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# Blockchain intelligence's semantic analysis and a suggested issue list

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## Abstract

Integrating blockchain technology with artifi- cial intelligence (AI) i.e., blockchain Intelligence makes an extremely powerful tool that solves many multidimensional problems in several domains. Blockchain technology has the potential to provide links to shared data, transactions, and records in a decentralized, safe, and reliable manner, includ- ing the information and decision-making capability of AI which makes machines similar as capable as humans. This study is intended to present an updated systematic review of the integration of Blockchain and AI in various applica- tion areas. We have studied and summarized more than 100 research papers to present an updated version of the review. We also discuss the future of Blockchain technologies with AI. By integrating these two technologies results increases the security, efficiency, and productivity of the applications. Past works feature a few possible advantages of integration of Blockchain and AI, yet just give a restricted hypotheti- cal system to depict forthcoming certifiable combination instances of the two advances. We survey and orchestrate surviving exploration on the integration of AI and Block- chain are other ways around to thoroughly build up a future research plan on the fusion of the two innovations

**Keywords** Blockchain · Artificial Intelligence · Integration · Cyberthreat · COVID-19 · Cybersecurity

## 1 Introduction

Blockchain and Artificial Intelligence (AI) are today's lead- ing technologies. They are both making infatuated moves in different realms. Recent breakthroughs in Machine Learning (ML), particularly in the field of Deep Learning (DL), are being used for prediction, classification, natural language processing, and image recognition, etc. It is enough to conclude that both AI and Blockchain have their strengths although they have certain limitations as well. Challenges Blockchain faces such as scalability, performance, and stability, and AI issues are the development of false news, safety problems, and massive monopolization of AI. AI and Blockchain will assist each other with their vulnerabilities [1].

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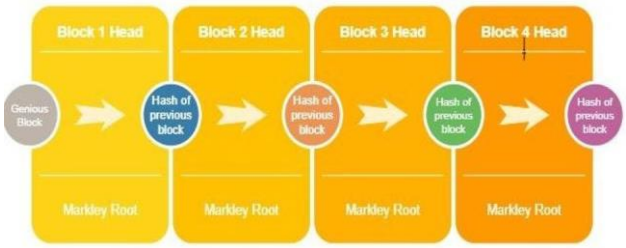


**Fig. 1** Structure of blockchain

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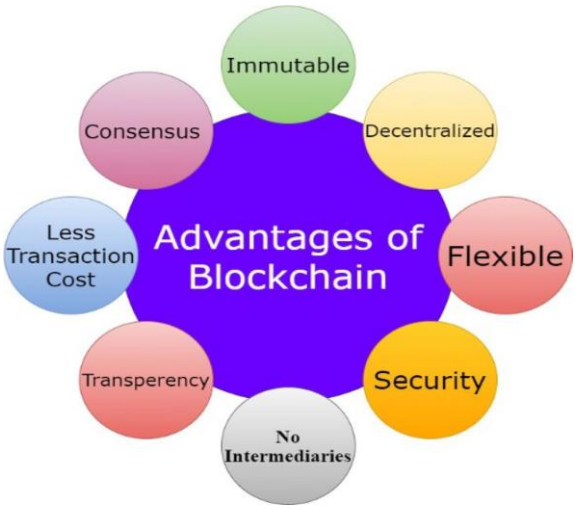


**Fig. 2** Advantages of blockchain

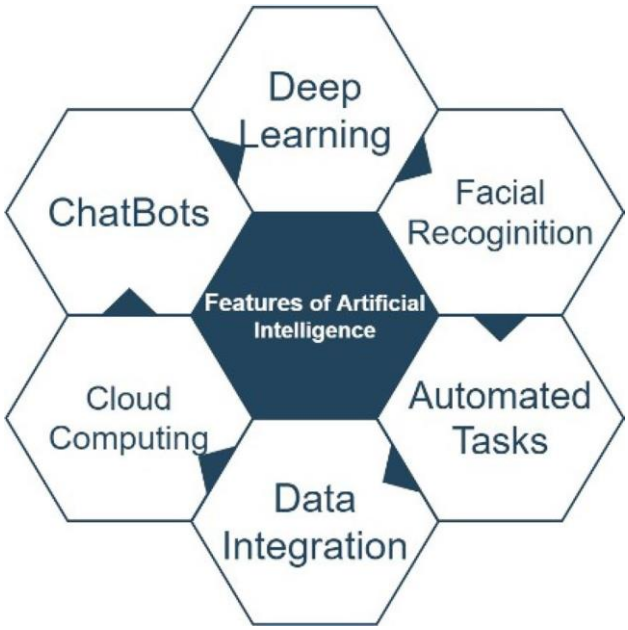


**Fig. 3** AI features

## 2 Research methodologies

To accomplish the target of responding to the research questions, we conducted the survey with the help of guidance published by Kitchenham and Charters [2] and Andrew S. Denney and Richard Tewksbury [3], we sought to move through the planning, conducting, and reporting phases of the review in iterations to allow for a thorough evaluation of the Literature survey.

