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UNIVERSITY OF MUMBAI

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A Project Report On

Health Information System Using Blockchain Technology

Submitted in partial fulfilment of the degree of Bachelor of Engineering (Sem 7)

In

Computer Engineering

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1. Project Conception & Initiation

1.1 Abstract

In India most of the patients & hospitals store medical data in conventional Hard Records System (paper based records). Due to which accessing and sharing medical records becomes difficult. Also there are high chances of papers getting misplaced, or loss of paper due to disasters such as floods, fire etc. Medical data is very sensitive in social aspect, so its confidentiality needs to be maintained. After taking all these factors into consideration we decided to make this project using Digital Records & Blockchain Technology which will be a small contribution towards Indian Healthcare Industry. The goal of creating such kind of system is to provide ease of data access, sharing of digital health records, and to maximize the protection of patients' data. One of the main reason behind using Blockchain Technology is, it will provide a very strong security for patients digital data.

1.2 Objectives

- Enabling quick access to patients' digital records for more coordinated & effective treatment
- Providing accurate, up-to-date, and complete case history about patients'
- Securely sharing digital information with doctors
- Enhancing privacy and security of patients' data by using Blockchain Technology
- Eliminating the need to maintain hard medical records
- Problem of lost or misplaced patient documents or reports will be eliminated
- Increasing patients' participation in system, thus increasing transparency

1.3 Literature Review

Paper 1 - Health Record Management through Blockchain Technology

The world is moving towards progress, to achieve the desired progress, the world should have a healthy population and health records are the projections of an individual's health over time. The centralised approach of maintaining the health records lead to data breaches. So we moved towards institution-driven approach of record maintenance, which didn't make much difference with the previously existing one. Since the patient have no control over the data, the chances of data being misused is high. So we need a patient-centered approach which is completely decentralised, which can identify data thefts, prevent data manipulation, and patient has the right in access control. Blockchain Technology serves as a best solution to address all the problems and fulfill the needs. Blockchain being a decentralised and distributed ledger it can also impact on billing, record sharing, medical research, identify thefts and financial data crimes in days to come. Implementation of smart contracts in health care can simplify things even better. Where invoking, record creation and validation will be done on Blockchain. This paper highlights on the patient-driven model of record maintenance using Blockchain technology where smart contracts can be incorporated in future days making it more potential in data exchange. Finding its huge scope, hoping that more researches will be carried out and practically implemented.

1.4 Problem Definition

In India most of the patients & hospitals store medical data in conventional Hard Records System (paper based records). Due to which accessing and sharing medical records becomes difficult & this process is time consuming. Also there are high chances of papers getting misplaced, or loss of paper due to disasters such as floods, fire etc. Medical data is very sensitive in social aspect, so its confidentiality needs to be maintained.

1.5 Scope

This project consists of creating a health information system using blockchain technology. With the use of this system, patients will now be able to securely share their health records with doctors & store these records safely without the fear of it getting misplaced or lost.

1.6 Technology Stack

Front end : HTML, CSS, JavaScript

Back end : Django

Database : SQL

Blockchain : Solidity

1.7 Benefits for environment & society

- This project is a small contribution to our National goal of Digital India
- Promoting Green India Initiative by reducing the usage of paper
- If any patient wants to take an expert opinion from a doctor who is situated in another state or country, they can simply share the digital records with them. This will eliminate the need to travel & meet the doctor in person, thus saving time, money & energy of patient
- With the usage of this system, users will no longer need to maintain conventional files. All digital documentation will be available on the system
- If any global pandemic occurs in future, tracking of patients will be much more streamlined & it will be very beneficial for the government to control the health crises in more effective way

2. Project Design

2.1 Proposed System

After taking into consideration various problems as explained in the abstract we propose our system “Health Information System Using Blockchain Technology”, this system will help in Enabling quick access to patient digital records for more coordinated & effective treatment, Providing accurate, up-to-date, and complete case history about patients, Securely sharing digital information with doctors, Enhancing privacy and security of patient data by using Blockchain Technology, Eliminating the need to maintain hard medical records, Problem of lost or misplaced patient documents or reports will be eliminated, Increasing patient participation in system, thus increasing transparency.

2.2 Design (flow of modules)

There are two main entities in this system, patient & doctor.

