

Modeling and innovation using artificial intelligence in accelerating handling the COVID-19 pandemic: A bibliometric study

Pemodelan dan inovasi menggunakan kecerdasan buatan dalam percepatan penanganan pandemi COVID-19: Sebuah studi bibliometrik

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Abstract

This study aims to analyze previous publications with the theme of modeling and innovation using artificial intelligence in accelerating the handling of COVID-19. The data of this study come from the Scopus database. This study uses VOSviewer to evaluate keywords from 575 publications in the Scopus database with research topics. Next, analysis of Scopus database search results visualizes features and trends of related journals, authors, and themes. This study found that articles on modeling and innovation using artificial intelligence in accelerating the handling of COVID-19 have been published in 267 journals, with the most popular journals being Chaos, Solitons, and Fractals. The results of bibliometric analysis show that there are ten popular journals, with The Lancet Infectious Diseases receiving the most citations. Likewise, in this study there are authors who have the most article documents, namely J.S. Suri with 4 (four) documents, and X. Xu is the most popular author with the most citations. The results of this study show that an AI approach can help in the dissemination of important information around the world while reducing the spread of misinformation about COVID-19. This study suggests that focused, effective, and efficient collaboration, coordination, and harmonization are needed between the central government, local governments, and commercial entities.

Keywords: artificial intelligence; coronavirus disease; innovation against COVID-19; modelling technology

Abstrak

Studi ini bertujuan untuk menganalisis publikasi sebelumnya dengan tema pemodelan dan inovasi menggunakan kecerdasan buatan dalam percepatan penanganan COVID-19. Data studi ini berasal dari database Scopus. Studi ini menggunakan VOSviewer untuk mengevaluasi kata kunci dari 575 publikasi di database Scopus dengan topik penelitian. Selanjutnya, analisis hasil pencarian database Scopus memvisualisasikan fitur dan tren jurnal, penulis, dan tema terkait. Kajian ini menemukan bahwa artikel tentang pemodelan dan inovasi menggunakan kecerdasan buatan dalam percepatan penanganan COVID-19 telah dipublikasikan di 267 jurnal, dengan jurnal terpopuler adalah Chaos, Solitons, and Fractals. Hasil analisis bibliometrik menunjukkan bahwa ada sepuluh jurnal populer; dengan The Lancet Infectious Diseases menerima kutipan terbanyak. Demikian pula dalam studi ini terdapat penulis yang memiliki dokumen artikel terbanyak yaitu J.S. Suri dengan 4 (empat) dokumen, dan X. Xu adalah penulis terpopuler dengan kutipan terbanyak. Hasil studi ini menunjukkan bahwa pendekatan AI dapat membantu dalam penyebaran informasi penting di seluruh dunia sekaligus mengurangi penyebaran mis-informasi tentang COVID-19. Studi ini menyarankan bahwa diperlukan kolaborasi, koordinasi, dan harmonisasi yang terfokus, efektif, dan efisien antara pemerintah pusat, pemerintah daerah, dan entitas komersial.

Kata kunci: kecerdasan buatan; penyakit coronavirus; inovasi terhadap COVID-19; teknologi pemodelan

Introduction

The coronavirus 2019 (COVID-19) pandemic is spreading rapidly around the world, killing thousands of people (Aghababaeian et al. 2020), and caused a major public health disaster when it became uncontrollable. As a result, it is very important for governments, public health professionals, and policymakers to implement various models and innovations in accelerating the response to COVID-19

(De Weck et al. 2020). Many people were caught off guard by the incidence of COVID-19. Most countries around the world were unprepared. Furthermore, as the pandemic spread, they reacted in very diverse ways, as seen from the various dynamics per country in terms of verified COVID-19 deaths per million people. The COVID-19 situation should be seen as a controlling challenge that requires an agile, multi-layered, model-driven systems engineering approach.

The COVID-19 problem has a far-reaching influence in both space and time. This will have an unknown but potentially long-term influence on all activities, making it a systemic disaster and not just a health problem (Alnizar & Manshur 2022). Thus, facing the current COVID-19 dilemma requires a comprehensive strategy that takes into account a very complex system (Jeong & Kim 2021), that is, society as a whole.

Another important feature of the COVID-19 dilemma is the rapid spread of the pandemic, which requires rapid decision-making (Tutsoy 2021). Furthermore, the COVID-19 problem has affected various sectors of society, including medical, banking, transportation, industry, and the overall economic system, since the establishment of important local and partial solutions (Nofriya & Sari 2021). Therefore, society needs quick and inventive action to reduce the impact of the crisis to the greatest extent possible. Time constraints encourage local and partial solutions, but they also require substantial cooperation between individuals to avoid conflicting methods.

Max Roser, an Oxford researcher, warned some countries in the face of COVID-19 (Roser et al. 2020). He chose the United States, Brazil, India, South Africa, Mexico, Colombia, Bangladesh, Argentina, Nigeria, and Indonesia as countries he found alarming. According to Roser, these countries have not succeeded in lowering the curve of positive cases of COVID-19, as can be seen from the increase in the number of confirmed cases every day. Furthermore, these countries are considered not to conduct extensive detection testing.