- IEEE Xplore Digital Library
- ScienceDirect
- SpringerLink
- ACM Digital Library
- Google Scholar
- Web Searches (gray literature)

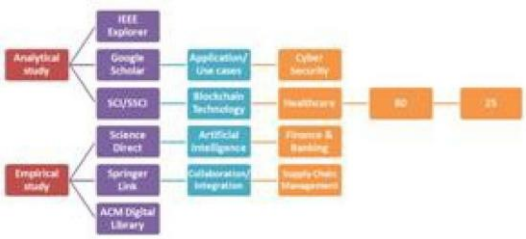

**Fig. 4** Inclusion process. (Col1: Type of studies, Col2: Database Searched, Col3: Primary Keywords, Col4: Secondary Keywords, Col5: Total Selected Papers, Col6: Primary Study Identifie

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## 3 Findings

Each primary research paper was read in full and the related qualitative and quantitative data were extracted and summarized in Table 3. All the primary studies had an emphasis or theme on how blockchain and AI were coping with a specific issue [4]. The emphasis of each paper is documented as well. Figure 6 shows the graphical analysis of the finding table. The subject of each paper was further grouped into wider categories to allow for a simpler classification of

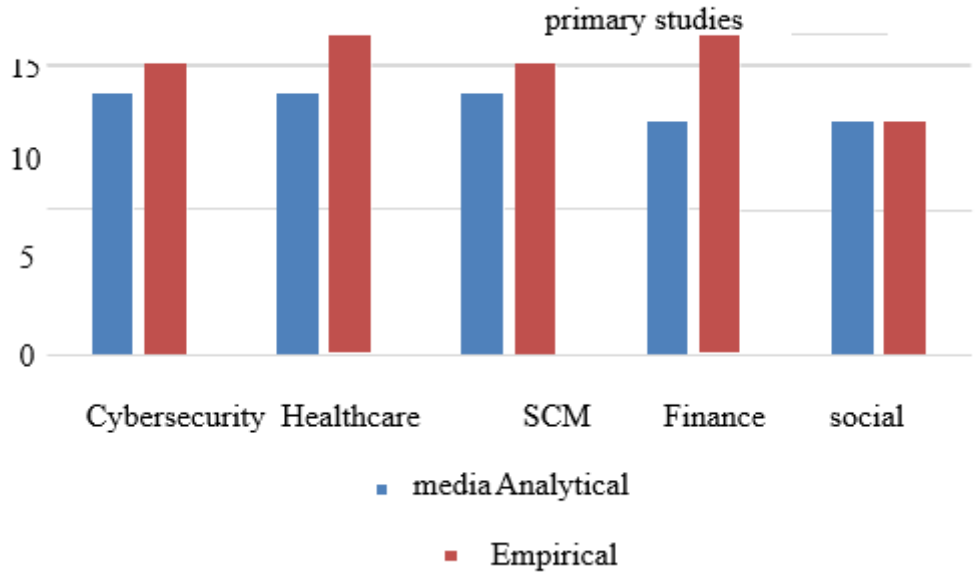


**Fig. 6** Graphical analysis from Analysis from Primary Studies

## 4 Taxonomy of application based on the integration of blockchain with AI

Our survey is typically based on the latest literature available in reputed and accurate databases like Scopus, WOS, etc. We are creating a blockchain technology taxonomy that encompasses five fields of a blockchain application that are divided into eight functional dimensions [5]. The taxonomy is based on current research literature, company studies, and classifications of prior blockchains. Our taxonomy is distinct because it combines knowledge of blockchain and AI technologies that can direct the implementation of blockchain-based systems. This research adds to the scientific knowledge base in three respects [6]. Next, we build a review of current literature on areas of blockchain use. Second, we recognize new AI aspects of relevance to blockchain implementations, which supplement extant work in the scientific literature. Third, we connected blockchain implementation areas and AI with blockchain features that can direct blockchain-based system development. For developers, the taxonomy offers an analysis of popular blockchain implementations for potential blockchain-based projects that can reduce implementation challenges [7]. According to the authors of Casino et al. (2019); Healthcare