Patient :-

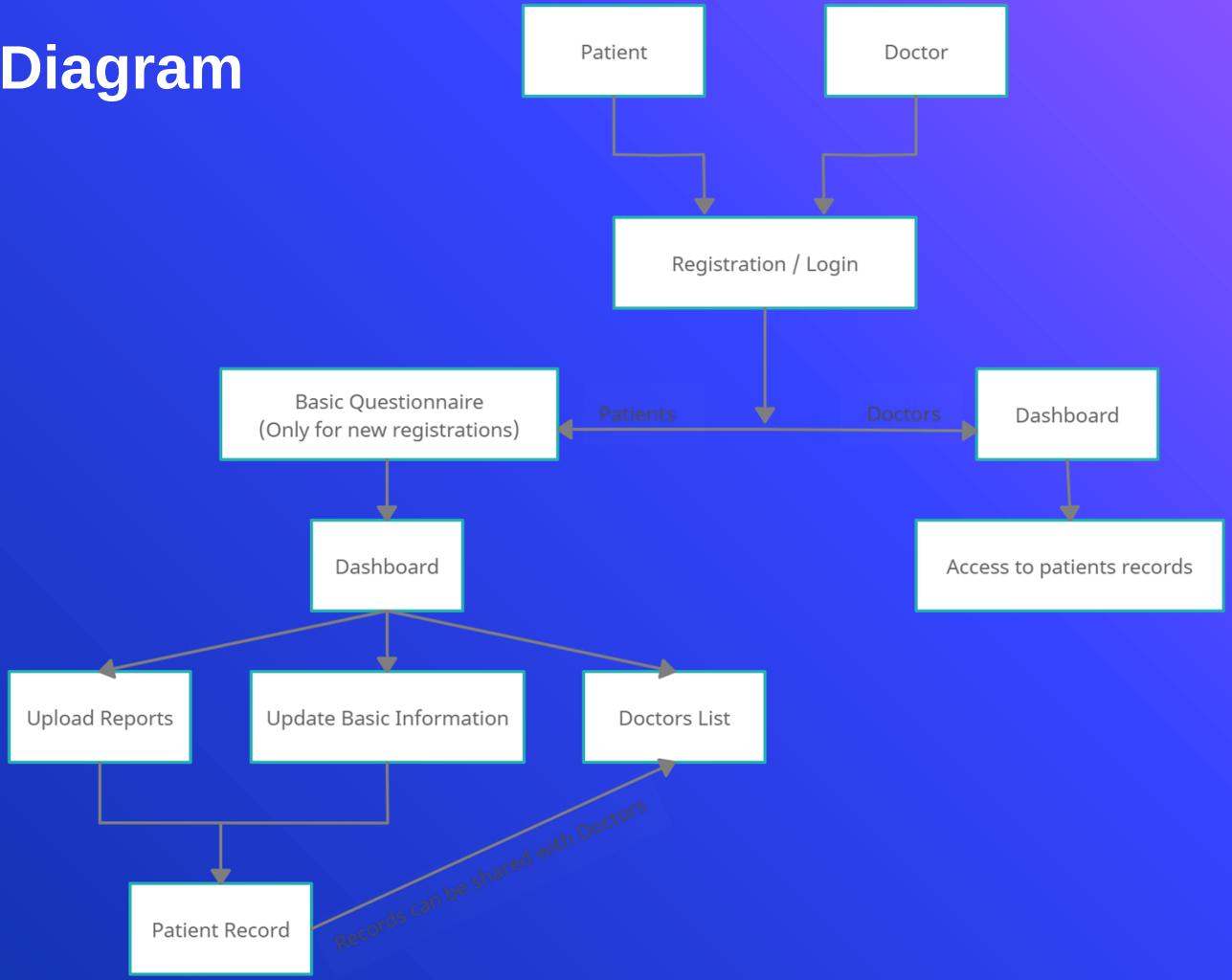
1. Create an account using unique Aadhar card number & then login into the system
2. For new patient after login, there will be a basic medical questionnaire. This will store the basic data about the patient. This includes blood group, height, weight, any specific allergies, any minor/major operation history etc.
3. Once this is done, patient will now be able to use the system
4. There will be an option to upload the medical documents (previous case history). Also after every visit to hospital, patient can upload their latest documents to the system. Whenever they upload any latest documents, they will be added to their case history.
5. The basic data is also editable, so patients can make changes whenever they want to (this is editable because height, weight, allergies etc these parameters can change over time)
6. Before visiting any doctor, through the system patient can share their health information (basic data & case history) with the doctor
7. A list of doctors will be available on the screen of the patient where they can select the doctor with whom they wish to share their health information
8. Only after the patient shares his/her health information, the doctor will be able to see it

2.2 Design (flow of modules)

Doctor :-

1. Create an account using some unique id & then login into the system
2. In the system doctors will be able to see all the health information shared by patients with them
3. This health information includes basic data & case history
4. Doctors will be provided with the real time counter of number of patients sending them their health information
5. After checking the health information sent by patients it can be marked as completed, so they will have a real time count of remaining patient’s health information to be checked. This will ensure that doctors do not miss any patient

2.3 Class Diagram



2.4 Modules

- Registration / Login
- Patient Dashboard
- Upload Reports
- Share Reports with Doctors
- Basic Information
- Doctor Dashboard
- View Patient Reports

2.5 References

https://ieeexplore.ieee.org/document/8862594

3. Planning for next semester

3.1 Planning

- Build a proper working model of all the modules
- Improvise on those modules, under the guidance of project guide
- Combine all the working modules properly to create the system
- Create the system having functionality as mentioned in the report
- Adding any extra features to system, under guidance of project guide

Thank you