SEC-HEALTH A BLOCK CHAIN BASED PROTOCOL FOR SECURING HEALTH RECORDS

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ABSTRACT

Storing and sharing health records through electronic systems pose security risks. To address them, several countries' regulations have established that healthcare information systems must fulfill security properties (confidentiality, access control, integrity, revocation and anonymity) and complementary ones (emergency access and interoperability). Upon tackling these issues, several proposals present security limitations and/or address specific properties only.We propose Sec-Health, a blockchain-based protocol that secures health records, addressing all of the main security and complementary properties defined in current regulations. We show that Sec-Health is a suitable solution by analyzing it under several attack scenarios and describing how it overcomes the problems of existing solutions. Furthermore, we evaluate a Sec-Health Proof of Concept, showing that it can reduce from 26% up to 90% the time to access health records, and reduce up to 50% client-side memory overhead, compared to related work.

1 INTRODUCTION

Information technologies introduce a number of resources and benefits to the healthcare field. Electronic Health Records (EHRs), such as patient's medical history, are one of the most widely employed resources providing a wide view of a patient's medical status. EHRs are commonly originated and shared with collaborators (e.g., physicians, nurses) through cloud computing systems, which results in a more convenient approach to managing such records. Cloud-based systems, however, introduce security challenges in healthcare . A recent report shows that healthcare data breaches are highly common , wherein several of them are classed as unauthorized access, which may lead to inappropriate use of health records (e.g., unwanted advertisements or lower chances of conquering a job opportunity).

Literature Survey

Because health records are targeted by cybercriminals, several countries established regulations requiring any entity to employ security measures when handling health data. The Health Insurance

Portability and Accountability Act (HIPAA), enacted by the United States Congress in 1996, provides guidelines that must be observed by all national healthcare organizations (e.g., hospitals). In 2016, the European Union has approved the General Data Protection Regulation (GDPR), recognizing that health records need special limitations regarding access and treatment through appropriate security mechanisms . Inspired by the GDPR, Brazil's government enacted the General Law for Personal Data Protection (LGPD) that presents similar principles

3 IMPLEMENTATION STUDY

EXISTING SYSTEM:

The literature presents several proposals that aim to ensure health records security. However, there is a lack of proposals that approach the main health records properties. Instead, they address only a subset of the concerns . In general, these solutions employ centralized approaches (e.g., based on clouds) or decentralized ones (e.g., blockchain-based).

Disadvantages:

- There is no MECHANISMS FOR ACCESS REVOCATION AND INTEROPERABILITY system which is not in an existing system.
- There is no health records protection against unauthorized modification and deletion.

Proposed System & alogirtham

The system proposed Sec-Health, a protocol that secures health records by addressing all of their properties. In essence, Sec-Health is composed of a set of schemes, based on decentralized approaches (e.g., blockchain and InterPlanetary File System and cryptographic primitives (e.g., Ciphertext-Policy Attribute-based Encryption and public key encryption), which allow records to be stored and shared securely.

4.1 Advantages:

(i) a blockchain-based protocol (Sec-Health), based on our previous work , which enhances the schemes employed in the previous protocol to fulfill the security properties of confidentiality, access control, and integrity;

(ii) (ii) Sec-Health includes novel schemes to address additional properties, i.e., emergency access, access revocation, anonymity, and interoperability;