The ten countries mentioned by Roser are represented by red, solid red, orange, and gray lines in the graphs created by Our World in Data (Hasell et al. 2020, Ritchie et al. 2020). Simply put, the redder a country's hue, the higher its positivity rate. This implies that the true number of coronavirus infections is greater than the number of confirmed cases (Roser 2022), as shown in Figure 1.

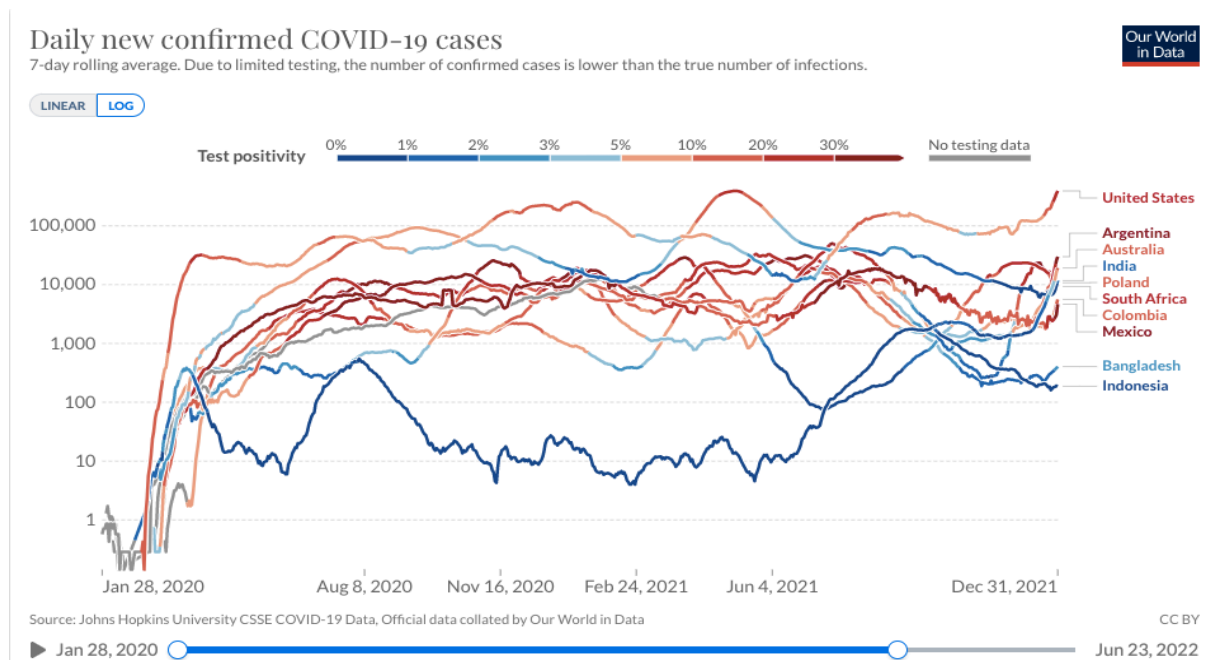


Figure 1.

Trend of daily new confirmed COVID-19 cases 2020-2021

Source: Johns Hopkins University CSSE COVID-19 data, official data collated by Our World in Data (2022)

The graph shows that, although the number of tests performed is still small, the positivity rate is quite large. This shows that as the testing capacity increases, the number of confirmed cases will also increase. In other words, the daily number of positive cases recorded so far does not include all current cases. There are some unfounded and still active examples out there. This was also conveyed by several scientists and epidemiologists related to coronavirus cases in Indonesia. As a result, it is imperative that people become more aware of the risks of transmission, as well as for the governments of individual countries to improve their testing capabilities. According to Roser's comments on the Our World in Data page, the basic goal of dealing with the coronavirus pandemic is straightforward: zero cases worldwide. The virus pays less attention to national boundaries. Even the 1918 influenza pandemic reached remote islands within a few months, and this happened before global air travel (Beach et al. 2022). As a result, if we want to avoid a situation where countries must isolate themselves from the rest of the world or suffer COVID-19 outbreaks regularly, the whole world must work together to combat the virus.

Looking at the above findings is important to analyze and discuss various research initiatives in this field, such as deep learning, machine learning, Big Data, and data science, all of which aim to provide practical solutions for the surveillance, detection, diagnosis, and treatment of viruses (Tutsoy 2021). AI-based medical solutions are emerging quickly, but practical use is still a long way off. In healthcare, AI is becoming more and more frequently used and includes the development of advanced algorithms capable of performing complex tasks efficiently and effectively (He et al. 2019). Technology can also serve as a catalyst for change. While digital technologies are critical in addressing the COVID-19 pandemic, they also hold many promises for the future. According to some observers, the pandemic will permanently normalize society's widespread use of digital technology (Doyle & Conboy 2020).

