



# **VIVEKANANDA INSTITUTE OF TECHNOLOGY & SCIENCE**

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## **A Blockchain Based System for Healthcare Digital Twin**

**Submitted by**

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**BATCH 11**

# ABSTRACT

1. **Digital Health Twin:** We built a smart “digital mirror” that reflects a patient’s real-world health using structured data – like organizing puzzle pieces into a clear picture.
2. **Secured by Blockchain:** To protect sensitive health info, we used Blockchain – like locking patient data in a tamper-proof vault with a digital bodyguard.
3. **Real & Reliable:** Our system works in real-life scenarios, with clear protocols and better performance than existing models – like upgrading from a sketch to a full-color blueprint.

# EXISTING SYSTEM

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## **1. Building Smart Hospitals – But with Open Doors**

Peng et al. created a "remote-controlled hospital" in China, where sensors work like eyes and ears, feeding real-time info into a central control room. But – they forgot to lock the doors! No access control or encryption means sensitive data could easily slip out.

## **2. Cloud Care with Missing Brains**

Liu et al. designed a "4-piece health puzzle" – physical world, digital twin, cloud services, and health data – to help elderly people care for themselves. But the puzzle is missing its thinking cap – there's no predictive algorithm to forecast health risks.

## **3. Smart Nutrition & Brain Maps – Great Ideas, Few Directions**

Shamanna's nutrition GPS helps diabetic patients navigate healthier lifestyles using real-time signals, but doesn't explain how it decides the route. Barbiero and Petrova, on the other hand, draw maps of mind and body, but leave us without a clear guide on how the data is processed or protected.

# DISADVANTAGES

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1.The system is not implemented public blockchain and only implemented private blockchain in which security is very less.

2.The data is not accumulated while patient goes through disease assessment phase.



# PROPOSED SYSTEM

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## **1. A Digital Health Blueprint Guarded by Blockchain**

We designed a “patient-first blueprint” – a structured data model that maps out a patient’s health journey in real-time, like a GPS guiding through treatment. This blueprint is brought to life as a Digital Twin, and to protect every data step, we wrapped it in Blockchain armor with proper threat modeling – like securing a high-tech vault with layers of intelligent locks.

## **2. Smart Workflows with Real-World Compatibility & Future Vision**

Our system acts like a well-trained medical assistant, following protocol flows to handle different scenarios efficiently. We’ve compared our assistant’s performance with global laws like HIPAA and GDPR, and other research systems. Finally, we highlight its current limitations and future upgrades – like planning a smarter, more capable version for tomorrow’s digital hospitals.

# ADVANTAGES

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1.The system is implemented DT which stands for the representation of the anatomy of a digital asset in a digital space which is the depiction of a physical phenomena from a physical space.

2.In the proposed system, the system is implemented DIGITAL TWIN FOR DEVELOPING A PRODUCT and DIGITAL TWIN FOR AN INDIVIDUAL INSTANCE which are more secure and safe.