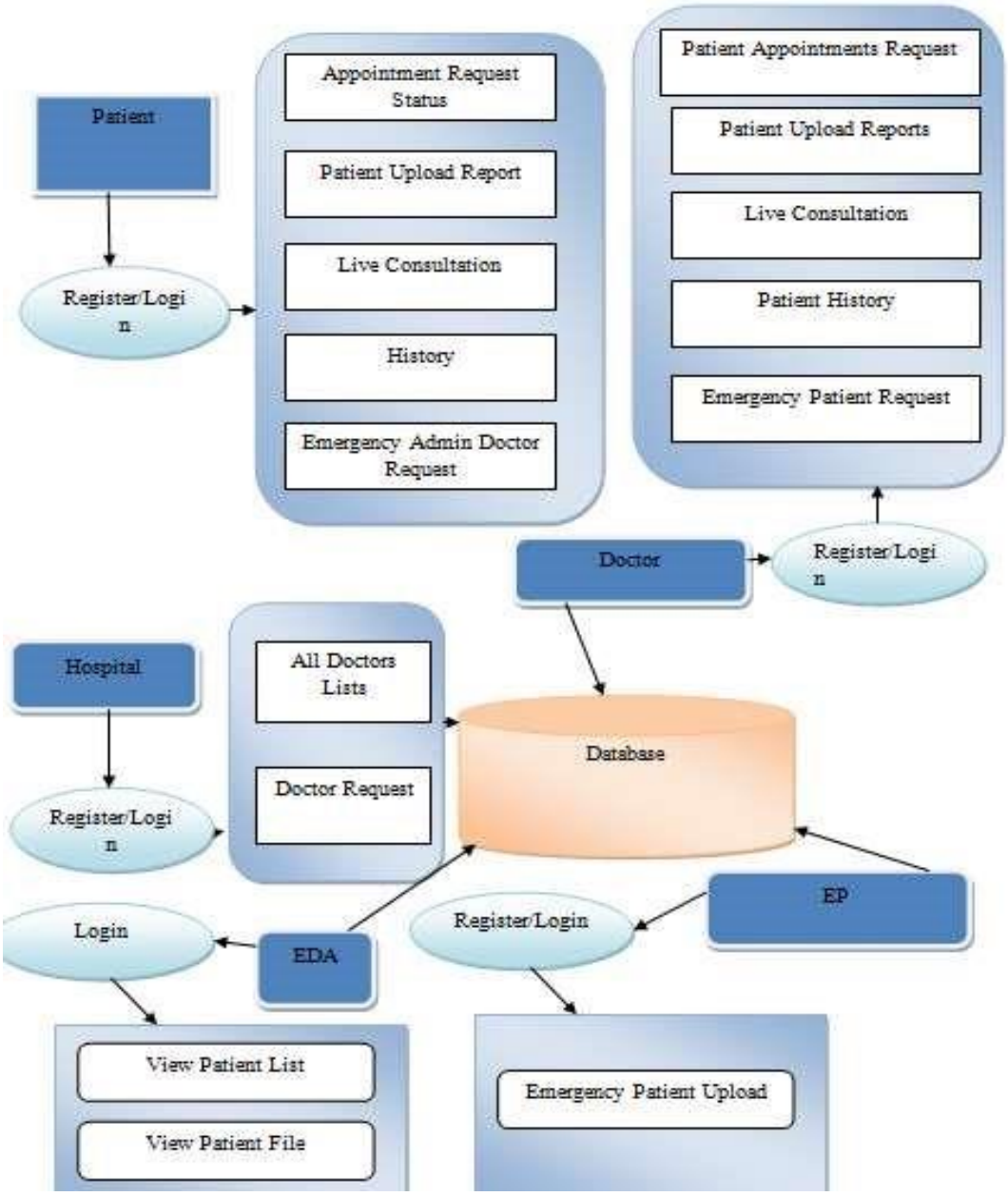


Fig:3.1 System Architecture

IMPLEMENTATION

Modules

Admin

In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations such as Login, List all users and authorize, View All Datasets, Decrypt & View All Health Records Type By Block chain, View Healthcare Records Type Results, View Diets Records Type Results.

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like Register and Login, View Profile, Upload Datasets, Find Healthcare Record Type, Find Healthcare Record Type By Hash code,

