

Q&A

Blockchain and Electronic Medical Records: An Interview With Renata Nunes Aranha and Leticia Lazaridis Goldberg

Value & Outcomes Spotlight's editorial board member, Marisa Santos, had the opportunity to sit down with Renata Nunes Aranha, cofounder of Rede Entropia, a venture and artificial intelligence (AI) and blockchain lab, and Leticia Lazaridis Goldberg, head of Entropia HealthTech and CEO of Eversafe, to discuss the latest in cutting-edge developments in blockchain and its relation to electronic medical records (EMR). Renata coordinated the creation of the Medical Graduation Project at Pontifical Catholic University in Brazil and worked on the implementation of innovative projects in various universities. Leticia possesses a unique perspective on the healthcare space, which has enabled her to work in a variety of cross-functional positions within the sector.



Renata Nunes Aranha

Value & Outcomes Spotlight: Blockchain is considered one of the most important inventions in recent years, created for someone known by a pseudonym, Satoshi Nakamoto. But most health professionals can only associate it with bitcoins (cryptocurrency). Could you explain what blockchain is?

Renata Nunes Aranha and Leticia Lazaridis Goldberg: Blockchain is a Distributed Ledger technology that permanently records



Leticia Lazaridis Goldberg

transactions in chronological order across a decentralized network of public or private computers. The technology prevents the record from being changed retroactively and allows the community to verify the authenticity of transactions.

The technology is based on 4 basic pillars: (1) **Distributed ledger:** each participant on a blockchain network has access to the complete information; (2) **Decentralized:** no single entity controls the information; participants validate the records of its transaction partners; (3) **Smart contracts:** a contract that determines the rules of operation of the transactions; and (4) **Asymmetric cryptography:** use of public and private key cryptography and cryptographic hash functions.

How can it be applied in healthcare?

Some examples of uses of blockchain technology that can help transform the healthcare industry include personal health record management, healthcare analytics, security and interoperability of Internet of Things and medical devices, supply chain management, and patient recruitment for clinical trials, among others.

At Entropia Health, we are working on Eversafe, a blockchain application that allows us to connect the silos of previously fragmented healthcare data, realign the incentives of diverse stakeholders, and give individuals more governance over their medical data. Individual users of health systems are at the center of EverSafe and will be empowered to access, manage, and share their health data through our platform.

Our vision is to put individuals at the center of the platform and build a complete picture of one's health. By bringing data together, tremendous wealth is generated that should be distributed to all stakeholders.

What are the advantages for patients and managers? What are the possible applications for clinical research and will it be more expensive?

Because of the immutable characteristics of the technology, blockchain can better ensure the resilience, provenance, traceability, and management of healthcare data. Patient recruitment for clinical trials is an expensive, time-consuming stage. Blockchain can expedite patient identification and matching. Additionally, the technology can validate data, incentivize participation, and allow for consent through smart-contracts.

What are the risks and disadvantages? Can we have confidentiality issues? Could you speak about the global blockchain market and real experiences with blockchain in healthcare?

We know the technology is useful to track how data have changed over time, but do not have benefits that are superior to conventional tools. This means that the risk of people altering essential health data decreases. However, there is a chance that more people may be able to access data given the decentralized nature of the blockchain. In the healthcare sector, many opportunities exist for using blockchain technology, and a few projects are already underway. Some examples are: CareChain, a European consortium to establish a public-permissioned infrastructure to manage health data owned and controlled by no one except the rightful owners (ie, the individuals); MedRec, a project designed by MIT, uses Ethereum for patients to control their medical data, including clinical EHR records

and data from personal health wearables like Fitbit; Blockpharma is a French start-up focused on solutions to trace drug sales online; and AMCHART, a patient-driven EHR on a hybrid public/private blockchain with AI for analytics and an incentive-driven model for better outcomes.

How does one know if blockchain should be applied to an organization's projects?

To determine whether your project may be a strong blockchain use case, you first need to have a deep understanding of the problem you are trying to solve and map the existing solutions that are in place. Then, select the cases that meet the following basic criteria: the problem involves written contracts with multiple parties; the extremely complex processes that maintain a multilevel validation chain; transactions that require traceability; transactions that require unique and non-changeable records; the need to increase or establish trust relationship among members of the business network; the need to track the ownership and control of a physical or virtual asset; or significant manual/human intervention needed for any part of the data or transaction processing.

Can you highlight some challenges and research needed in the blockchain arena?

The implementation of a blockchain project requires much coordination with all parties involved. Importantly, because of the novelty of the technology, we need to educate people about the benefits and applications for their businesses. The current operational systems for blockchain applications still pose significant challenges. Some platforms have scalability issues, where others still need more adoption and software stability.

Another challenge is building a team with a decentralized mindset. Most of us were trained on centralized business models, so when it comes to designing a decentralized blockchain business model, we need to pay special attention to participants' incentives and how to generate wealth that can be distributed among the network members. Moreover, software engineers that can work on blockchain projects are hard to find and expensive. In a world of data silos, where companies are treating people's data as their assets, we must challenge this paradigm. Our vision is to put individuals at the center of the platform and build a complete picture of one's health. By bringing data together, tremendous wealth is generated that should be distributed to all stakeholders. ●