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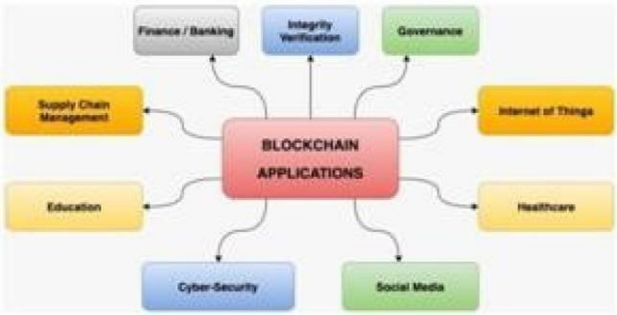


**Fig. 7** Taxonomy of applications

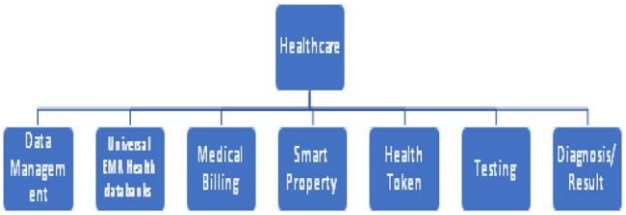


**Fig. 8** Healthcare applications

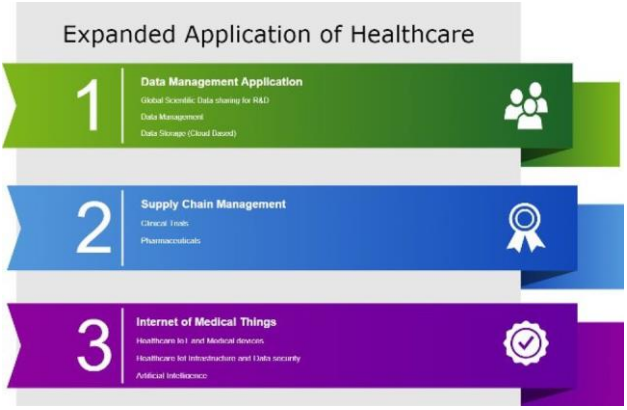


**Fig. 9** Expanded applications of healthcare


**Fig. 10** Workflow diagram. (Source: https://www.mdpi.com/2076- 3417/9/9/1736/htm)

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## 5 Challenges in collaboration

- Scalability and latency
- Sustainability of protocol for blockchain
- Resilience of quantum
- Adoption of blockchains and interoperability
- Data protection and options for privacy & security
- Big Data and AI

Several of the key studies [8] have preferred to use the Ethereum smart contracts and network to pursue solutions to their safety issues furtherer potential analysis may involve a study of the diverse contexts in which disruptive cybersecurity technologies have been or can be used, by Ethereum and/or otherpermissionless authorized blockchain systems.

Proposed agenda

From the above discussion on various domains, Cybersecurity needs more attention in terms of making it less vulnerable to society, here we proposed an agenda to developa secure system of cyber threat intelligence information exchange by using features of blockchain and artificial intelligence. The idea is to make the industry integrated robust against cybersecurity attacks. Where the responsibility of countering these attacks does not only lay on an individual organization but with secure information exchange about the cyber-attacks and their countermeasures among variousstakeholders this responsibility becomes a common challenge and a goal shared by these collaborative partners. Wehave staken this as our future work.

## 6 Conclusion and future aspect

We contribute to a systematic literature review of various blockchain and AI implementations in different fields. recognizes four research questions and checks for those questions in information databases. Our analysis is focused on studiesthat use artificial intelligence to add applications suitabilitymeantime use blockchain as a hyper ledger to add automation. The most common types of applications are security and productivity enhancement, prediction, and decision-making[9] First of all, we are extending prior research that considers blockchain in AI integration. Second, all views, and the many different definitions of their convergence, are considered. Third, by drawing theoretical conclusions from practical research and outlining possible practicalresearch possibilities from theory, we bridge the gap betweentheory practices. Fourth, we explain how convergence pro- duces innovation [10]. Fifth, we propose an agenda to look at one of the core principles of cyber threat intelligence information exchange in cybersecurity. As the study indicates, the hottest subjects in recent developments are cybersecurity, social media, healthcare, supply chain management, and finance/banking. On the way to the future, thealliance between blockchain and AI would provide our com-munity with limitless inventions and revolutions [11]. The convergence of blockchain and AI will provide a

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bunch of innovations in the future to enhance human life, but it is still in the development stage, with a lot of unexplored areas to be tackled, such as scalability, lack of standards, prob- lems with consensus protocols, etc. For future studies, it is an exceptional open door.

As per journal guidelines I am as an author of manuscript titled "Semantic analysis of blockchain intelligence with pro- posed agenda for future issues" with submission id- IJSA-D- 22-00063R1, declares following points as follows:

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