5 RESULTS AND DISCUSSION

Screen Shots

Fig 5.1 login page

Fig 5.2 admin page

Fig 5.3 registration page

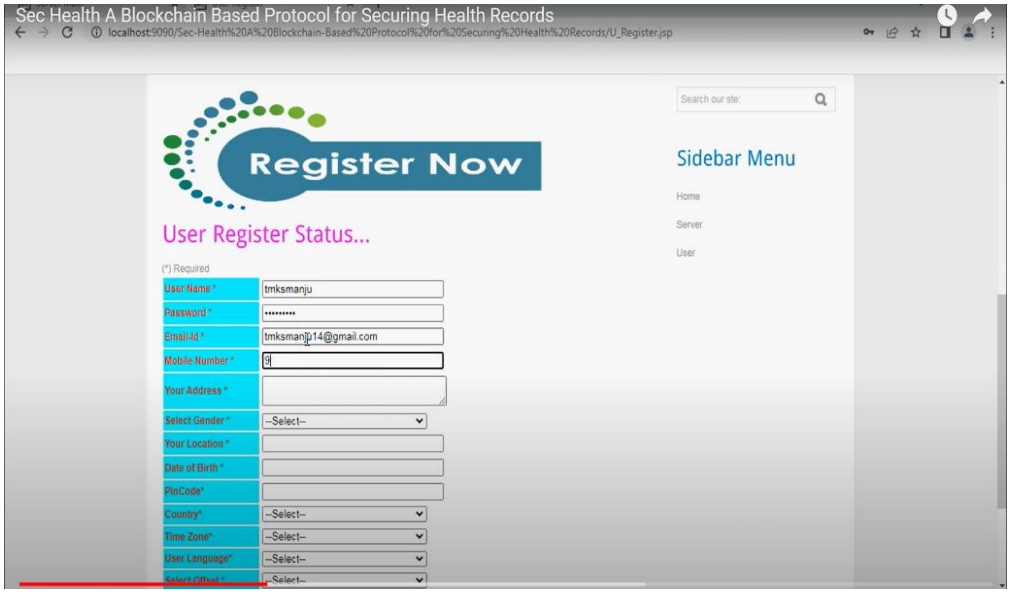
Fig 5.4 searching

