Intellihealth : Electronic Health Record System

Under the guidance of **Prof. Sangeeta Parshionikar**

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Introduction

Purpose

We aim to implement a decentralized blockchain-based architecture to enhance data security, privacy, and immutability of patient health records.

Findings

1. Physical Documents are tedious to read and carry
2. Digitization through blockchain provides security

Methodology

1. Using various blockchain based tools like Ganache, Truffle
2. Integration of Front End tools like Angular to make the product

Originality

1. Implementation of blockchain to secure data
2. Creating a product that caters to all stakeholders

Problem Statement

To develop an electronic health record (EHR) system that provides secure access to medical records for patients, healthcare providers, and hospital administrators, allowing patients to be more involved in their healthcare.

Objectives

- To use **decentralized blockchain technology** to enhance data privacy and **security**, eliminating data breaches and unauthorized access, giving patients control over their health records.

- To streamline health record processes to improve healthcare efficiency, making it easier for providers to **access** and **update** patient information.

- To create an intuitive, **user-friendly interface** for both patients and healthcare professionals.

Literature Review

Literature Review

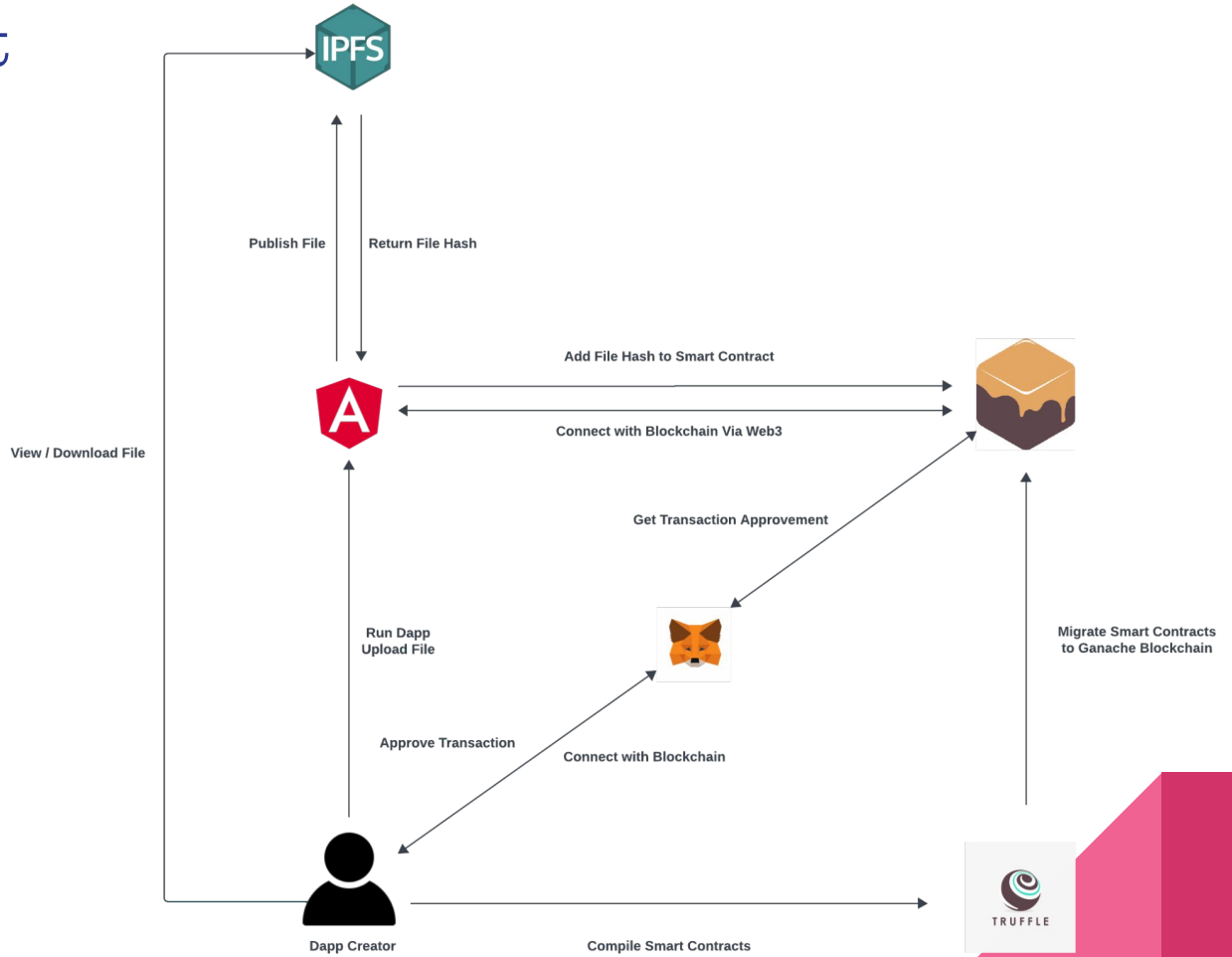
Title	Year	Findings	Research Gaps
ACTION-EHR: Patient-Centric Blockchain-Based Electronic Health Record Data Management for Cancer Care	2020	Every hospital integrates a blockchain node connected to its individual EHR system, establishing an integrated blockchain network. hybrid strategy was embraced, wherein solely management metadata found its place on the blockchain.	Regulatory challenges pose a significant hurdle, as the healthcare industry lacks specific government regulations tailored to blockchain technology implementation
Electronic Healthcare Data Record Security Using Blockchain and Smart Contract	2022	Blockchain Handshake (BH) protocol was developed to facilitate connections between the database, the blockchain network, and the health record system, effectively serving as an interface between the components.	Lack of rigor in research methods, including inadequate sample sizes, inappropriate statistical analyses, or insufficient control of variables, compromises the strength of the conclusions drawn.