AI applications are used to analyze various health care datasets. For structured data, machine learning methods such as supporting vector machines and neural networks, as well as deep learning and natural language processing for unstructured data, are the leading AI methodologies today. Cancer, neurology, and cardiology are the three main disease areas where AI is used. After that, the application of AI to stroke is studied in more depth, focusing on three main areas: early detection and diagnosis, therapy, as well as prediction of results and evaluation of prognosis (Jiang et al. 2017). AI has grown in popularity in recent years as a method to stimulate or mimic cognitive abilities including reasoning, adaptation, sensory assessment, deep learning, and meaningfulness (Hossain et al. 2020). AI can also help with drug screening and antiviral development to treat COVID-19. COVID-19 datasets can be used to train AI systems, and the resulting models can be used to find existing COVID-19 drugs that work. For example, this method can be used to find effective generic drugs against COVID-19 (Ahuja et al. 2020).

COVID-19 testing is critical to controlling the outbreak, but the demand for reverse transcription polymerase chain reaction (RT-PCR) test kits far exceeds the amount of supply. In this study, we present an AI-based approach to COVID-19 screening. Our approach takes only a few seconds to check for the presence of the virus in the patient. We built the Residual Attention Network after being dissatisfied with these models, which is a way to screen for COVID-19 with 98% testing accuracy and 100% validation accuracy. The feature map of our model is displayed as a region in a chest X-ray that is very important for classification. Even though the outbreak of COVID-19 remains a serious threat to society, state officials have been working on plans to restore schools and institutions. Opening a college will inevitably result in additional COVID-19 casualties, but the key question is how many children should be able to attend regularly while losses remain manageable. This research creates a long-term policymaking system based on AI to produce time-varying policies for part-by-part openness of institutions (Tutsoy 2021).

The suggested approach consists of a multi-input-multi-output, uncertain, and adaptive background parametric model that is externally updated by the developed adaptive policy. Its long-term estimates calculate the likelihood of future deaths under current policy, while its policymakers devise alternative ways to reduce future deaths. Given the fragility of healthy structures and the scarcity of test kits, especially in developing countries, forecasting the spread of COVID-19 is likely to help decision-makers in improving health management and reducing associated issues (Mbilong et al. 2021). By combining different time delays with three sets of COVID-19 datasets (periods), confinement, decontamination, and hybrid datasets, we investigated the performance of six multi-step models developed using Machine Learning and Deep Learning in response to various conditions.

In Indonesia, handling COVID-19 emphasizes the importance of collaboration, cooperation, and synergy, as well as the formation of a task force team aimed at accelerating the response to COVID-19. When collaborative governance is used, this cooperation is needed to determine which governance practices are the same (Amin et al. 2021). The pandemic has created a difficult environment to make important decisions that must be enforced quickly. The most significant obstacle to standardizing the implementation of Large-Scale Social Restrictions is the absence of health quarantine provisions in Law No. 6 of 2018. The Task Force for the Acceleration of Handling COVID-19 was formed as part of a joint effort to anticipate the greater impact of the spread of COVID-19, both within ministries/agencies and local governments.

In addition to being a tool for early detection, the need for pandemic risk assessment, identification of key intervention areas for the COVID-19 response, and database administration can have an impact on public awareness and decision-making, by conducting a framework to see how they understand and describe the effects of research (Strahan et al. 2020). AI algorithms are used to extract sentiment and personality qualities from free text responses to group individuals (Flint et al. 2021). People classified as COVID-19 are more concerned about infections, diseases, and deaths. Behavioral clusters found using AI algorithms during COVID-19 lockdowns differed significantly in sentiment and personality features, as well as concerns about COVID-19, activities, lifestyle practices, and health.

AI has been used to track the spread of the coronavirus and to classify high-risk people. By extensively reviewing historical data, it has also proven a high degree of accuracy in projecting real-time infection rates. Bibliometric analysis is a quantitative assessment of academic literature to identify publishing patterns, contributions of authors and journals, national productivity, and research alliances and partnerships. The number of studies exploring the use of digital technologies to improve health behaviors has increased dramatically in recent decades. Due to the interdisciplinary nature of the issue, it is necessary to include data and technologies from other research disciplines. At this point, it is not known how such domain information is combined in real-world applications. Thorough research is needed that maps and analyzes the use of knowledge in these evolving interdisciplinary problems (Taj et al. 2019).

COVID-19 has aroused everyone's curiosity, especially among scientists and academics from different disciplines, not just virology and allied subjects. Several studies have been conducted and published. According to the latest estimates, between 2020 and 2021, there will be 273 published papers indexed in Scopus, with 139 in 2020 and 134 in 2021. The author of this paper sees how AI, Big Data, and the internet of things have been used to accelerate the detection, prevention, response, and recovery of COVID-19 cases in other countries, as well as how they are implemented in Indonesia. The author proposes that the Indonesian government use appropriate policies and technology to prevent the spread of COVID-19.