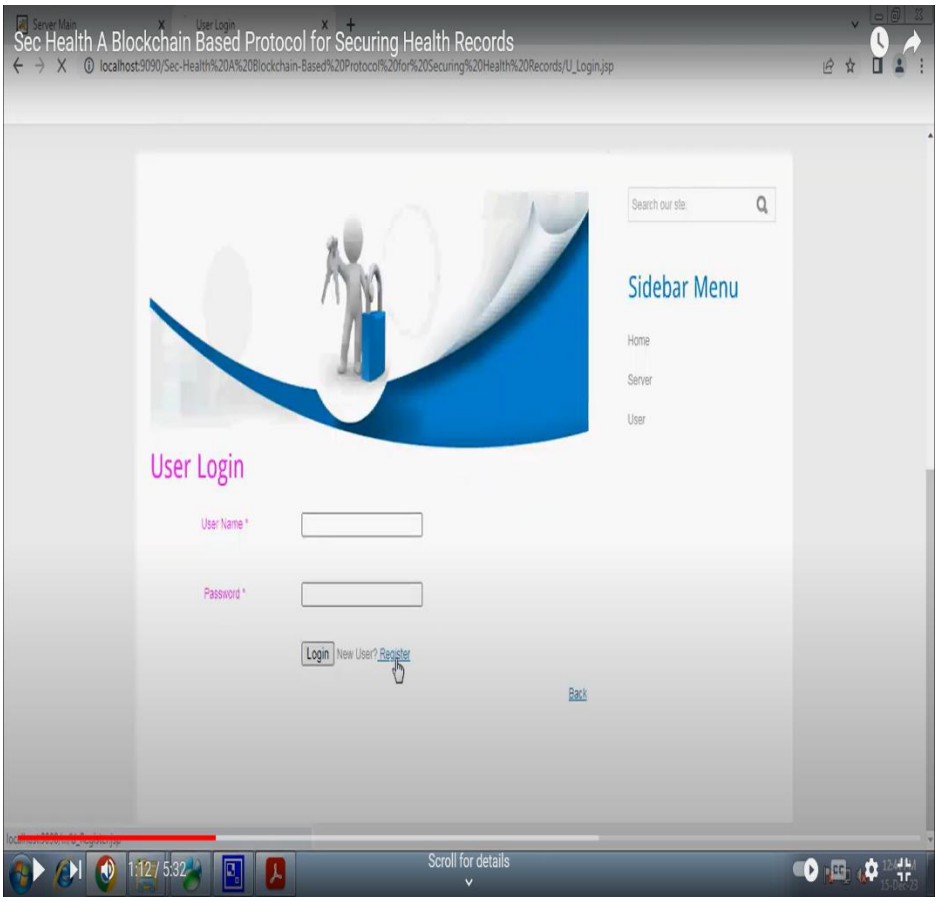
Fig 5.5 Slide 1

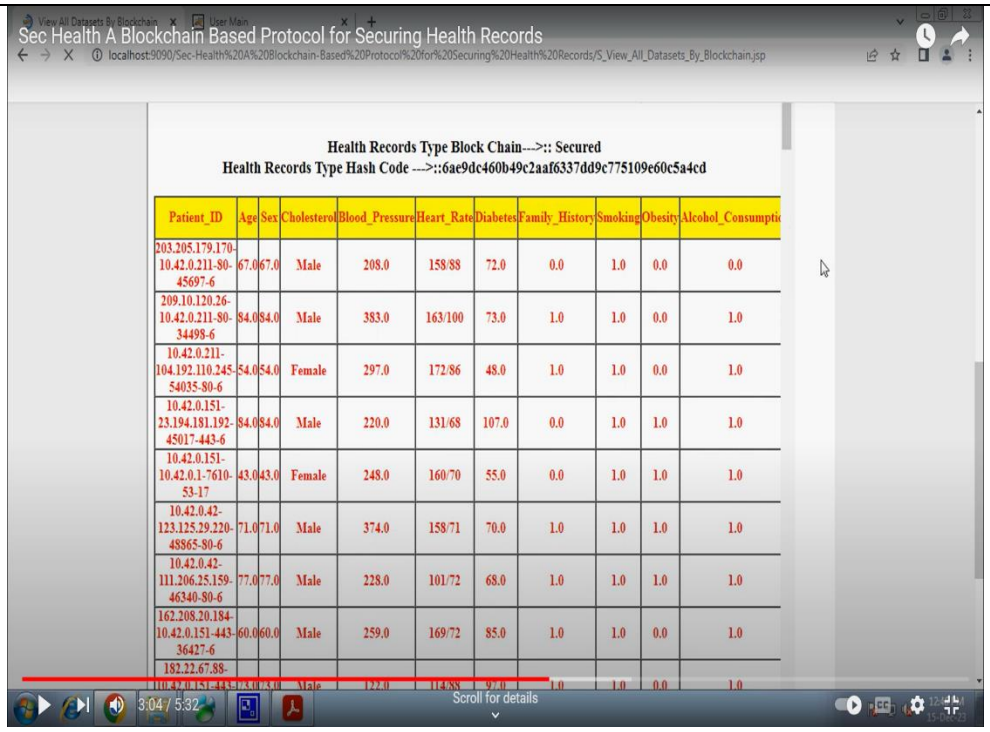
Fig 5.6 slide2

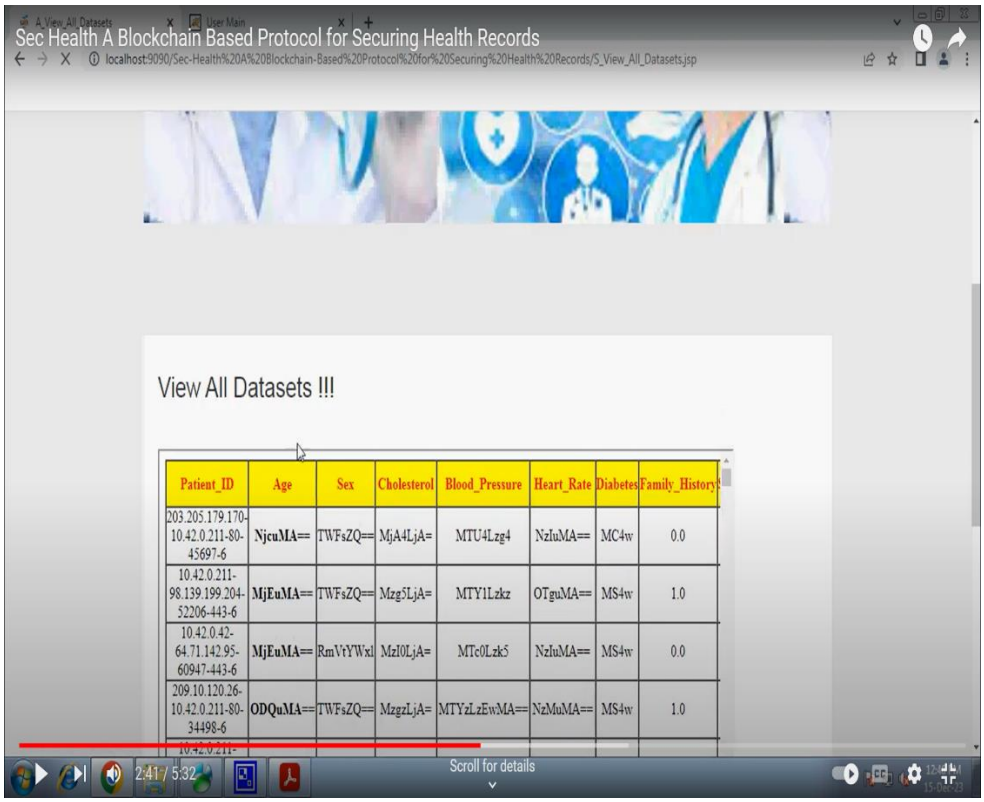
Fig 5.6 slide 3