Title	Year	Findings	Research Gaps
A design of blockchain-based architecture for the security of electronic health record (EHR) systems	2018	Proposed approach integrates a dynamic reward system within the blockchain framework, where health providers play a crucial role in sustaining the integrity and functionality of the network.	The paper lacks a detailed discussion on scalability, a crucial consideration for large-scale EHR systems. While the authors mention that the architecture is designed to accommodate increasing participant numbers, a thorough analysis of scalability challenges is notably absent.
A Consent Model for Blockchain-Based Health Data Sharing Platforms	2020	a consent-based dynamic architecture model for healthcare data sharing using blockchain technology, smart contracts, and ontologies for 6 consent representation.	Ensuring that the consent mechanism maintains privacy for data providers is a critical concern that the authors intend to address through large-scale tests to verify the platform's ability to safeguard user privacy

Title	Year	Findings	Research Gaps
A Blockchain-based Approach for Data Accountability and Provenance Tracking	2017	The paper proposes three models for blockchain-based systems, involving contracts tailored for specific stakeholders, generic data instances, and multiple data subjects. It discusses design considerations like contract lifecycle, trust model, and blockchain architecture	The research identifies future work areas such as exploring sharding for scalability, using business blockchain approaches like Hyperledger, and developing a model-based translation mechanism for automatic contract generation
ABlockchain distributed ledger technologies for biomedical and health care applications	2017	The study emphasized the potential of blockchain to revolutionize healthcare by providing decentralized management, immutable audit trails, enhanced data provenance, robustness, availability, and heightened security and privacy measures for medical records and health data sharing.	Transparency and confidentiality challenges can compromise patient data privacy on a blockchain network. Speed and scalability constraints may limit the use of blockchain protocols in real-time and scalable healthcare applications. The threat of a 51% attack poses the risk of malicious nodes taking control of the blockchain network.