The study looked at coronavirus papers released between 2020 and 2021 and tracked by Scopus. The United States contributed 49 documents, India 49 documents, China 39 documents, The United Kingdom 37 documents, Italy 32 documents, Canada 14 documents, Egypt 13 documents, Australia 12 documents, Pakistan 10 documents, and Saudi Arabia nine documents. Letters, reviews, editorials, and records form the rest of the coronavirus entries in each database. In both databases, the top issuing countries are the United States, India, China, the United Kingdom, and Italy. COVID-19 subjects are topics that most individuals write about, according to poll data. Everyone who uses COVID-19 in their various publications, whether they are academics, practitioners, researchers, or authors, does so in their varied positions. As a result, a huge number of report publications can be predicted. Even though COVID-19 is no longer a pandemic, the number of published publications on this issue is constantly growing. Articles are the main source of information provided by authors capable of advancing science in their field. One of the results of the process of creating a research theme is the number of papers that have been published in various electronic databases and can be accessed publicly online (Trysnawati & Pare Allo 2020).

Research Method

There are several steps that must be completed before doing bibliometric analysis, including the data search process, bibliographic filtering, rechecking bibliographic properties, and finally bibliometric analysis. Several tools and websites aid in visualizing the process. In this study, the data search procedure necessitates information on the quantity of scientific publications in the form of journals on COVID-19 (Aulianto et al. 2020). The data search technique employs an application or program known as Publish or Perish, or PoP, which is a piece of software that can retrieve data from Google Scholar Query articles to obtain citation information and transform it into a variety of statistics. The program was used to look for data in the Scopus database and do journal searches. Scopus is a compilation of the world's major literature compendiums, with citations containing abstracts or summaries of peer-reviewed scientific literature (Zahra et al. 2021).

Bibliometric analysis methodology is used to identify the trend of publications released in 2020-2021 by utilizing a quantitative approach to gather data from internet databases to determine publications on the issue of modeling and artificial intelligence in illness management. Current scientific output is evaluated using bibliometric analytic techniques based on the number of citations, keywords, geographic data, author collaboration, and discipline interaction. The fundamental data include annual publication output, publishing country, topic of study, number of citations, keyword co-occurrence, co-authoring, and cooperation networks between nations and institutions.

The data for this study were gathered through documentation, namely data from Scopus for the years 2020-2021. We used keywords related to AI and COVID-19 to extract bibliometric data from the Scopus database. We assessed and abstracted the articles after extracting the available literature to see if they were eligible for bibliometric analysis. Articles that did not include AI-related keywords or were not COVID-19-focused were excluded. This inquiry includes all studies, regardless of study design, due to the small number of publications. There is no linguistic barrier. Tracing procedures were restricted to 2020 and 2021 when the COVID-19 epidemic emerged in December 2019. The goal is to make data distribution and graphic display more straightforward. In addition, the data are sorted into groups depending on the factors studied and presented in a tabular style (van Eck & Waltman 2010).

After the results have been obtained and the discussion has taken place, the next step is to make conclusions. VOSviewer software (<http://www.VOSviewer.com/>) was used to display author keyword co-occurrence, author contributions, international collaboration, and co-reference analysis-citations. We also used the Bibliometrix R program (<https://www.bibliometrix.org/>) to compute the frequency, percentage, and citation of each journal and country. "Biblioshiny" generates a global collaboration map as well as a number of other visualizations (related information, author cooperation) (Islam et al., 2021). The Scopus database was used as the study's foundation. A search query to find a behavior change system having a technological component was implemented. As a result, the phrases (ref (innovation and ref (artificial and intelligence) and ref (pandemic)) and pubyear > 2010 and pubyear < 2022 and (limit-to (oa , "all")) and (limit-to (doctype , "ar") or limit-to (doctype , "re") or limit-to (doctype , "sh") or limit-to (doctype , "le")) and (limit-to (subjarea , "soci")) and (limit-to (language , "english")) and (limit-to (srctype , "j")). Articles published between January 2020 and January 2021 were excluded from the search. The procedure for integrating the data is described further down. Scopus returned 134 and 139 articles, respectively, in response to the search query.

Results and Discussion

The link between digital technology and health behavior change was investigated in the study. The review is divided into two parts. To begin, a comprehensive bibliometric analysis was performed to identify worldwide academic networks and research trends. The bibliometric study uncovers key publications, authors, and collaborative networks across multiple stakeholders, showing where multidisciplinary collaboration is already strong and where it may be strengthened. The scoping review was followed by bibliometric analysis to map the collected material and address issues about the theoretical underpinnings of digital behavior modification treatments and telecommunications use. COVID-19 is still going strong, needing a new AI-based way to stop it.

In a scientific setting, AI is a system that can learn new things. In recent decades, there has been a tremendous surge in research on the use of digital technology to change health behaviors. Due to the multidisciplinary nature of the topic, expertise and technology from several disciplines are required. It's unclear how information from those domains is incorporated in practical applications today. Detailed analysis is needed that systematically maps and investigates the use of knowledge in this growing multidisciplinary topic (Taj et al. 2019).

