligence is contributing in so many ways in health industries. Its contributions include disease diagnosis, drug discovery, disease predictive analysis, e.t.c.
ii. **Financial Field:** In financial field, artificial intelligence is helpful in credit scoring, detection of fraud and finance forecast.
iii. **Retail Industry:** Artificial Intelligence is currently making waves in retail industries where it is applied in supply chain, optimization of price, products recommendation.
iv. **Manufacturing Industries:** Artificial intelligence is applicable in quality control, predictive maintenance, and product optimization.

v. **Transportation Industries:** Artificial Intelligence is behind the functioning of autonomous vehicles, traffic prediction system and route optimization.
vi. **Educational system:** Application of Artificial Intelligence in educational field is evident in personalized learning and intelligent tutoring systems.
vii. **Agriculture:** with the help of Artificial intelligence, we now embark on smart Agriculture and predictive farming.
viii. **Security:** Artificial Intelligence is used in facial recognition systems, intrusion detection, and cyber security.

The application of Artificial Intelligence is not limited to the above list as it is applicable in virtually every field of human endeavour. However, there is commonality among all these applications of Artificial Intelligence, they all apply one or more of the seven patterns of Artificial Intelligence. These patterns are discussed below.

Seven Patterns of Artificial Intelligence

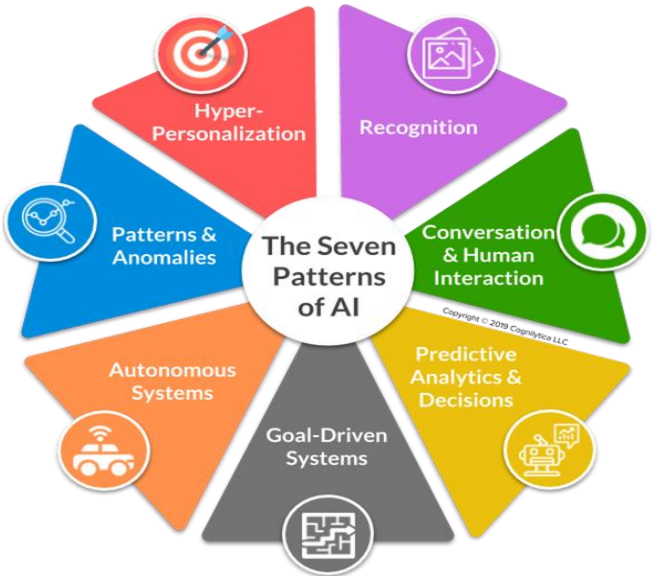

Figure 3.1 the seven patterns of Artificial Intelligence (Kathleen W.2020)

Figure 3.1 above portrays the seven patterns of Artificial Intelligence solutions that are applicable in all artificial Intelligence projects including chatbot building, image recognition or autonomous vehicles. These seven patterns can be independently applied or combined in different ways depending on the nature of the problem at hand.

Autonomous systems: These are systems that have the ability to perform a given task, attain a set objective and connect with their environment. These systems can actualize a given objective with minimum human participation. They minimize manual labour by using their machine learning ability to independently perceive the environment, infer future behaviour of external elements and plan on how to tackle the situation. Autonomous systems are applicable in different types of autonomous vehicles and machines such as cars, trains, boats, airplanes, autonomous documentation and knowledge generation, autonomous business processes and cognitive automation.

Patterns and Anomalies: Machine learning helps in the identification and analysis of pattern in order to discover anomalies. The pattern-matching is a commonly used technique for developing artificial intelligence projects. This pattern uses machine learning and some cognitive techniques to discover data patterns and higher order connections between data

points in order to find out whether it corresponds or deviates from the original pattern. It is mainly concerned with discovering pattern matches and mismatches. These systems are mainly applied in fraud and risk detection as well in finding patterns among data. It also helps in minimizing and fixing human mistakes. Examples includes predictive text used to analyse speech and grammar patterns so as to suggest suitable words for speedy writing process.

Hyper personalization: This pattern works with the principle of treating every customer as an individual. Hyper personalization involves creating and presenting customized messages, information and recommendations to customers using their data. This is achieved through individual customer's profiles. With the help of machine learning, profiles are developed using data obtained from browsing history, purchase pattern, geographical location, demographic and behavioural data. A typical examples of application of hyper personalization is seen in Netflix company where Artificial Intelligence technology is applied in recommending movies to audience on the basis on preferences and in Starbucks that use hyper personalization in connecting with their customer base. Hyper personalization is not only used by marketers, it's application can also be found in financial field, healthcare sector and personalized wellness and fitness systems.