#### 4.1 Architecture Diagram

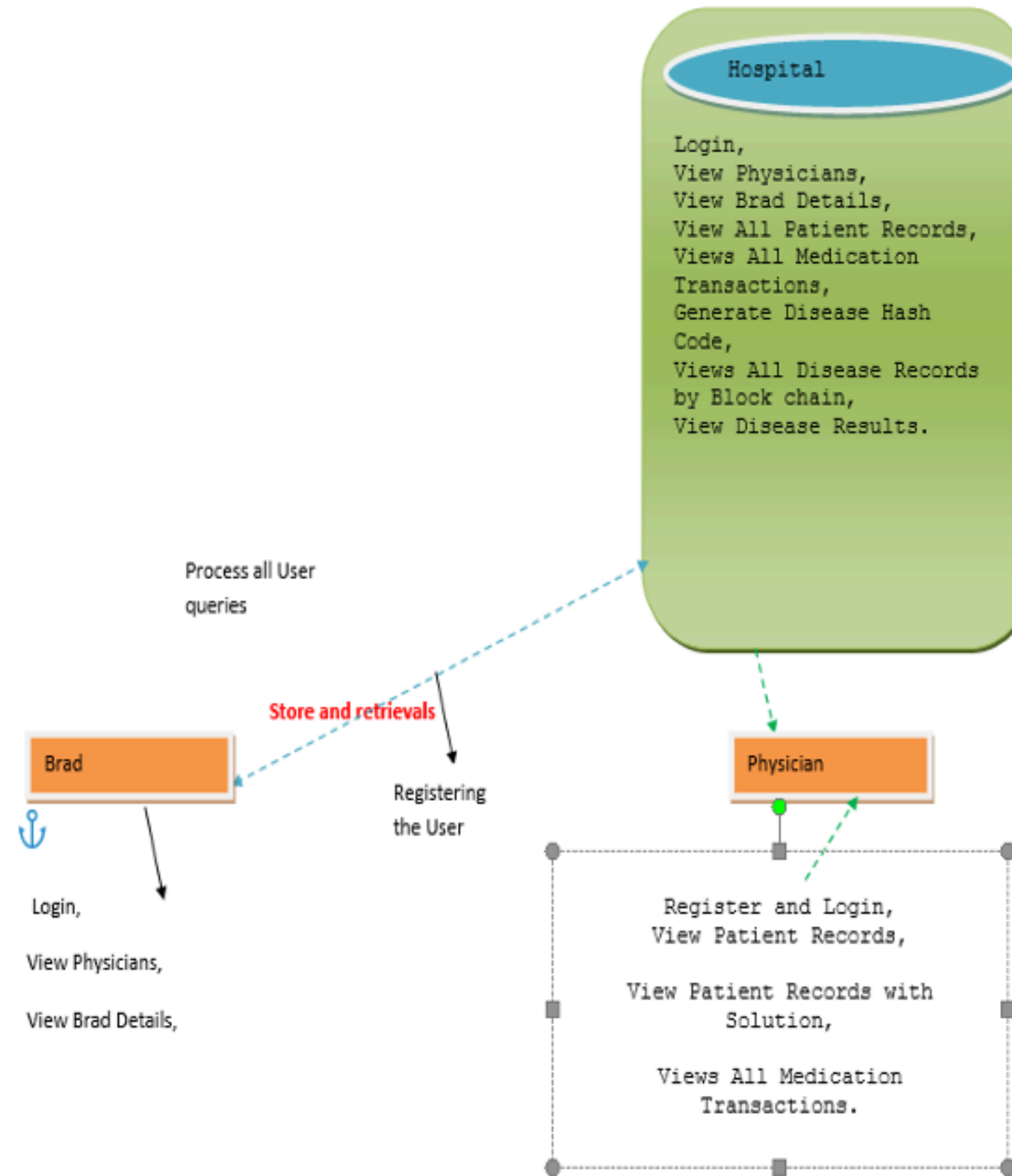