In the field of literature, there are several new bibliographic studies that focus solely on COVID-19 testing. Previously, in the field of academic research, a large number of studies with a high level of consensus on one topic have been completed (Aristovnik et al. 2020). While the current level of COVID-19 research suggests that knowledge is still in its early stages, a thorough and in-depth analysis is still lacking. As a result, the main purpose of the work is to present a comprehensive bibliometric analysis of COVID-19 research across the scientific and social science research landscape, using methodologies new bibliometrics. Globally, digital technologies are being used to aid public health responses to COVID-19, including population monitoring, case identification, contact tracing, and care assessment based on mobility and public communication data. This quick reaction uses billions of mobile phones, large web data sets, networked gadgets, relatively inexpensive computer resources, and breakthroughs in machine learning and natural language processing (Budd et al. 2020).

The previous study consisted of 575 publications consisting of 422 articles, 72 reviews, 32 Conference Papers, 18 Letters, 15 Notes, nine Editorial), four Book Chapters, two Short Surveys and the rest Erratum as many as one publication, as shown in Figure 2.

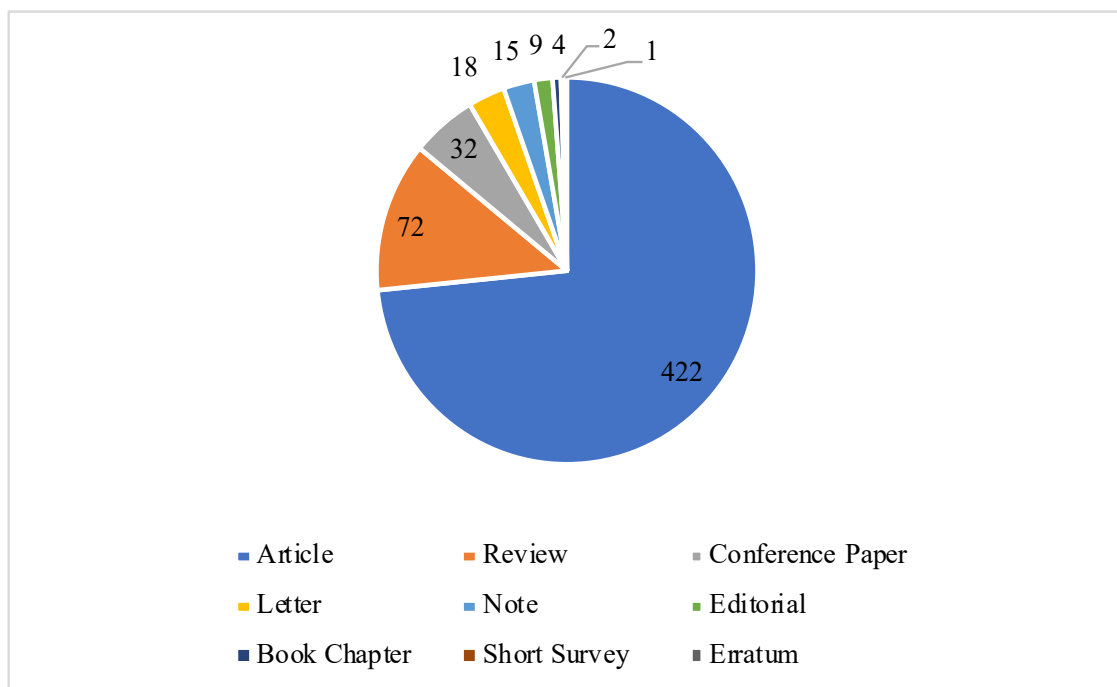


Figure 2.
Types of publications related to modeling and innovation using artificial intelligence in accelerating handling of COVID-19
Source: Scopus database 2022

Table 1 Provides an overview of publications related to modeling and innovation using AI and the nature of accelerating the handling of COVID-19 that are most widely cited and the issues that have been discussed. This publication in turn encourages researchers to find various solutions in accelerating the increasingly critical handling of COVID-19.

Table 1.
Top 10 most cited publications

Rank	Authors	Title	Cites
1	(Xu et al. 2020)	Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modeling of its spike protein for risk of human transmission	1218
2	(Kucharski et al. 2020)	Early dynamics of transmission and control of COVID-19: a mathematical modelling study	1180
3	(Prem et al. 2020)	The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: a modelling study	1032
4	(Giordano et al. 2020)	Modelling the COVID-19 epidemic and implementation of population-wide interventions in Italy	770
5	(Li et al. 2020)	Using Artificial Intelligence to Detect COVID-19 and Community-acquired Pneumonia Based on Pulmonary CT: Evaluation of the Diagnostic Accuracy	583
6		Elective surgery cancellations due to the COVID-19 pandemic: global predictive modelling to inform surgical recovery plans	566
7	(Maringe et al. 2020)	The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study	546
8	(Gilbert et al. 2020)	Preparedness and vulnerability of African countries against importations of COVID-19: a modelling study	538
9	(Roberton et al. 2020)	Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study	498
10	(Eikenberry et al. 2020)	To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic	488

Source: Scopus database 2022

Authorship

The authors who most often publish articles in international journals related to modeling and innovation using AI acceleration of handling COVID-19 are different, as shown in Figure 3: J.S. Suri (4), Z.I. Attia, Q.Liu, Y.Li, M.Chen, Y.Yang, M.Maleki, S. Vaid, N.G. Davies and O.Pfaar (2 each).

