Creating Reliable Artificial Intelligence Model for Cloud-Assisted Electronic Health Records Using Blockchain Technology – A Survey

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by

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Introduction/Background

- Health records now in the cloud
- HER Benefits: Potential to transforming communication in healthcare
- Challenges needing urgent solution
- Blockchain: great potentials for addressing these challenges
- Conceptual Frameworks
  - Peer-to-peer networks
  - Roles of Miners
- Types of Blockchain
- Algorithms for Blockchain
- Smart Contracts
- Digital Signature

Materials and Methods

- Search Strategy
  - Using **the most relevant search terms** to provide a general review of the subject
  - Boolean **OR** functions allowed for the broadest possible recall of the main concepts
  - The first concept, (**privacy** OR **security** OR **confidentiality**), the second concept, (**electronic medical records** OR **electronic health records** OR **EMR** OR **EHR**), and the third concept, **Blockchain**, were combined using the Boolean **AND** function, so that the overall search would specifically retrieve literature containing the core subjects.
  - Results of our search were restricted to the last ten years, from **2012 to 2022**
  - Papers selected from across the world but majority of selected papers originated from developed economy

Article selection

- **Twenty-five** articles selected for review

- Articles included from **multiple countries around the world**

- Papers selected represents **diverse perspectives and areas of research** that share **electronic records**, **privacy** and **security** as core themes.

- **Articles** outsides our **date range** were excluded

Search Results

	EHR Bloclchain Focus?	Anticipated Benefits?	Standardization?	Any Relation with Big Data?	Platform of Blockchain used to Handle HER?	Country-specific Focus	Publication Type
Mamun et al, 2022	Yes	Yes	No	Yes	No	Australia; New Zealand	Survey
Gupta et al, 2022	Yes	Yes	Yes	Yes	Yes	India	Research Paper
Ross Wei Wei. Et al, 2015	No	Yes	No	Yes	Yes	United States	Research Paper
Sandeep Tadge et al, 2021	Yes	Yes	No	Yes	Yes	Australia	Research Paper
Yujin Han et al, 2019	Yes	Yes	No	Yes	Yes	South Korea	Research Paper
Kyungpook et al, 2020	No	Yes	Yes	Yes	Yes	Korea	Research Paper
Schmeelk et al, 2022	Yes	Yes	No	Yes	No	United States	Review
Gariépy-Saper et al, 2021	Yes	Yes	No	Yes	No	United States	Review
Yonggang Xiao et al, 2021	Yes	Yes	No	Yes	Yes	China	Development Study
Jeffrey Tsai, 2018	Yes	Yes	Yes	Yes	No	Vienna, Austria	Conference Paper
Narayanan et al, 2016	No	Yes	No	Yes	Yes	United State	Research Paper
Minoli et al, 2018	No	Yes	Yes	Yes	Yes	United States	Literature Review
Azaria et al., 2016	Yes	Yes	No	Yes	No	Vienna, Austria	Conference Paper

Results and Discussion

- Discussion

- Five essential properties form the basis upon which the journals papers chosen were discussed:

  - **Privacy**

    - Privacy refers to the right that someone can decide when, how and at which levels accessing the personal EHRs, transforming them and sharing them with others are given

    - Privacy can be breached in various situations; for example, a healthcare provider may either intentionally or by mistake abuse EHRs

    - Privacy is a great factor to consider when comparing blockchain-based solutions that claim to maintain the privacy of EHRs.

  - **Security**

    - Security defines the level at which someone's EHRs are restricted and allowed only to authorized personnel

    - Digital forms of health records are exposed to security breaches

    - These factors indicate that we should consider security related to EHRs seriously

  - **Storage scalability**

  - **Cost Analysis**

Limitation, Conclusion and Recommendation

- Limitation
- Conclusion
- Recommendation