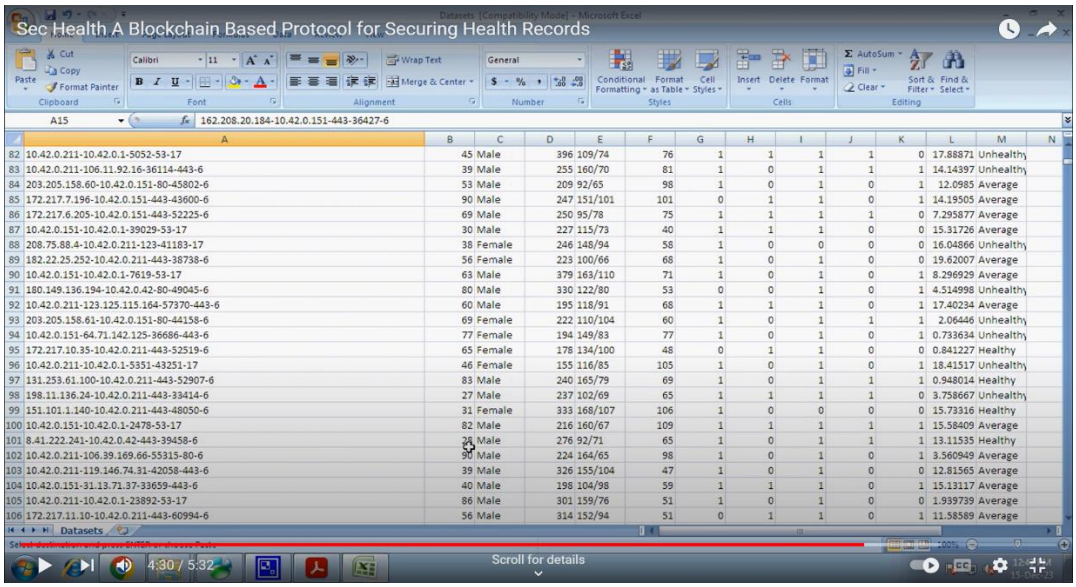
Fig 5.7 user


Sec Health A Blockchain Based Protocol for Securing Health Records
Register Now
User Register Status...
Sidebar Menu
Home
Server
User

