**Blockchain application in Healthcare**

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The amount of data in healthcare is expanding rapidly. The digitalization, management, and analysis of such data enable the healthcare providers to convert the resources into information and knowledge to improve both quality of service and efficiency of healthcare delivery. Electronic Health Records (EHR) are used to document components of multiple content and structures by different parties of the healthcare participants, including healthcare professions, patients, and insurance companies (Häyrinen, Saranto, & Nykänen, 2008). However, mixed results were discovered regarding the quality of information and system of electronic health record (Nguyen, Bellucci, & Nguyen, 2014). The successful functioning of an EHR system is subject to a series of key elements, including enhancing communication among all end users , integrating clinical workflow, disseminating accurate information at the point of care, facilitating diagnostic process, supporting research, as well as maintaining the data security and privacy (Graber, Byrne, & Johnston, 2017; Hicks, Dunnenberger, Gumpper, Haidar, & Hoffman, 2016; Nguyen et al., 2014; Papoutsi et al., 2015). Blockchain, with its ledger technology, can advance these functions and benefit both the developers and users of the EHR systems.

The first benefit of blockchain is the decentralized management system of data. This system allows databases existing in a peer-to-peer manner so that each database can collect the data independently. Meanwhile, it also authorizes multiple access to these databases, which enhances the information sharing among various parties involved in the healthcare process (e.g., hospitals, healthcare practioners, patients, insurance companies, etc.) (Mettler, 2016). This function enables both the patients and the healthcare providers to contribute to the medical records, reduces the time and cost consumed during the information transition between different institutions, and help patient avoid repetitive information filing.

The second feature of blockchain is that the origin and transition of the data can be confirmed and tracked, so that it is the data can hardly be altered. This feature guarantees the accuracy of the critical information during the sharing process. In addition, it can provide every diagnosis and treatment the patient going through by demonstrating the contributors to the records. It also helps the clinical practioners to get an overall understanding of the patients’ medical history to make better judgement and decisions.

Furthermore, blockchain can accelerate health-related research by providing easily retrievable structured and categorized data. The storage function allows blockchain to keep longitudinal data targeting on either a specific disease or a special group. As the data repository is independently developed by each unit, it also offer the convenience to researchers who want to conduct geographic analysis of disease prevalence or make epidemic predication.

In addition, the blockchain technology builds up the security and privacy through several approaches. The cryptography is adopted to generate and verify security keys to protect the confidentiality of the data. The central authority has been replaced by distributed ledger technology, which avoid the risk of information leak when the central authority is under attack. These methods will advance the preservation of verified data and prevent the EHR from being accessed by unauthorized parties.

Although potential challenges, such as user acceptance and hypothetical attack, may affect the implementation of blockchain, this new information management model will certainly benefit the EHR system in various novel ways. The information professionals should work on bridging implementation gap between the blockchain system and end users by creating environment to engage individuals in the clinical process. It is also critical for the information experts to participate and lead a digital health initiative which can optimize the utilization EHR system as well as other information resources to support clinical decision making and healthcare research.

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