



Blockchain Technology to Combat Covid 19

*Shrivani EN^{*1}, Charunya GR^{*2}*

^{*1,2}Department of ECE, SJCT Chickballapur, Karnataka, India.

ABSTRACT

The scientific community has become concerned about the impact of blockchain technology as a motivational tool in the COVID-19 era. Since the beginning of the pandemic, the number of scientific articles published in this field has been increasing, making it highly desirable to carry out a bibliometric study to identify research efforts. Therefore, the aim of this work was to conduct a literature review of blockchain and COVID-19 technology in the field of Business Management to identify recent lines of research. To do so, we used a text mining technique on a corpus composed of 37 articles in the Web of Science database. The results obtained clearly show 3 distinct clusters. The first represents the blockchain technology framework in organizations and stakeholders in which the research methodology in artificial intelligence is very important. The second shows the need to take into account business sustainability caused by COVID-19. The third indicates the impact of the pandemic on the supply chain industry.

Introduction

In this worldwide health crisis, the medical industry is looking for newer technologies to monitor and control the COVID-19 (coronavirus) pandemic. Thus, to monitor and control the spread of any virus, accurate and trustable data are required or essential. However, in the present scenario, the existing technology lacks the trustable data that may provide the correct information about the novel coronavirus widespread or outbreak. The sources such as public hospitals and clinical laboratories can provide information about the COVID-19 pandemic patients, but the data may not be faithful because it is not monitored and appropriately stored and possibly not collected according to the set guidelines.

Practical implications There are several practical implications that can be appreciated when considering using blockchain technology. Although the included studies in this review reported 10 applications of blockchain for the COVID-19 pandemic, blockchain can be employed for other applications such as disaster relief insurance, contactless delivery, online education, manufacturing management, e-government, agriculture, food distribution, donation tracking, and smart hospitals. We noticed that most applications of blockchain reported by the included studies were not proactive to prevent the spread of COVID-19 such as developing drugs and vaccines, prediction of COVID-19 spread, prediction of the need for resources in certain times or places, smart hospitals, contactless delivery (e.g., robots and unmanned aerial vehicle), and prediction of any future epidemic. Artificial intelligence can be used for analyzing data collected from the blockchain network to provide the above-mentioned proactive applications. Thus, we expect new specialized blockchain systems to combat the pandemic in a wider set of proactive applications as we face the second wave.

WORKING PRINCIPLE

Blockchain is a public distributed ledger in which health records and treatments are recorded in chronological order. Any record or medical details added to the blockchain cannot be modified or altered, meaning records are safe from hacking. A block is the smallest unit of the health details. Previous hash: This is the aggregated set of transactions. It is clear that the blockchain technology processes involve the following steps:

(a) Collecting requisite data from the blockchain participating nodes, and (b) Creating raw data and subsequently developing it into a big scale data. These steps establish the online digital document ledger. Blockchain technology assures the security of the collected data and helps to maintain its privacy. The blockchain secured data are analyzed by using various artificial intelligence-based solutions. BT provides various feasible solutions for the COVID-19 pandemic, such as outbreak tracking, donation tracking, and medical supply chain management. It is also used to establish fast, preserving, and reliable data exchange with the stakeholders. Worldwide, hospitals and masses face the shortage of medical equipment to fight this pandemic.