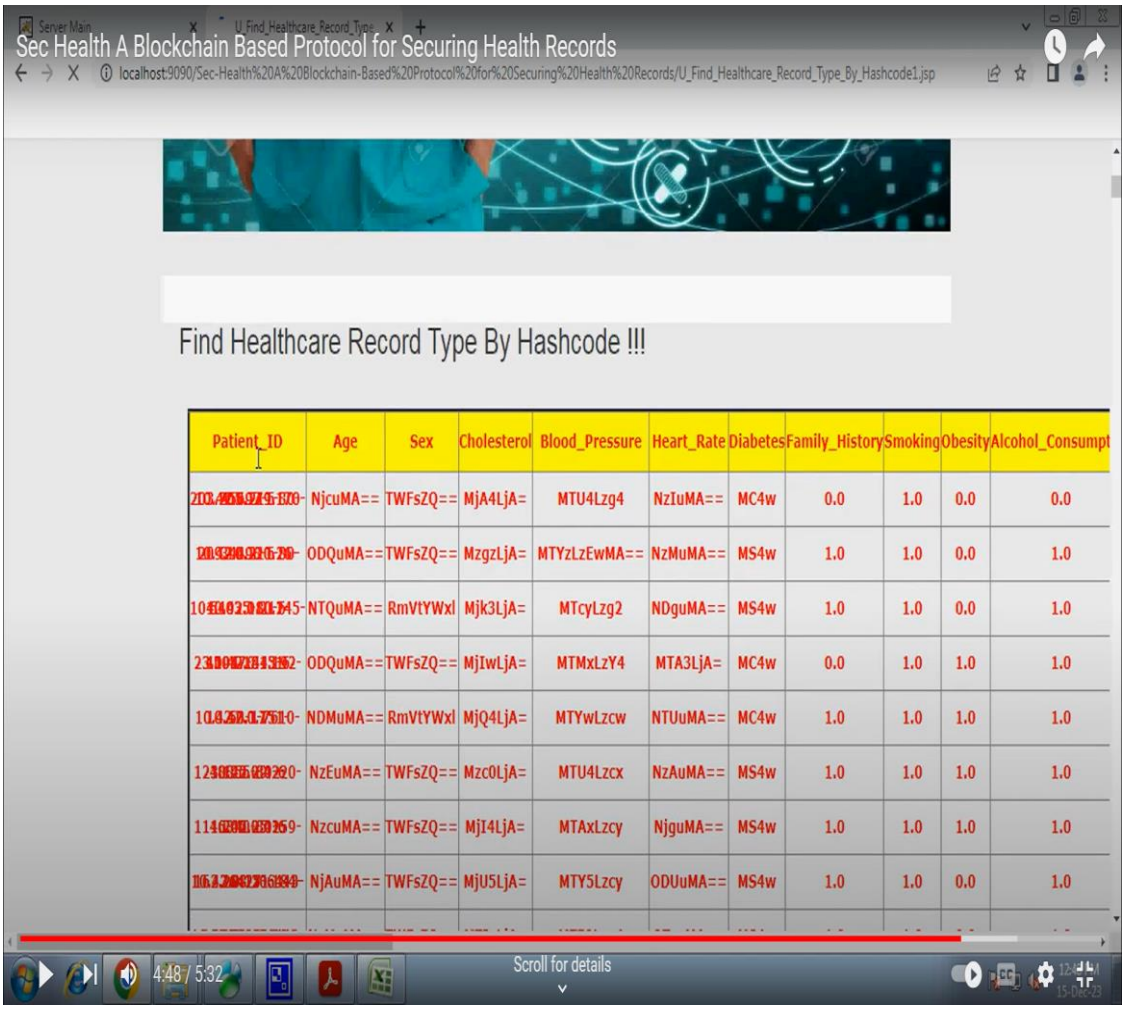

Sec Health A Blockchain Based Protocol for Securing Health Records
Sidebar Menu
Home
Server
User
User Login
User Name *
Password *
Login
New User? Register
Back
Scroll for details


