SMART INDIA HACKATHON 2024

Problem Statement ID - SIH1620

Problem Statement Title - Queuing models in OPDs/ availability of beds/ admission of patients. A hospital based solution is ideal which can integrated with city wide module.

Theme- Medtech/Biotech/Healthtech

PS Category- Software

Team ID- TM001

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Idea Description

➢ To encounter this problem we are using 3 portals.

PATIENT PORTAL :

- The Patient Portal is secure and personalized online space for patients.
- Allows patients to manage their health details, book appointments and view Live Queue status.

HOSPITAL ADMIN PORTAL :

- The Administrative Portal will be managed by hospitals.
- Allows hospitals to manage patient records, track staff activities, analyze utilization of the resources and many more.

DOCTOR PORTAL :

- The Doctor Portal allows doctors to manage their daily schedules, monitor patient queues, track tokens, and review appointment history.
- It makes doctors' workflows more efficient and helps elevate the standard of the patient care.

➢ Innovation and uniqueness of the solution

1 Online Appointments in OPDs

- Allows patients to book an online appointment in OPDs of the hospitals.
- It tackles the overcrowding issues which minimizes the waiting area congestion.

2 Automated Token Generation

- Generates a token number upon confirm booking of an appointment.

3 Live Queue System

- Patients can track their position in queue and the expected wait time.
- Notifies patients when the queue moves forward.