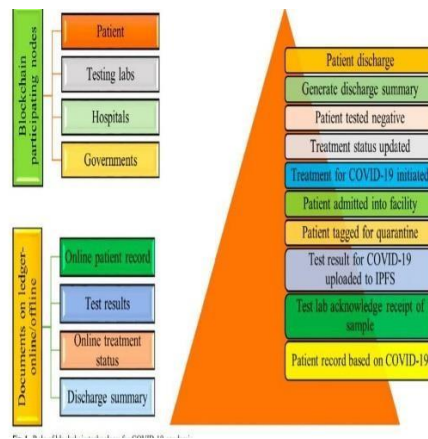


Figure1: Role of Blockchain technology for COVID-19

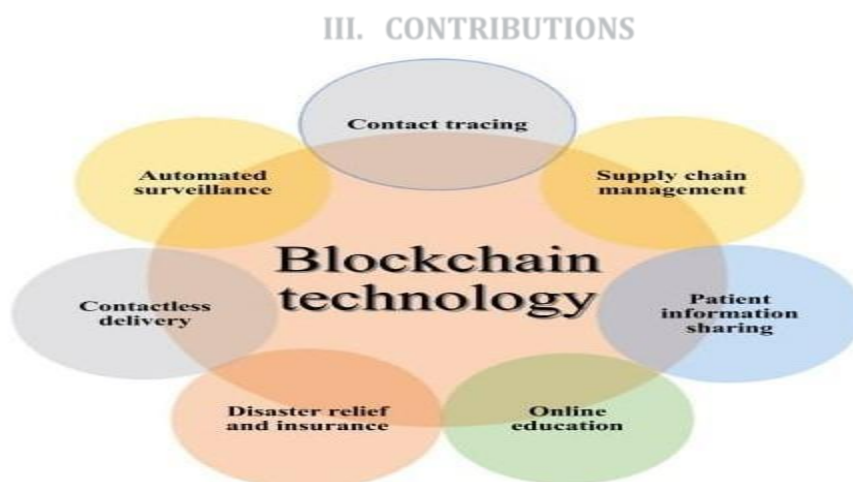


Figure 2: 2: Contributions of blockchain technology for covid-19 pandemic

The blockchain technology participating nodes are used for patients, testing and clinical laboratories, hospitals, and government sites. Besides, the documents on the digital ledger are patient records, sample test results, treatment status, and discharge summary. Figure 1 shows the essential steps used in blockchain technology to track and record the data's COVID-19 active patients. Initially, the patient is examined and diagnosed according to the pre-symptoms of COVID-19 disease. The patient sample is taken, and if it is found positive, then the patient is quarantined for at least 14 days. During this period, the blockchain technology application is used to do the treatment and the monitoring of the patient. Then, the recovery phase starts, and the patient is re-examined for COVID-19. However, if the sample result is negative, the patient is discharged, and a discharge summary is generated. The patient data are recorded for future reference; its privacy is maintained and produced when needed to show on a large scale. The blockchain technology gives assurance about the accuracy of the patient's recorded data. According to the Organization of Economic Cooperation and Development (OECD) (OECD Economic Outlook, Interim Report March 2020: Coronavirus: the world economy at risk, 2020), the global economy has been slowed down and has grown at its slowest rate since 2009 due to the complete shutdown of various sectors such as supply chain, insurance, tourism, agriculture, construction, and automobiles.

III. CONTRIBUTIONS

Figure 3.3 explains contributions of blockchain technology that are useful during this COVID-19 pandemic. This pandemic has affected sectors like healthcare, finance, politics, economics, and education. Blockchain technology can play a vital role in the effective management of the post COVID-19 world. Blockchain technology's key features can support the proper implementation of many use cases such as contact tracing, disaster relief, patient information sharing, e-government, supply chain management, immigration management, manufacturing management, automated surveillance, contactless delivery, and online education.

ADVANTAGES:

- Blockchain technology enables distributed, encrypted, and secure logging of digital transactions.
- It is expected to revolutionize computing in several areas, mainly where centralization is unnatural and privacy is essential.
- It can be leveraged globally to track the spread of the coronavirus infection by deploying a blockchain network on citizens' mobile devices.
- One of the major potentials of blockchain technology is to preserve the patient information.
- It can simplify the fast tracking of drug trials and record and track all fundraising activities and donations transparently.

CONCLUSION

Blockchain technologies are expected to help people return to their normal lives previously unaffected by the pandemic and reduce the spread of COVID-19 until a vaccine is developed. Although many possible applications of blockchain were found in this review, most of them are not mature enough to show their expected impact in the fight against COVID-19. We expect new specialized blockchain systems to combat the pandemic in a wide set of applications as we face the second wave. We encourage governments, health authorities, and policymakers to consider all blockchain technologies proposed by our included studies and other reviews, and to put them into practice to combat the challenges of COVID-19 and similar major public health emergencies. Further studies are required to empirically assess the effectiveness of blockchain technologies in mitigating COVID-19 challenges. We also encourage researchers to examine the performance of COVID-19 blockchain technologies in terms of transaction cost, scalability, and/or latency when using different consensus algorithms, platforms, and access types.

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