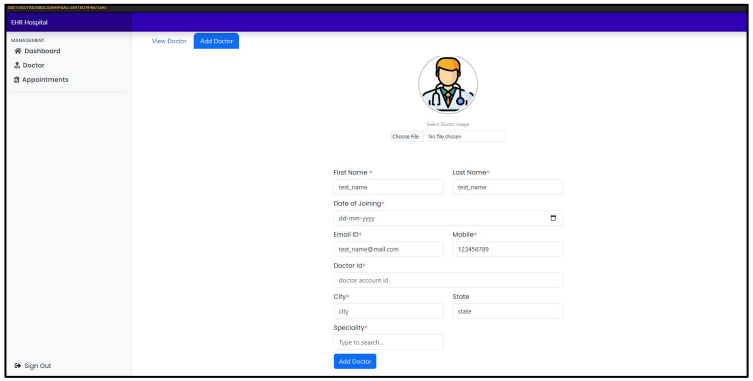
Methodology

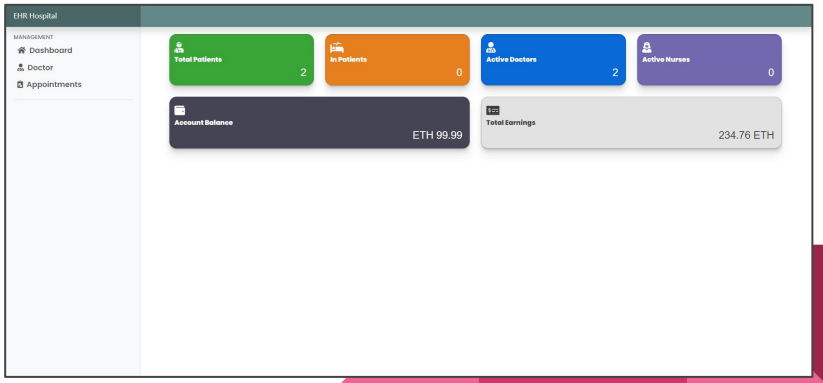
Layout


IPFS
Publish File
Return File Hash
Add File Hash to Smart Contract
Connect with Blockchain Via Web3
View / Download File
Get Transaction Approvement
Run Dapp
Upload File
Migrate Smart Contracts
to Ganache Blockchain
Approve Transaction
Connect with Blockchain
TRUFFLE
Dapp Creator
Compile Smart Contracts

Admin Module

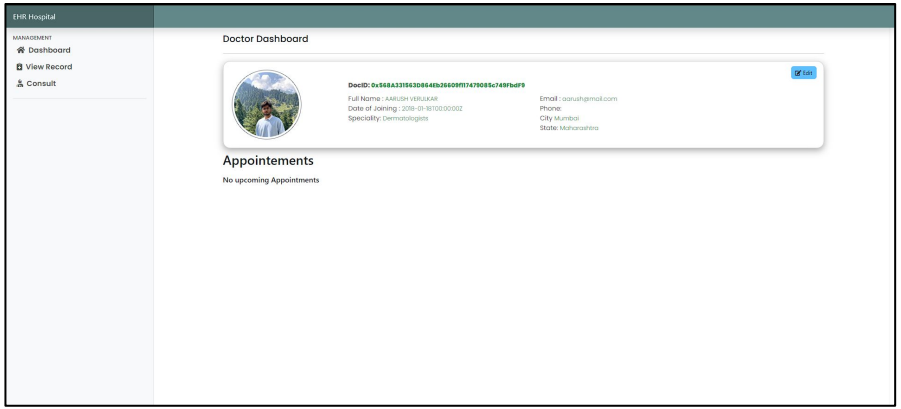
- Admins can register doctors on the website.
- Admins can view the statistical data regarding the website, including the number of active doctors and patients.