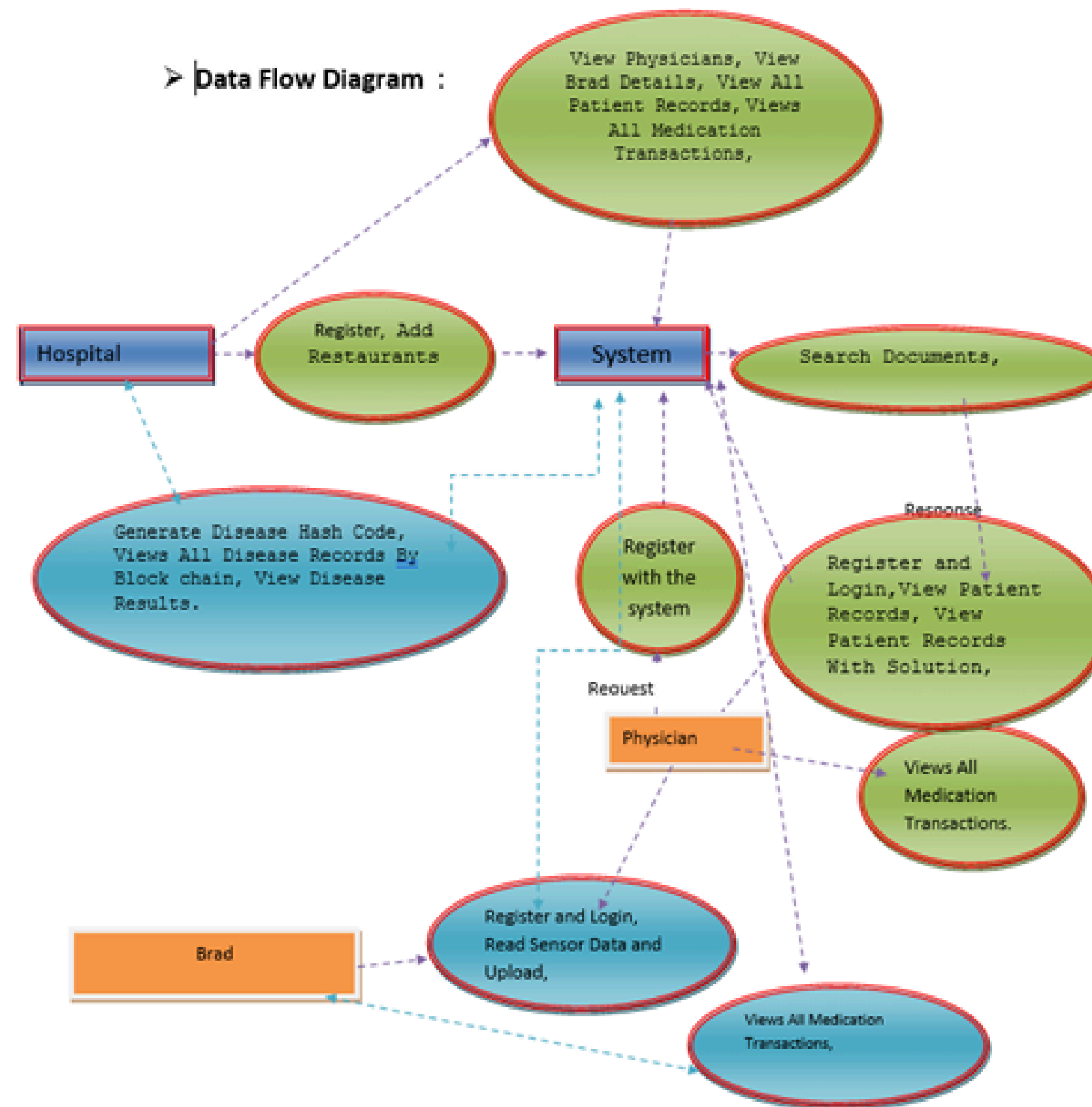