Predictive analytics and Decision support: this involves the use of machine learning and some cognitive technologies to comprehend how the past or present behaviours assist in predicting the upcoming result and facilitate decision making. This pattern is applicable in assisted searching and retrieval, prediction of future value of data, behaviours prediction, failure prediction, assisted problem solving, best fit identification and selection, match identification, optimization, advising and intelligent navigation

Conversational Pattern: *Conversational/Human interaction involves the use of machine learning and natural language processing in mimicking human interactions. This pattern enables machines interact with humans in the same manner humans interact with each other which includes communication from* machine to human or vice versa, and communication between the two. It is applicable in chatbots, voice assistants, as well as sentiment, mood and intent analysis. **Conversational Pattern** attempts to comprehend the motive behind human interactions and facilitates communications among people through the process of translation.

Recognition Pattern: Recognition pattern involves the use of machine learning and some cognitive technologies in identifying and determining required elements in images, audios, texts and videos. Its main purpose to enable machines identify and understand items. It has its applications in recognitions of objects and image, recognition of faces, recognition of handwriting and text, recognition of audio and sound, as well as detection of gestures.

Goal-Driven Systems Pattern: this pattern aims at finding the most optimal path or solution to a problem. Goal-driven systems lay emphasis on specific goal attainment. They depend on action plan or objective to reach a particular goal. Goal driven systems work by setting up sequence of action and learning through trial and error. They usually make use of reinforcement learning and with the strength of reinforcement learning and other advanced computing technologies, machines can now beat some distinguished players in games like DoTA, chess and Go. This pattern of artificial intelligence can be applied in resource optimization, games, solving iterative problems, bidding etc.

Combining Patterns for Artificial Intelligence Solutions

Although these artificial intelligence patterns can be applied independently in projects, companies can combine two or more of these patterns to achieve their desired goals. Integrating these patterns artificial intelligence based projects provides organizations with better plan, approach and solution. Currently, evolving technologies emphasize the application

of these seven patterns in order to accelerate the planning of artificial intelligence projects. For instance, working on recognition pattern requires one to gain knowledge of wide variety of solutions already applied in similar cases, information about the data that is needed to implement the pattern, use cases and areas of applications of the pattern, algorithm, model implementation hints, and other information that will aid in speedy delivery of high quality projects.

Although artificial intelligence is still in its early stage of adoption, identifying and using these patterns will enable companies reach their artificial intelligence based project goals more easily and quickly, with better result.

Importance of Artificial Intelligence in Digital Communication and Social Media

Artificial Intelligence has a good number of applications capable of transforming our daily lives. The integration of these application has improved communication between organizations/marketers and consumers. Artificial Intelligence automation is rapidly transforming digital communication and social media, making it faster, more efficient and productive. Some of the benefits of Artificial Intelligence in digital communication and social media are as follows:

1. Improved Efficiency: Artificial Intelligence enables organizations consolidate their digital communication processes, making it possible for customers' inquiries and needs to be responded and attended to in a faster and more efficient manner; thus saving time and resources while ensuring customers' satisfaction.
2. **Higher Accuracy**: Artificial Intelligence automation has reduced errors encountered in digital communication to its barest minimum. It has the potential to identify and correct errors in customer data before they are sent out, thus ensuring that customers are provided with accurate information.
3. **Promotes Personalization**: With artificial intelligence algorithm, organizations can personalize their digital communication. This algorithm helps to identify customers' preferences so that messages are tailored accordingly to ensure the needs of the target audience are met, thereby, making communication more engaging and effective.
4. **Increased Security**: With the availability of many artificial intelligence based security techniques, organizations can better protect their system from cyber threats and also ensures that malicious contents are detected and blocked before it reaches customer.

Digital Communication

Digital communication is an electronic means of exchanging data, information, or messages. it is a fundamental way to communicate and can be through e-mails, instant messages, video calls, social media etc. Communication is more important than ever in this digital era as it is an element of every successful business transaction. Through interacting with people, information sharing, established relationships and collaboration, one can leverage the opportunities presented by technology and the internet.

Benefits of Communication

- **Connecting with people:** With internet people can easily communicate with one another anywhere, anytime and social media, instant messaging and video calls, have even made it easier as people can now connect with family and friends in real-time.
- **Sharing Information:** People now share their perceptions and ideas with the world through blogs or social media.
- **Establishing Relationships:** Communication is a very vital tool for building and maintaining relationships and digital communication helps greatly in facilitating connection between one another.