Sec Health A Blockchain Based Protocol for Securing Health Records
localhost:9090/Sec-Health%20A%20Blockchain-Based%20Protocol%20for%20Securing%20Health%20Records/S_View_All_Datasets_By_Blockchain.jsp
Health Records Type Block Chain--->:: Secured
Health Records Type Hash Code --->::6ae9dc460b49c2aaf6337dd9c775109e60c5a4cd
Patient_ID
Age
Sex
Cholesterol
Blood_Pressure
Heart_Rate
Diabetes
Family_History
Smoking
Obesity
Alcohol_Consumptio
203.205.179.170-10.42.0.211-80-45697-6
67.0
67.0
Male
208.0
158/88
72.0
0.0
1.0
0.0
0.0
209.10.120.26-10.42.0.211-80-34498-6
84.0
84.0
Male
383.0
163/100
73.0
1.0
1.0
0.0
1.0
10.42.0.211-104.192.110.245-54035-80-6
54.0
54.0
Female
297.0
172/86
48.0
1.0
1.0
0.0
1.0
10.42.0.151-23.194.181.192-45017-443-6
84.0
84.0
Male
220.0
131/68
107.0
0.0
1.0
1.0
1.0
10.42.0.151-10.42.0.1-7610-53-17
43.0
43.0
Female
248.0
160/70
55.0
0.0
1.0
1.0
1.0
10.42.0.42-123.125.29.220-48865-80-6
71.0
71.0
Male
374.0
158/71
70.0
1.0
1.0
1.0
1.0
10.42.0.42-111.206.25.159-46340-80-6
77.0
77.0
Male
228.0
101/72
68.0
1.0
1.0
1.0
1.0
162.208.20.184-10.42.0.151-443-36427-6
60.0
60.0
Male
259.0
169/72
85.0
1.0
1.0
0.0
1.0
182.22.67.88-
Male
122.0
114/88
97.0
1.0
1.0
0.0
1.0
3:04 / 5:32
Scroll for details


Sec Health A Blockchain Based Protocol for Securing Health Records
localhost:9090/Sec-Health%20A%20Blockchain-Based%20Protocol%20for%20Securing%20Health%20Records/S_View_All_Datasets.jsp
View All Datasets !!!
Patient_ID
Age
Sex
Cholesterol
Blood_Pressure
Heart_Rate
Diabetes
Family_History
203.205.179.170-10.42.0.211-80-45697-6
NjcuMA==
TWFsZQ==
MjA4LjA=
MTU4Lzg4
NzIuMA==
MC4w
0.0
10.42.0.211-98.139.199.204-52206-443-6
MjEuMA==
TWFsZQ==
Mzg5LjA=
MTY1Lzkz
OTguMA==
MS4w
1.0
10.42.0.42-64.71.142.95-60947-443-6
MjEuMA==
RmVtYWxl
MzI0LjA=
MTc0Lzk5
NzIuMA==
MS4w
0.0
209.10.120.26-10.42.0.211-80-34498-6
ODQuMA==
TWFsZQ==
MzgzLjA=
MTYzLzEwMA==
NzMuMA==
MS4w
1.0
2:41 / 5:32
Scroll for details


Sec Health A Blockchain Based Protocol for Securing Health Records
Scroll for details


Sec Health A Blockchain Based Protocol for Securing Health Records
View Healthcare Records Type Results !!!
JS Chart
1116
2345
Not Secured
Secured
Scroll for details



6. CONCLUSION AND FUTURE WORK

CONCLUSION

In this work, we proposed Sec-Health, a block chain-based protocol that secures health records while addressing all of their main properties, namely confidentiality, access control, integrity, access revocation, emergency access, interoperability, and anonymity. Sec-Health shows security advantages compared to related proposals that present highly centralized mechanisms. While those proposals are generally based on a trusted or semi trusted server, Sec-Health affords several decentralized features, preventing one single entity from compromising the healthcare system. Furthermore, compared to decentralized solutions, our protocol addresses the challenging problem of fulfilling all the main properties of health records, whereas other solutions focus on offering mechanisms for specific properties only.

7. REFRENCES

In this work, we proposed Sec-Health, a block chain-based protocol that secures health records while addressing all of their main properties, namely confidentiality, access control, integrity, access revocation, emergency access, interoperability, and anonymity. Sec-Health shows security advantages compared to related proposals that present highly centralized mechanisms. While those proposals are generally based on a trusted or semi trusted server, Sec-Health affords several decentralized features, preventing one single entity from compromising the healthcare system. Furthermore, compared to decentralized solutions, our protocol addresses the challenging problem of fulfilling all the main properties of health records, whereas other solutions focus on offering mechanisms for specific properties only.