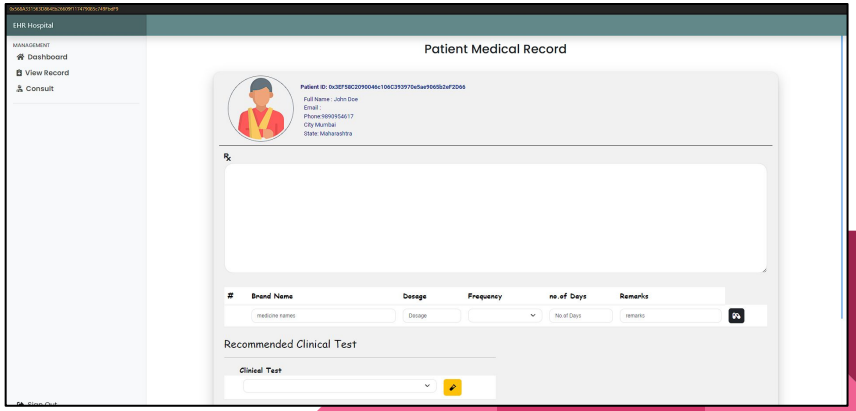




Doctor Module

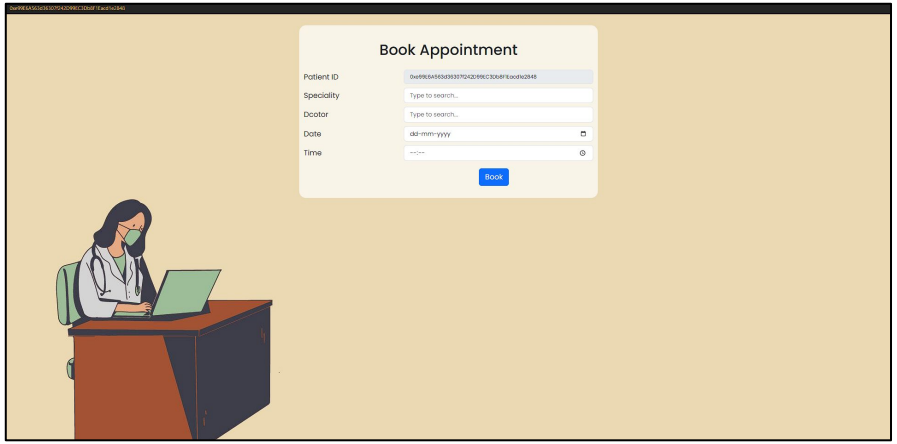
- Doctors can manage appointments.
- Doctors can view patient histories.
- Doctors can provide consultations, write prescriptions & upload test reports.

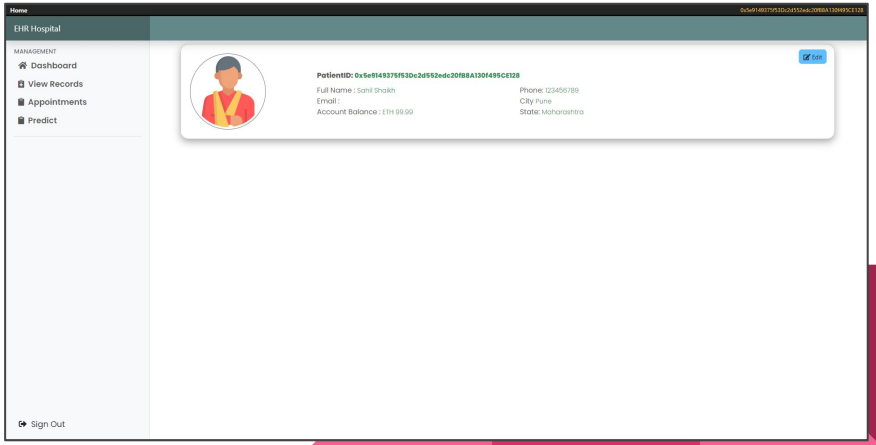




Patient Module

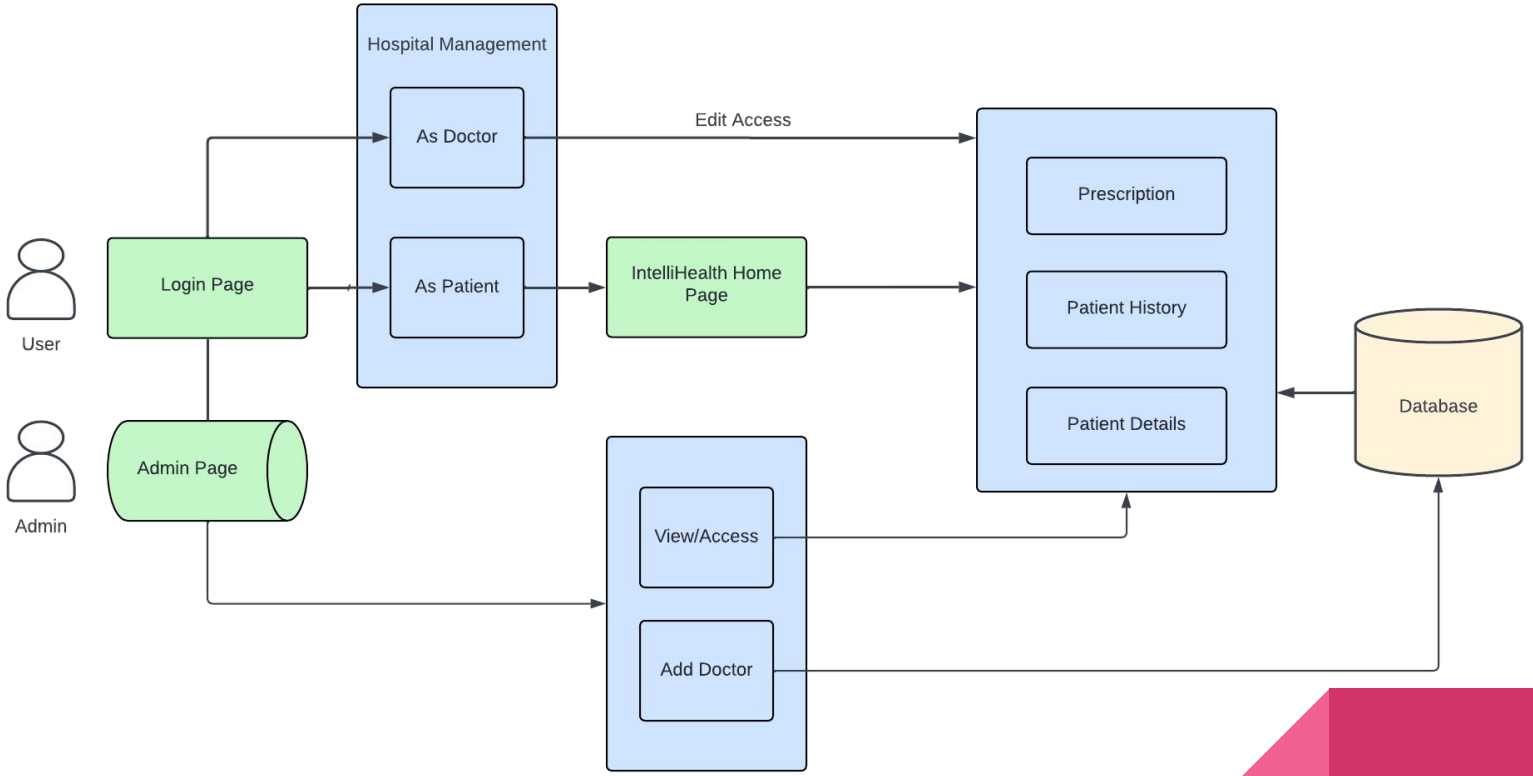
- Patients interact with the system through a homepage, where they can book appointments.
- The Patient's Panel allows them to view suggestions, prescriptions, personal medical history.
- Patients can update their personal details.