- **Collaboration:** Effective and efficient communication helps in quick realization of a common goal, whether group project with others or businesses.
- **Dominating:** The present digital era is constantly evolving, and communication is very important in order to stay ahead of the curve. Staying connected, informed and sharing ideas and information can help people stay ahead of the competition and succeed in this era.

Types of Digital Communication

Below are some of the most common types of digital communication:

Email: this is a commonly used digital communication channel used in sending and receiving messages, documents, and other files through the internet.

Instant Messaging: This involves real-time transmission of messages over the internet using applications like Yahoo Messenger, WhatsApp and Facebook Messenger.

Video Conferencing: Through video conference, users in different locations can have real-time face-to-face meeting over the internet. Organisations, remote workers, educational institutions, and others communicate through this channel all over the world at little or no cost.

Social Media: This involves creating and sharing contents, ideas, interests and other forms of information through virtual communities and networks.

VoIP: With Voice over Internet Protocol technology, people can make and receive calls over the internet. It is very cost-effective compared to long-distance phone calls.

SMS: Short Message Service is a text messaging service used for exchanging short text messages across mobile devices.

Benefits of Digital Communication

Digital tools have revolutionized human communication, making it faster, more efficient, and easily accessible to connect with one another. Some of the ways digital tools have greatly influenced communication include:

- **Speed**: Communicating with digital tools helps to instantly exchange ideas and information. E-mails, instant messages and text messages are currently used to send and receive information within few seconds, thereby, improving the speed and efficiency of communication.
- **Accessibility: Digital communication has lifted the barrier of** distance in communication as internet and mobile devices enable people connect to each other anytime and anywhere nowadays.
- **Cost-Effectiveness**: It is generally cheaper when compared with traditional communication methods. For instance, communicating through VoIP and video conferencing are often less expensive than making long-distance phone calls or scheduling physical meetings.
- **Enhanced Productivity**: With digital communication, companies and organizations working across different time zones can now interact in a faster and more convenient manner, thereby improving efficiency.
- **Environmental-Friendly**: Digital communication reduces paper use and minimizes carbon emissions, thus creating more friendly atmosphere.

Social Media

Social media is a term given to different technologies that help people share ideas and information. It makes information accessible in real time and promotes connection with one another. Over 4.7 billion people which about 59% of the world's population use social media platforms from Facebook to Instagram, X (formally Twitter), YouTube and so on. These platforms make the world more interconnected.

From the 2019 survey report by Pew Research Centre, the use of social media helps in connecting with more friends and getting diverse personal networks, especially within emerging economies. Social media generally presents user-generated contents that engage people through likes, shares, comments, and discussion. it helps people build community and provides suitable platform for companies' marketing campaigns. However, it facilitates bigotry and misinformation. Social media platforms are categorized into six namely, social networking, social bookmarking, social news, media sharing, microblogging and online forums. these

Impact of Artificial Intelligence on Digital Communication and Social media

The arrival of artificial intelligence has hugely impacted digital communication and Social media. Starting from the way we communicate with each other to how data are being protected. These impacts are as follows:

- **Virtual Assistants**: Artificial Intelligence-driven technologies are applied in various ways in order to enhance communication experiences. Natural Language Processing (NLP) one of the arms of artificial intelligence that helps machines understand and respond to human languages is now being deployed in creating virtual assistants like Amazon's Alexa and Apple's Siri which assist in responding to voice commands and answering questions. These virtual assistant systems can offer personalized assistance to users, allowing them to quickly and easily access information.
- **Improved Security**: AI technology provides a new level of security for digital communication. Artificial Intelligence-powered security systems have the ability to detect and block malicious activities well in advance before any damage. Artificial Intelligence facial recognition systems are being employed today in the verification of user identities ensuring that only authorized users are granted access to sensitive data. Again.
- **AI-Automated Customer Service Chatbots**: Organisations apply natural language processing (NLP) and machine learning (ML) in the automation of many of their communication processes. Chatbots are Artificial Intelligence tools that offer real-time communication services to customers. They provide support, information, and assistance 24/7. Through automation of routine tasks, Chatbots can help companies improve their customers' experiences by responding timely to their need. This technology minimizes manual labour, ensures customer satisfaction and reduces operational costs.
- **Language Translation: Artificial** Intelligence translation tools has made it very easy and convenient for one to communicate with people of different languages. With real-time translation, people now communicate across borders thus bridging different language barrier
- **Personalization:** With Artificial Intelligence algorithms user data can be analysed in order to understand user preferences and customize content based on their interests. This helps in delivering more relevant and engaging content, such as personalized emails and adverts.
- **Performance Monitoring**: Artificial Intelligence technologies can be used to monitor the performance of digital communication campaigns. Here Artificial Intelligence-enabled analytics are deployed in measuring the effectiveness of companies' campaigns and identifying areas for improvement. This enables organizations boost the strength of their digital communication efforts.
- **Optimization:** Artificial Intelligence algorithms are used to analyse user data to identify the most effective channels for messages delivery. This helps to ensures that messages get to the right destination timely enough.
- **Automation of Social Media Marketing:** One of the most direct applications of artificial intelligence in social media is the automation of various marketing, advertising and