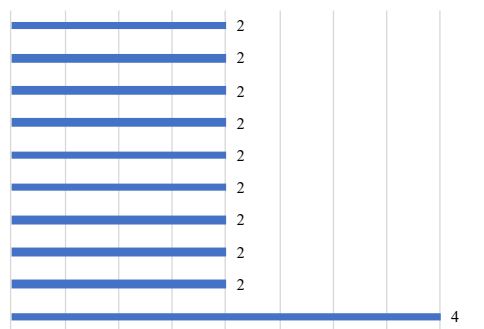


Figure 3.

Top 10 authors who write most often related to modeling and innovation using artificial intelligence in accelerating handling of COVID-19

Source: Scopus database 2022

Publication venues

Publications related to modeling and innovation using AI in accelerating the handling of COVID-19 are very strict in interdisciplinary science and technology. Meanwhile, journals such as Chaos, Solitons and Fractals, Journal of Medical Internet Research, International Journal of Environmental Research and

Public Health, The Lancet Infectious Diseases, Scientific Reports, Radiology, The Lancet Public Health, Nature Medicine, The Lancet Digital Health, and The IOP Conference Series: Earth and Environmental Science have a large number, as seen in Table 2. However, this is not surprising because editorials and journals are the target audience for researching manuscripts for significance and orientation toward independent selection. Therefore, it seems that publications related to modeling and innovation using AI in accelerating the handling of policy-oriented COVID-19 are still lacking.

Table 2.
Top 20 places for research publications in various international journals

Journal			
1	Chaos, Solitons and Fractals	20	14%
2	Journal of Medical Internet Research	15	10%
3	International Journal of Environmental Research and Public Health	11	8%
4	The Lancet Infectious Diseases	11	8%
5	Scientific Reports	9	6%
6	Radiology	7	5%
7	The Lancet Public Health	7	5%
8	Nature Medicine	7	5%
9	The Lancet Digital Health	6	4%
10	IOP Conference Series: Earth and Environmental Science	6	4%
11	Nature Communications	5	3%
12	PLoS ONE	5	3%
13	Frontiers in Public Health	5	3%
14	Infectious Disease Modelling	5	3%
15	Journal of Human Lactation	4	3%
16	IEEE Access	4	3%
17	Mathematical Biosciences	4	3%
18	Proceedings of the National Academy of Sciences of the United States of America	4	3%
19	Healthcare (Switzerland)	4	3%
20	Journal of Biomolecular Structure and Dynamics	4	3%

Source: Scopus database 2022

Linkage of publication networks related to modeling and innovation using artificial intelligence in accelerating the handling of COVID-19

There are as many as 123 research keywords related to modeling and innovation using AI in accelerating the handling of COVID-19 extracted from 575 publications. Table 3 shows the top 20 keywords, among which with a frequency of occurrence of more than 30 are COVID-19 (537 publications), pandemic (159 publications), artificial intelligence (154 publications), innovation (124 publications), sars cov (50 publications), handling (48 publications), patient (34 publications), and role (30 publications).

Table 3.
Top 20 Keywords of paper

Rank	Keywords	Frequency	Percentage
1	COVID-19	537	36%
2	pandemic	159	11%
3	artificial intelligence	154	10%
4	innovation	124	8%
5	sars cov	50	3%
6	handling	48	3%
7	impact	42	3%
8	Modeling	42	3%
9	patient	34	2%
10	role	30	2%
11	crisis	29	2%
12	analysis	29	2%
13	Reviews	28	2%
14	response	28	2%
15	modelling study	27	2%
16	application	25	2%
17	challenge	25	2%
18	type	23	2%
19	spread	23	2%
20	approach	21	1%

Source: Scopus database 2022

In the use of VOSviewer, the minimum number of relationships with them is set to ten terms. After VOSviewer analysis, there are four groups (red, green, blue, and yellow) that show the relationship between one topic and another. VOSviewer can display bibliometric mappings in three ways: Network Visualization (Figure 4), Overlay Visualization (Figure 5), and Density Visualization (Figure 6). Colored circles are used to label keywords. The size of the circle correlates well with the presence of keywords in the title and abstract. As a result, the frequency of occurrence affects the size of letters and circles. The larger the letters and circles, the more often keywords appear (Hamidah et al. 2020).