Fig: 4.1 Architecture Diagram

# UML DIAGRAMS



➤ Data Flow Diagram :



➤ Use case

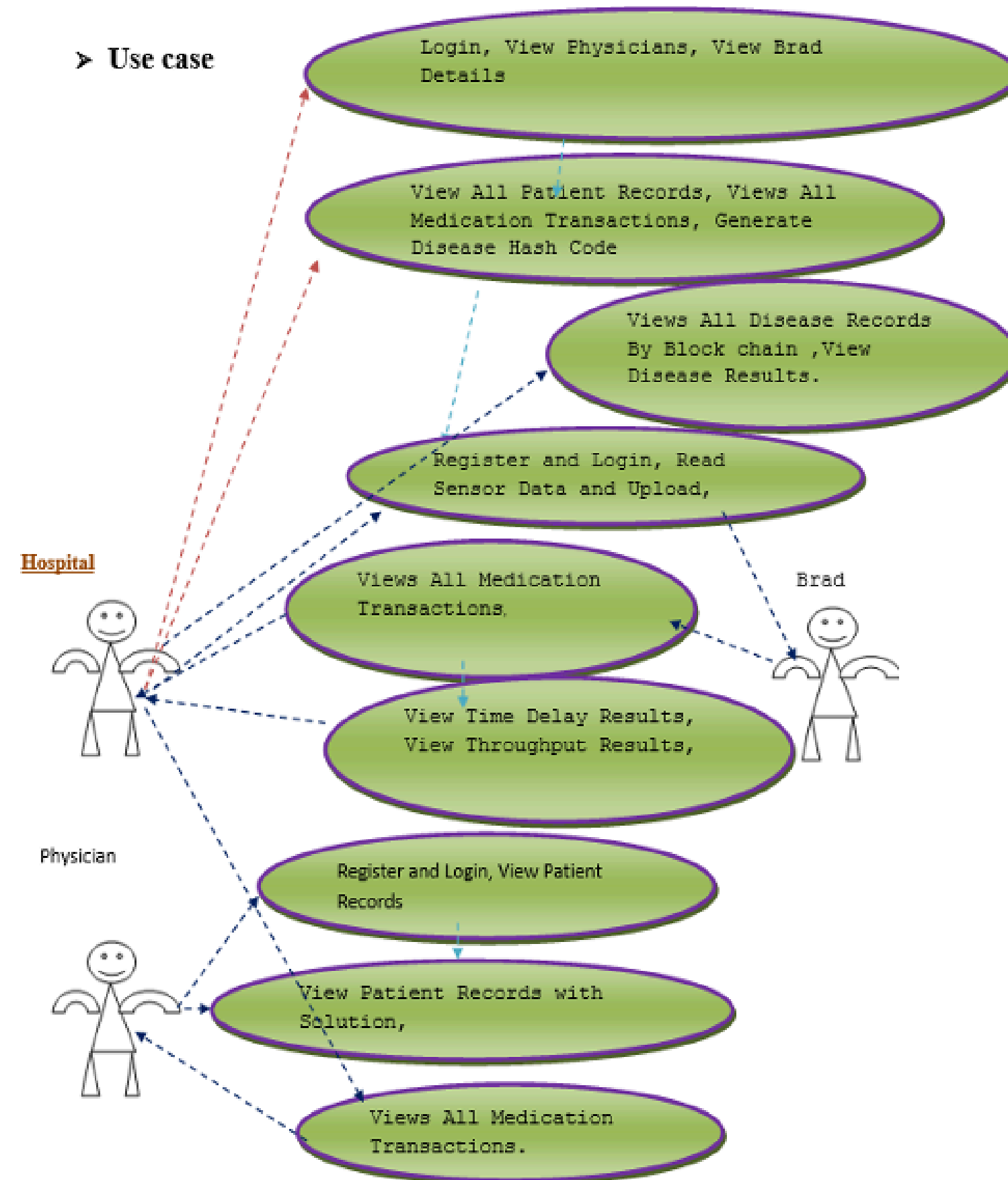
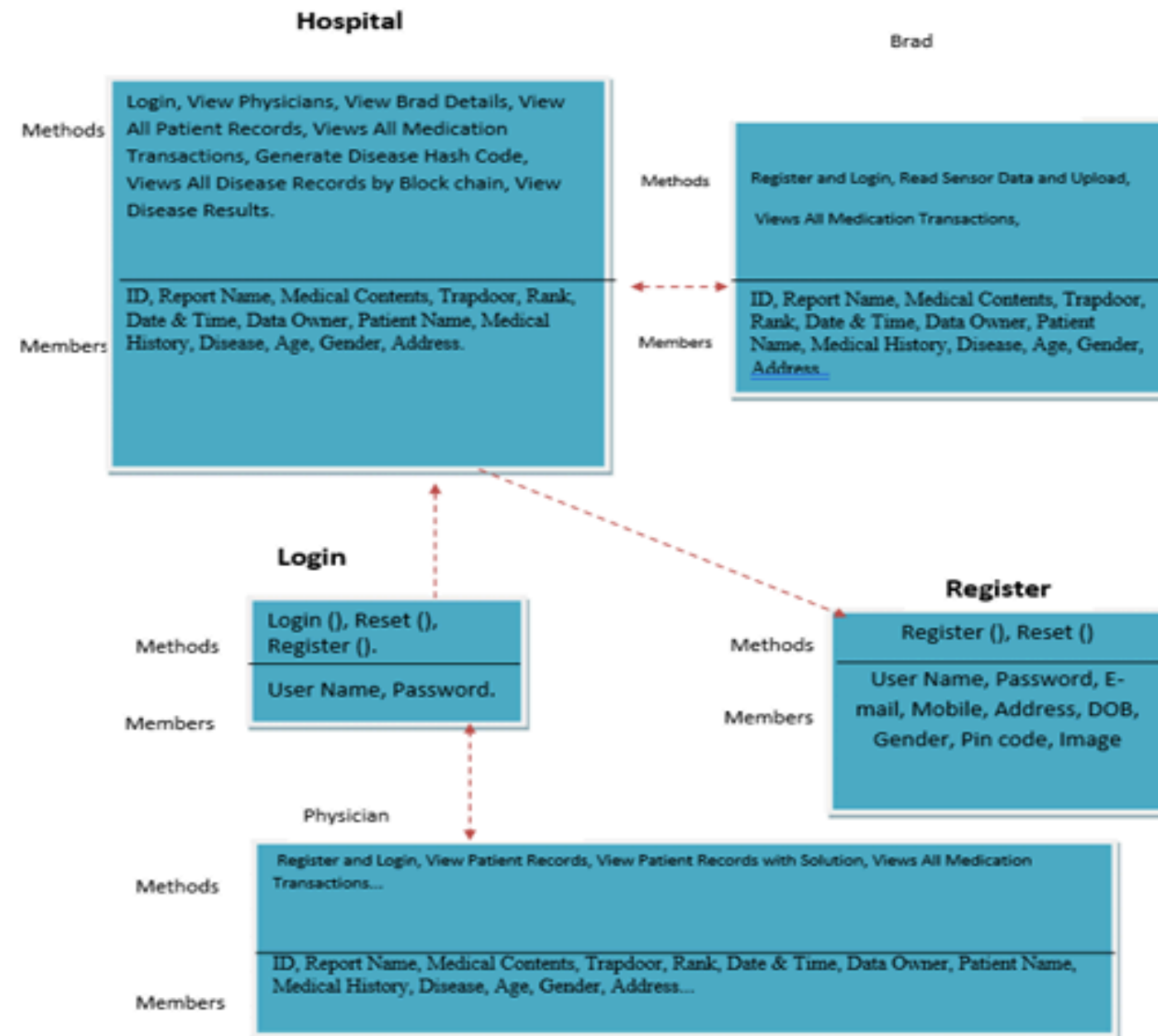
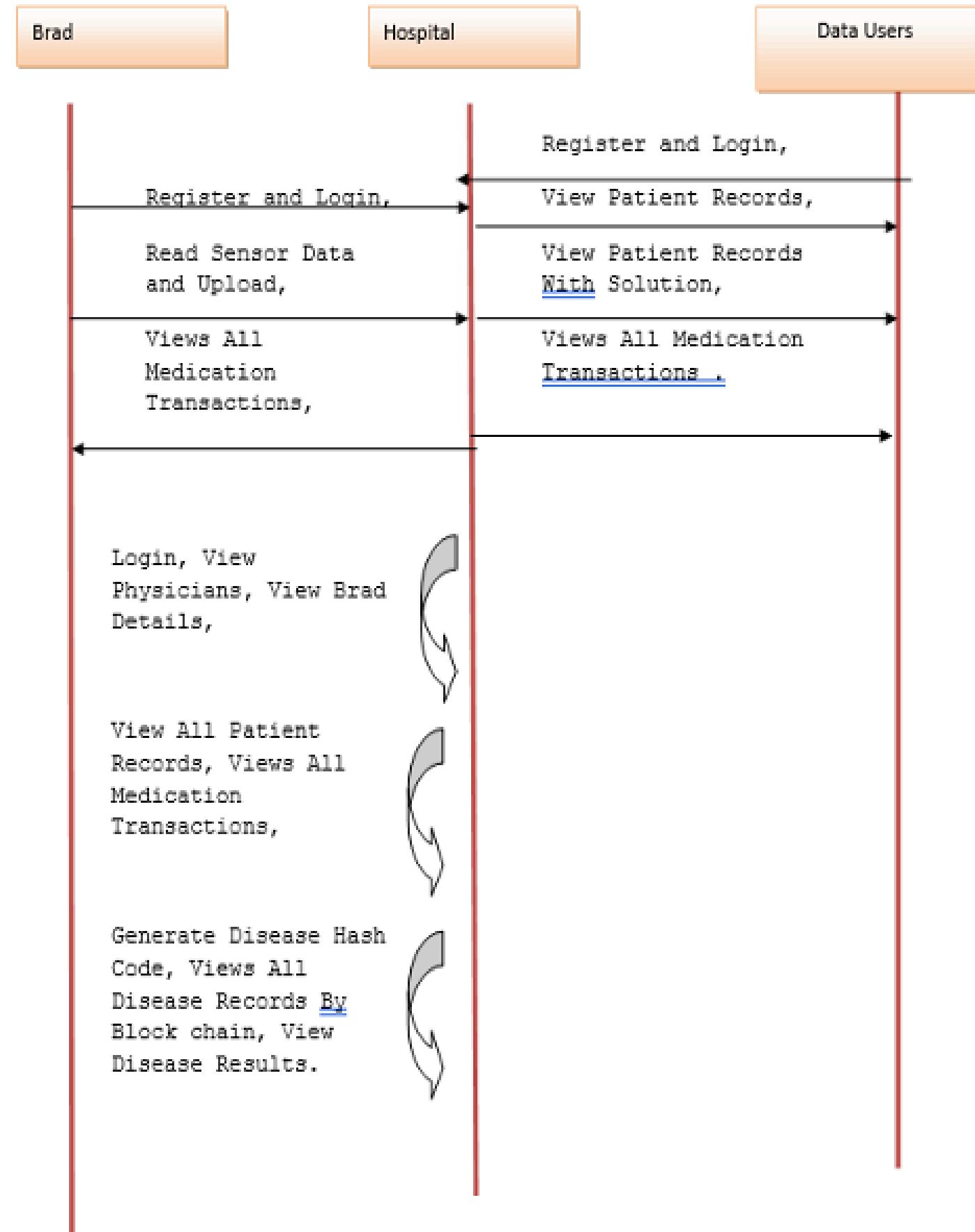