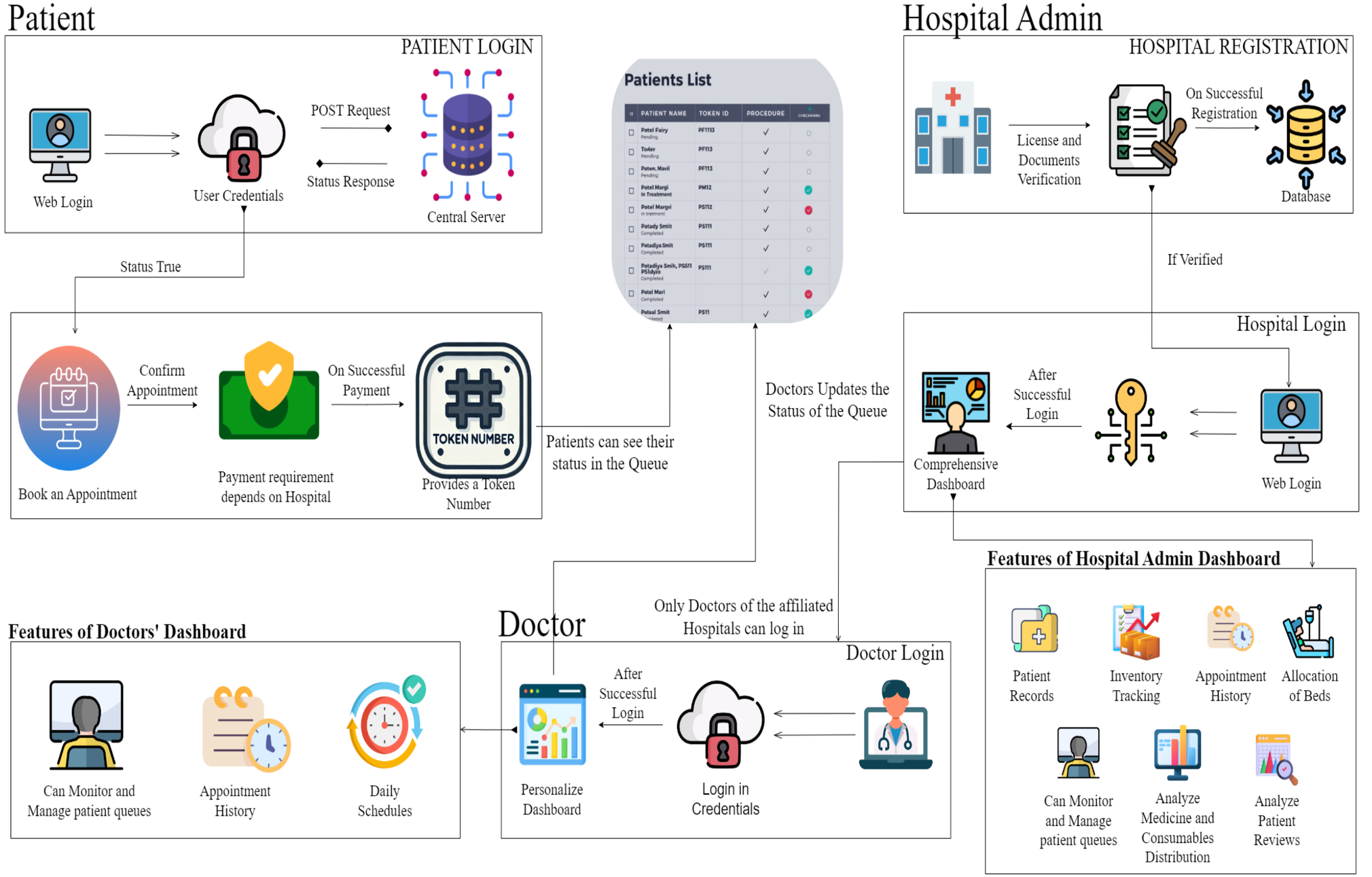
4 City-Wide Integration

- Integrated with city-wide hospital networks.
- Allowing users to access real-time information across multiple hospitals.

Technical Approach

Tech stack

- **Algorithm Development:**
  Express.js & Golang - Core technologies used for developing the Queue Management Algorithm.
- **Encryption and Security:**
  Custom encryption algorithm powered by 8 layer octa 512 bit encryption for secure data transmission and authentication.
- **Front-End Development:**
  HTML,CSS3 & Javascript – Technologies used to create an interactive and responsive GUI.
- **Cloud Services:**
  MongoDB & Redis – NoSQL Database Management System.



Proposed Solution

KEY FEATURES

Enhancing Patient care and Overall Efficiency

1 Appointment Scheduler

- Patients can book appointments online, receive reminders, and avoid forgetting.
- Helps doctors to stay organized and managing schedules efficiently.
- Prevents double bookings, and ensures smoother, more productive days.

2 Send Queue Status Updates

- Patients receives real-time updates on their queue position and estimated wait time.
- Can monitor their status from home, which helps them plan better and arrive right when it's their turn.

3 Beds Utilization Control

- The system updates bed availability in real-time, letting staff quickly assign beds and avoid delays.
- Alerts staff when beds are running low, helping staff prepare for more patients.
- Each department tracks its bed allocation, ensuring efficient use and readiness, especially during peak times.

4 Operational Monitoring Dashboard

- It brings everything together in one view—patient records, bed availability, and other resources.
- Staff can customize their dashboard to highlight what matters most to them and quickly respond to real-time updates.

5 Online Laboratory Management

- Lab reports are shared electronically, so patients and doctors get results faster.
- Notifies patients instantly by email or text, making the process quicker and easier.

6 Multilingual Support

- System supports multiple languages, so patients and staff can use it in their preferred language.
- Improving communication and reducing misunderstandings, making it more accessible for everyone.

Feasibility And Viability

Operational Feasibility

Should the hospital implement the proposed solution to streamline patient admissions and add availability ?