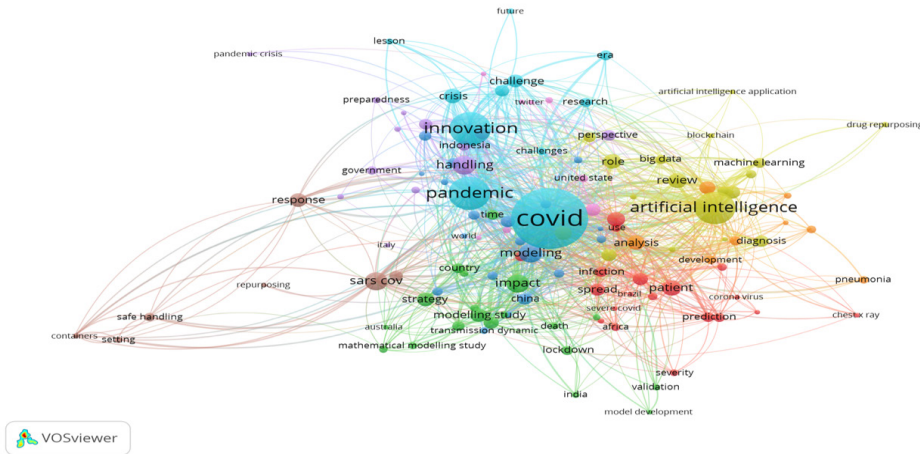


Figure 4.
Visualization topic areas using VOSviewer using Network Visualization
Source: Data processing using VOSviewer 2022

Figure 4 illustrates the clusters in each of the problem areas under investigation. The terms pandemic, impact, and care can all be found in the same cluster (red area). This suggests that they have a close bond. The timeline-based approach is the third method for displaying bibliometric networks. Time-based methods, in contrast to distance-based and graph-based techniques, imply that each node in a bibliometric network can be connected to a specific point in time. Since a publication can be easily linked to a specific moment of time based on its publication date, timeline-based techniques are ideal for displaying a network of publications. There are two dimensions in the timeline-based representation, one of which is used to represent time. Other dimensions may be used to indicate the interrelationship of nodes. The exact instant in the time at which a node is associated determines its placement in the time dimension. The association of a node with another node can be used to infer its placement in other dimensions (van Eck & Waltman 2014).

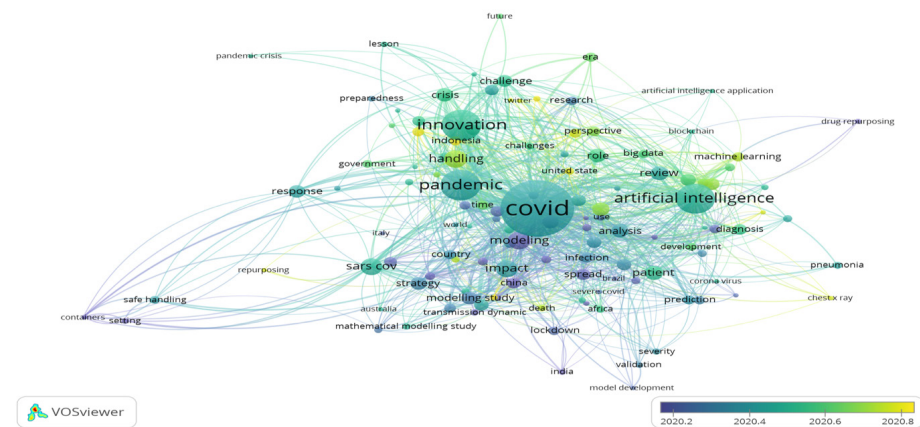


Figure 5.
Visualization topic area using VOSviewer using Overlay Visualization
Source: Data processing using VOSviewer 2022

Figure 5 illustrates the trends from year to year in the study. It is worth mentioning that, since this coronavirus epidemic began at the end of 2019, there were only two investigations in 2019, with the number increasing significantly in 2020. Efforts to limit infection and the spread of the disease have resulted in lockdown periods in which the movement of people has been restricted, thus negatively impacting work, lifestyle behavior and health (Flint et al. 2021).