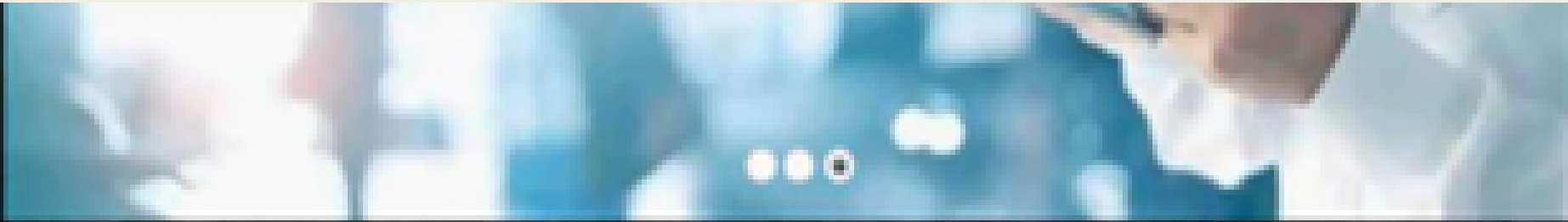
Figure 1 Fig: 4.3.1 USE CASE DIAGRAM

➤ **Class Diagram:**





**OUTPUT SCREENS**



# WELCOME TO Hospital LOGIN



Name (required)

Password (required)