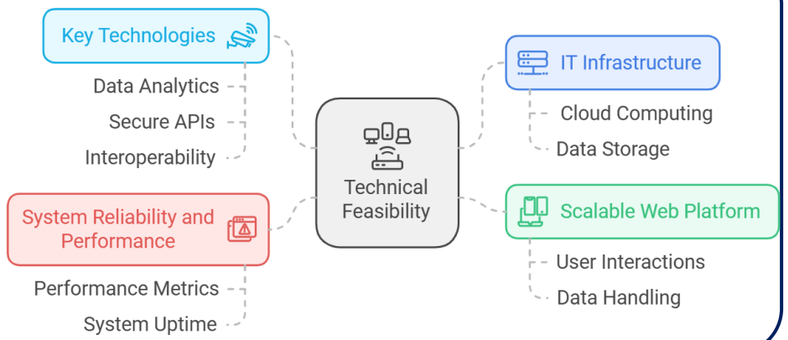
Implement

System for the real time data analytics and queuing /centralized model.

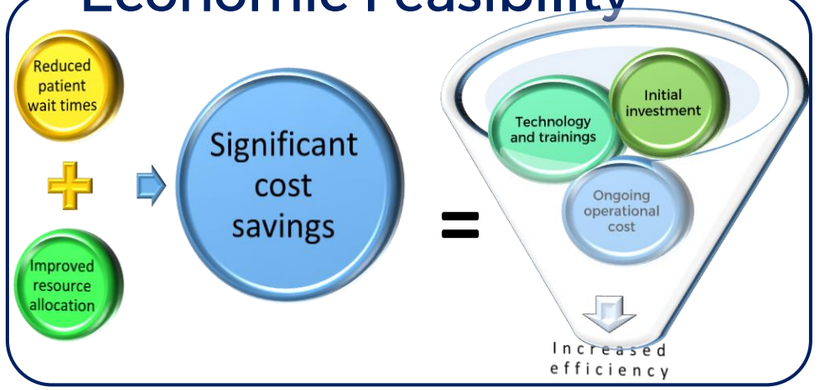
By making changes

Continue with current manual processes

Technical Feasibility



Economic Feasibility



VIABILITY

Transparency: log details of the hospital is transparent.

Market demands: Managing OPDs queues, bed availability and inventory.

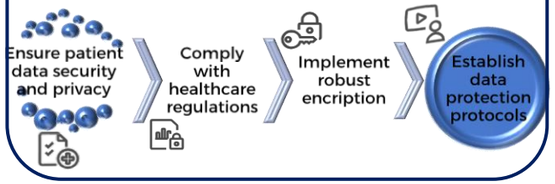
Scalability: Easy implementation in various healthcare systems.

CHALLENGES

Data Security and Privacy

Solution

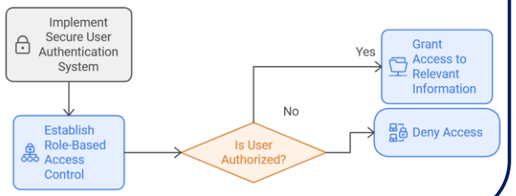
- Implementing strong encryption both in transit and at rest to secure data.
- **SSL/TLS** (Secure Sockets Layer/Transport Layer Security).



User Authentication and Access Control

Solution

- Designing role-based access control (RBAC) to ensure that users only access the information and features relevant to their role.



Handling High Availability and Disaster Recovery

Solution

- Implement redundancy and failover mechanisms for continuous uptime.
- Develop a disaster recovery plan with regular backups and rapid restoration.
- Regularly test disaster recovery procedures to maintain preparedness.

Impact And Benefits

IMPACTS

Patients

- ✓ Easier Appointment Booking
- ✓ Reduced Wait Times
- ✓ Convenient Access to Records
- ✓ Transparency on Availability

Healthcare Providers

- ✓ Streamlined Operations
- ✓ Better Resource Management
- ✓ Improved Patient Flow

Administratives

- ✓ Data-Driven Decisions
- ✓ Cost Savings
- ✓ Enhanced Satisfaction

BENEFITS

ECONOMIC

- ✓ Operational Cost Savings
- ✓ Reduced Resource Needs
- ✓ Patient Cost Savings
- ✓ Productivity Gains
- ✓ Scalable System