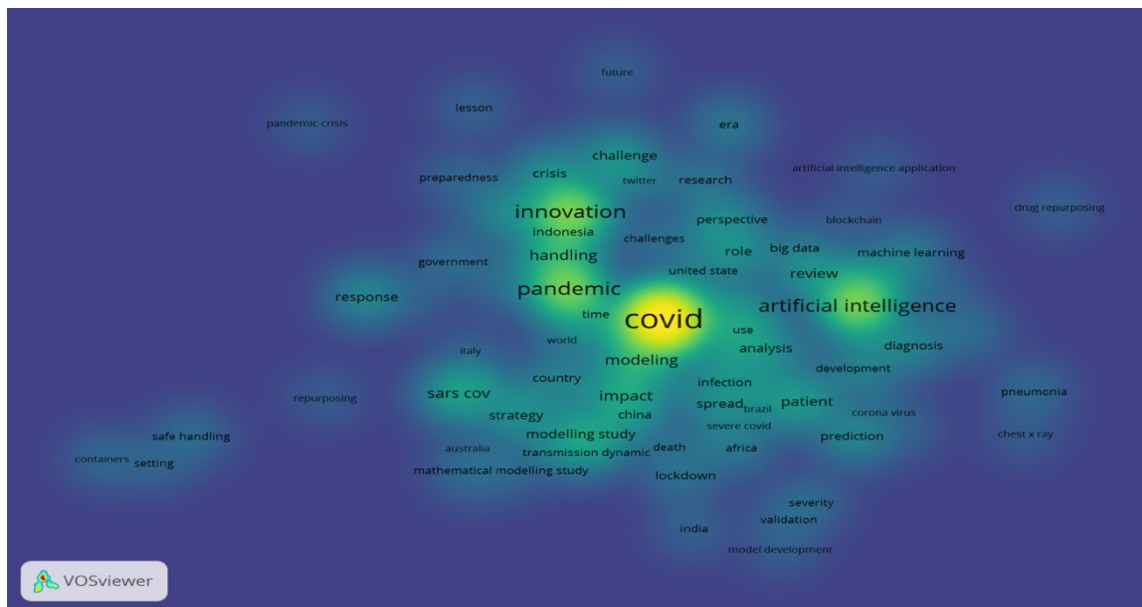


Figure 6.

Visualization topic areas using VOSviewer using Density Visualization

Source: Data processing using VOSviewer 2022

Meanwhile, Figure 6 illustrates the level of research, showing that the more intense the color that appears, the more research is carried out. Based on the analysis using VOSviewer as shown in Figure 4 – Figure 6 above, the keywords that often appear are covid, pandemic, innovation, artificial intelligence, sar cov, handling, impact, and modeling. Other scholars, for example, have not conducted research on how AI can help combat COVID-19. Therefore, researchers can help in combating the spread of COVID-19 by conducting studies on the use of AI-based technology. A significant percentage of news disseminated contains misinformation that adversely affects the cognitive and psychological health of its readers (Madani et al. 2021). The analysis that will be carried out on the problem of combining technology with AI can also be observed in various studies carried out by different scholars. In addition, Figure 4 – Figure 6 above show that previous research with the keywords modeling and innovation has a relatively low number compared to artificial intelligence and COVID-19. As a result, we can help deal with the COVID-19 outbreak by utilizing AI technology. Other studies have shown that the use of technology can help students bridge the learning gap during the COVID-19 pandemic (Rahmatizadeh et al. 2020).

Conclusion

This article reviews previous publications with the theme of modeling and innovation using artificial intelligence in accelerating the handling of COVID-19 articles from 575 documents obtained from the Scopus database. The results of the review using VOSviewer show that there are several dominant concepts in each existing cluster. This is in accordance with what has been previously researched by researchers so that it can assist researchers in finding information about the theme under study. In this paper, there are several topics that have strong ties to modeling and innovation using artificial intelligence in accelerating the handling of COVID-19, namely, COVID-19, pandemic, artificial intelligence, innovation, sars cov, handling, impact, and modeling.

Chaos, Solitons, and Fractals is the most published journal, according to bibliometrics. At the same time, there is no doubt that universities have contributed the most publications. In addition, we can anticipate many studies focused on accelerating artificial intelligence, for which unbiased time series data are required. More international initiatives in this area are encouraging, although more diagnostic testing is needed. Not only to provide training data for operational AI models, but also to help manage pandemics more efficiently and save lives and money. All the afflicted countries are making significant efforts to seal their companies by closing doors, imposing social isolation, and canceling events at the time of writing. These measures appear to have succeeded in limiting the spread of the disease.

COVID-19 research is growing in popularity, due to the growing need for urban expansion and quality of life improvements. Based on a keyword network analysis, the main study subjects in the COVID-19 domain are: (a) modeling and innovation, (b) artificial intelligence, and (c) response to the 2019 coronavirus disease pandemic. Keyword burst analysis shows that research themes vary rapidly over time and that many lines of research on COVID-19 are evolving simultaneously. The internet, internet of things, models, management, systems, and "things" are all part of the new research. Because of the surge in strongest citations, new keywords emerged, while less strong citation keywords implying "COVID-19" developed into its own field of study. In some ways, this supports the idea that, in terms of artificial intelligence, a shift from data intelligence to service intelligence is needed to meet the demands of the public.

Judging from previous research, the results of this study show that the AI approach can help in the dissemination of important information around the world while reducing the spread of misinformation about COVID-19. The positive power and potential of AI must be harnessed in the fight to curb the spread of COVID-19 to preserve lives and mitigate the economic devastation caused by this terrible disease. In addition, this study shows a lack of coordination across countries, and institutions, so exchanges and collaborations between institutions in many countries need to be strengthened; research on the use of AI in dealing with COVID-19 will experience significant progress.

This study suggests that focused, effective, and efficient collaboration, coordination, and harmonization are needed between the central government, local governments, and commercial entities. The limitation of this research is that the source of data obtained and analyzed only comes from the Scopus database. So, this research must be developed using data sources and comparative analysis using the Scopus database and the Web of Science (WoS) database.

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