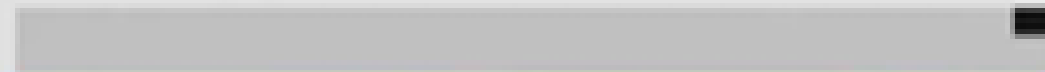


## Home Menu

- Home
- Physician
- Hospital
- Staff



## WELCOME TO Hospital



## Hospital Menu

Home

**New Patients**

View Staff Details

View All Patient Records

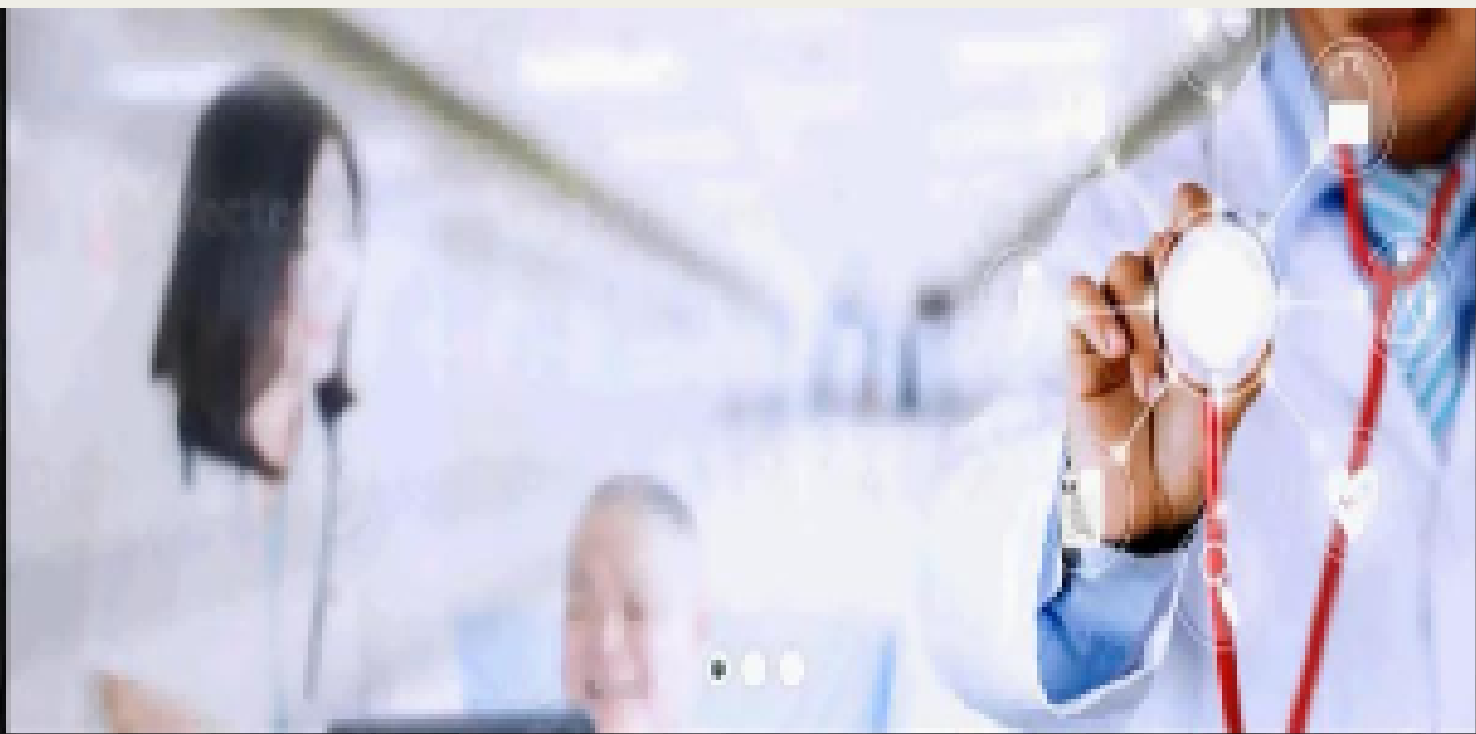
View All Medication Transactions

Generate Disease Risk Code

View All Disease Records By  
Disease

View Disease Results

Logout



**View All Physicians !!!**


Physician Image	Physician Name	DOB	E-Mail	Mobile	Location
	Pakshi	25/05/1987	Pakshi123@gmail.com	9999999999	Bangalore

[Back](#)