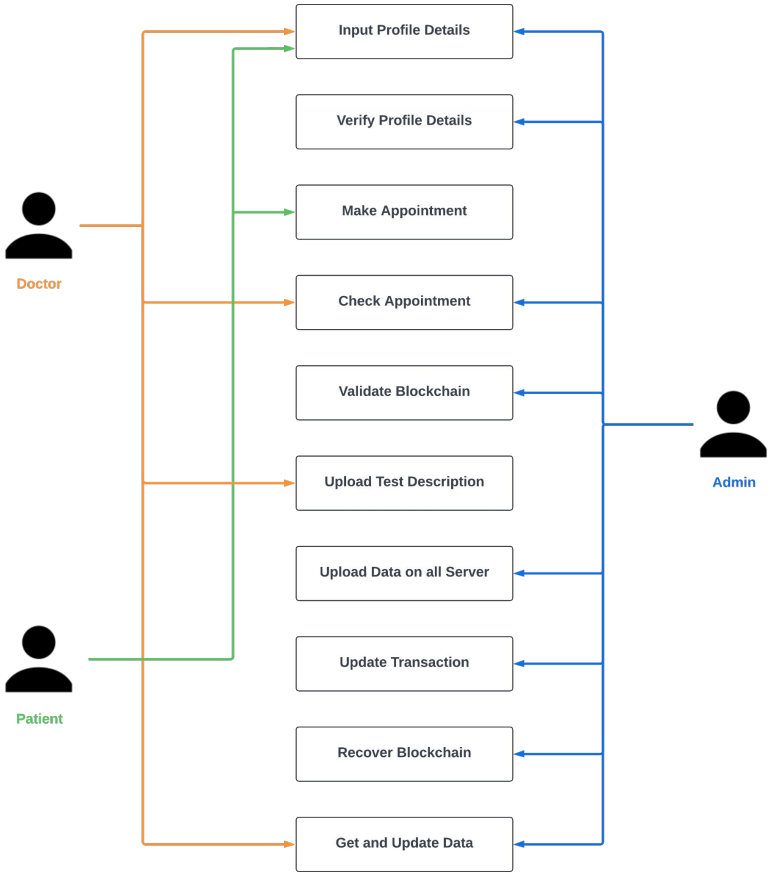


System Architecture

Flow


Hospital Management
As Doctor
Edit Access
Prescription
Login Page
As Patient
IntelliHealth Home Page
Patient History
User
Patient Details
Database
Admin Page
View/Access
Admin
Add Doctor

Use Case Diagram



Tools & Languages

Blockchain

- Ganache
- Truffle
- IPFS
- Solidity

Front End

- HTML
- CSS
- Angular
- TypeScript

Back End

- Express
- NodeJS
- Django

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Thank You!