analytical activities. Artificial Intelligence algorithms are now used to automate posts scheduling, campaigns monitoring and data crunching, thus replacing most of the less effective manual process and optimizing efficiency. Platforms such as Hootsuite and Buffer apply artificial intelligence technology in tracking audience engagement, suggesting optimal posting times, providing smart recommendations and automating certain actions like following back new followers.

- **Generation of Unique Contents:** Beyond automation, artificial intelligence is now being applied directly in creating original social media content such as text, images and video. With tools like Linktree, Murmuration and Synthesia, one can generate posts or synthetic media for promoting products.

Conclusion

The impact of Artificial Intelligence in digital communication and social media cannot be over emphasized. It is playing a very important role in enhancing the efficiency and effectiveness of digital communication and social media. it is presently improving the way people communicate, from improved customer experiences to tasks automation, personalization and provision of data-driven insights. As artificial intelligence continues to evolve, individuals and organizations will leverage its strength to enhance digital communication and social media experience.

References

Abou-Zahra S., Brewer & Cooper, 2018. Artificial intelligence (AI) for web accessibility: Is conformance evaluation a way forward?

Broussard M. (2018), Artificial Unintelligence: How Computers Misunderstand the World. Cambridge: MIT Press.

Campolo A, *et al*. (2017), *AI Now 2017 report*. Report, AI Now, New York. Available at: https://ainowinstitute.org/reports.html.

Chui M., Manyika, & Miremadi, 2015., "Applying artificial intelligence for social good,"

November 28, 2018,https://www.mckinsey.com/featuredinsights/artificialintelligence /applying-artificialintelligence -for-social-good.

Frankish K and Ramsey WM (2014), The Cambridge Handbook of Artificial Intelligence. Cambridge: Cambridge University Press.

Ibert O, Oechslen A, Repenning A, Schmidt S. Platform ecology: a user-centric and relational conceptualization of online platforms. Global Netw. 2022;22(3):564–79. https:/ /doi.org /10.1111/ glob.12355

Javornik A, *et al*, 2021. 'What lies behind the filter?' Uncovering the motivations for using augmented reality (AR) face filters on social media and their effect on well-being. Comput Hum Behav. 2022;128:107126. https://doi.org/ 10.1016/ j.chb.2021.107126

Kang H, Lou C. 2022. AI agency vs. human agency: understanding human–AI interactions on TikTok and their implications for user engagement. J Comput Mediat Commun:zmac014. https://doi.org/10.1093/jcmc/zmac014

Karatop B., Kubat, and Uygun, 2015. Talent management in manufacturing system using fuzzy logic approach. Computers & Industrial Engineering.

Kathleen walch 2020, the seven patterns of AI, *C*ognilytica.

Lee *J. 2018 et al.* Industrial artificial intelligence for industry 4.0-based manufacturing systems. Manufacturing lEtters

Liu D.R, Shi, & Liu, *2011.* Mining group-based knowledge flows for sharing task knowledge Decision Support System (2011)

Sadiku M. N. O. *et al* 2021," Artificial Intelligence in Social media". International journal of scientific Advances

Sarmiento H., 2020. "How artificial intelligence can benefit the social media user," https://medium.com/clyste/how-artificialintelligence-can-benefit-the-social-media useraeaefd24e0a7

Ibarra *et al*., 2018; Müller, Buliga, & Voigt, 2020, 2018." Business model innovation through Indistry 4.0: A review: Procedia Manufacturing industry.

Manoharan S, Senthilkumar R., 2020. An intelligent fuzzy rule-based personalized news recommendation using social media mining. Comput Intell Neurosci.1–10. https://doi.org/10.1155/2020/3791541.

Misselhorn C. 2018.Grundgragen Der Maschinenethik. Stuttgart: Reclaim.

Von krogh G. 2018. Artificial intelligence in organizations: New Opportunities for phenomenon-baseed theorizing.

Zhang C, Lu Y. Study on artifcial intelligence: the state of the art and future prospects. J Ind Inf Integr. 2021;23: 100224. https://doi.org/ 10.1016/j.jii.2021.100224.