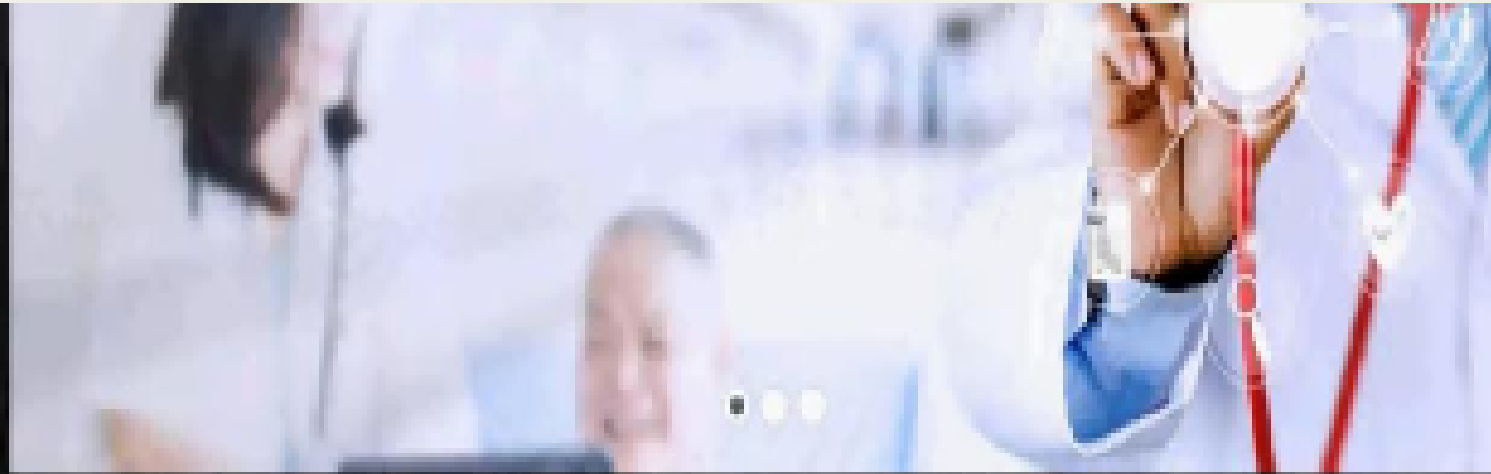




View All Brads !!!

Brad Image	Brad Name	DOB	E-Mail	Mobile	Location
	Goel	05/05/1987	Goel IC3@gmail.com	9915588376	Bangalore

Goel



View Patient Report :

Menu

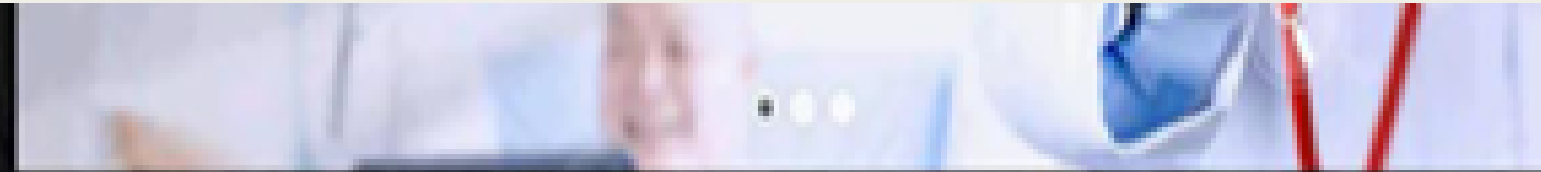
None

ID	Report Name	Exam Name	View
1	Sonography.txt	Colon	View Report...
2	Syn.txt	Colon	View Report...

[Back](#)

Medical Contents :	
Tripdoor :	-7015e380eab43a5e550c417aa298:3ac7b13d7
Rank :	0
Date & Time	WTCWTAU4A4yMAgID640M20Mx
Date Owner	Global
Patient Name	U22YQ==
Medical History	80Vhang7G8u2uy779GzW9a0FAZC80u2u00uZp4=
Disease	RQ4LZ3M
Age	W0M=
Gender	TWFr20==
Address	cgf=gg0+4adENy3Nde1p00k20FKUj9Q==





## Views All Disease Records By Blockchain!!!

Disease Block Chain---> MTH  
Disease Mark Code --->134a881715a2abeb196e1766eadaa28bd33498a6

ID	Report Name	Disea Name	View
1	Somasegar.txt	Covid	<a href="#">View More...</a>

Disease Block Chain---> Dengue  
Disease Mark Code --->3764e684c8342a9f29e08c2ad736c8719a12ad82

ID	Report Name	Disea Name	View
1	Disea.txt	Covid	<a href="#">View More...</a>



Physician

Hospital

Ref

User Name (required)

Password (required)

Email Address (required)

Mobile Number (required)

Your Address

Date of Birth (required)

Select Gender (required)

Enter Pincode (required)

# Read Sensor Data and Upload Patient Report !!!

## Menu

Home

Logout

Patient Name

Asaph

Medical History

Heavy Head Ache and Stomach Pain

Disease

Diabetes

Age

Gender

—Select—

Address

Select Report

Choose File

Report Name :

No file chosen

Report Contents

# CONCLUSION

- **HDT System:** Standardizes patient data collection across key healthcare stages.
- **Blockchain Security:** Ensures secure storage and conflict-free access.
- **Protocol Flow:** Defines efficient data utilization for healthcare applications.
- **Future Development:** Lays the foundation for a full human digital twin.

# Thank you!

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**TEAM 11**