SOCIAL

- ✓ Increased Healthcare Access
- ✓ Improved Patient Experience
- ✓ Safer Hospital Environment
- ✓ Inclusive Services

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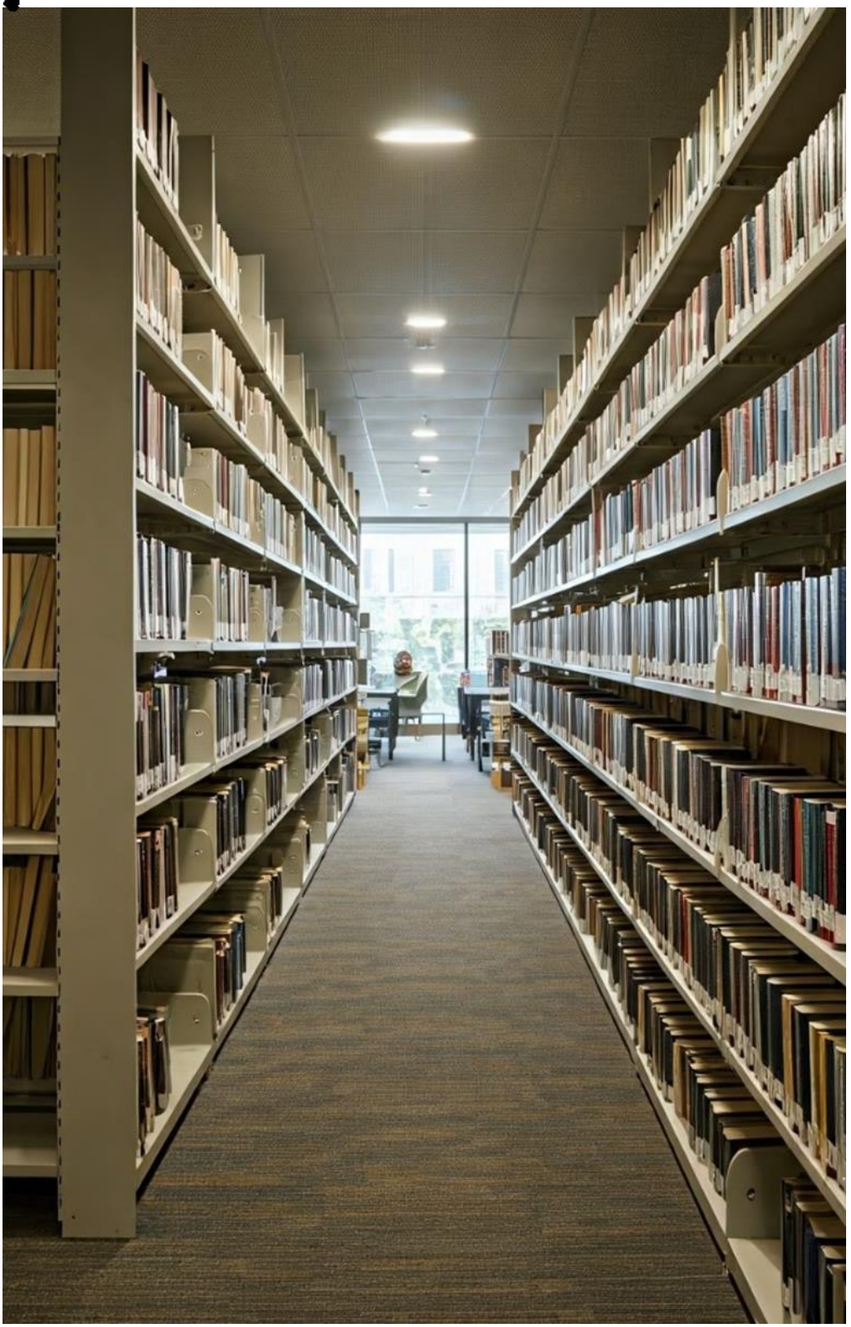

❖ References And Research

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Figma Link