



INTERNATIONAL HEALTHCARE HACKATHON



Nursing Informatics

Problem Statement

TRACKING PATIENT VITAL SIGN IS TIME CONSUMING.

Team Members

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Technical Approach

We are leveraging a **Microservices-Based** approach with three specialized servers to ensure real-time monitoring, predictive AI-driven insights, and personalized patient care.

Server 1 : Real-Time Data Collection & Redis Caching

Purpose: Ensures instant transmission of patient vitals from medical machines to the system.

How it Works:

- Connected to vital monitoring devices (Heart Rate Monitors, BP Machines, Pulse Oximeters, etc.).
- Eliminates latency issues and ensures doctors and nurses receive updates instantly.

Server 2 : Patient & Staff Data Management

Purpose: Stores and manages patient, doctor, and nurse records securely.

How it Works:

- Centralized database containing patient history, doctor schedules, treatment plans, and prescriptions.
- APIs enable seamless integration with Hospital Management Systems (**HMS**) and Electronic Health Records (**EHRs**).

Technical Approach - Continued

Server 3 : Generative AI for Predictive Healthcare

Purpose : Uses existing LLMs to generate personalized health insights.

: Key Functionalities :



Generates Extreme Vital Thresholds for Each Patient

AI analyzes patient history, age, medical conditions, and trends to create customized vital thresholds. Sends early warnings when values approach critical levels, reducing emergency cases.



Generates Personalized Diet Plans

Based on real-time vitals, dietary preferences, and medical history, the AI suggests custom diet plans.

Example: A diabetic patient gets a low-carb, high-fiber meal plan, whereas a cardiac patient gets a low-sodium diet.

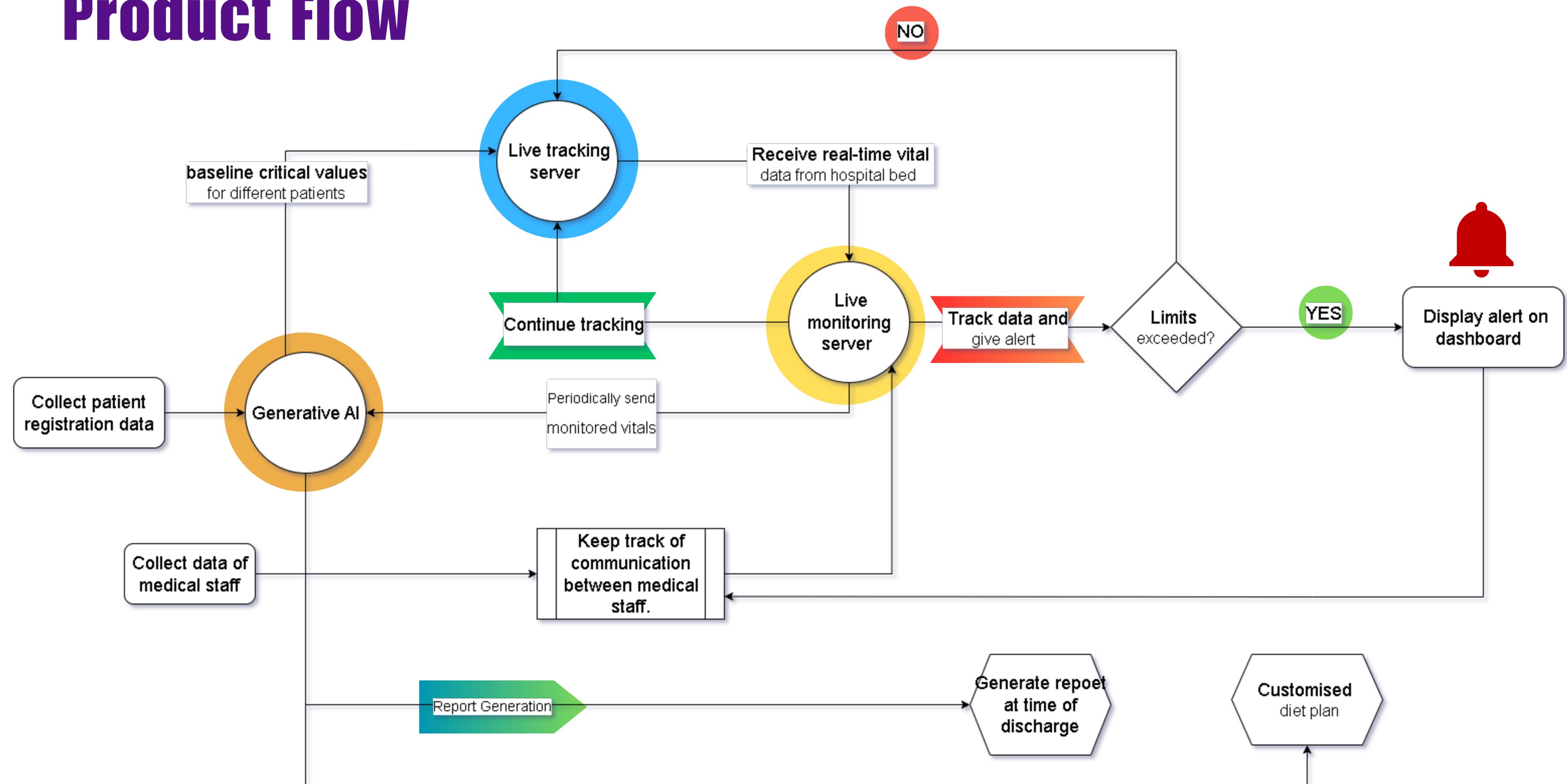


Generates Automated Medical Reports

Compiles vital trends, medication effectiveness, and treatment progress into easy-to-read automated reports.

Enables doctors to track patient recovery and adjust treatments accordingly

Product Flow



Feasibility & Viability

Technical Feasibility

- Proven Tech Stack: Uses **Redis**, **Node.js**, **Python**, **LLMs** models, ensuring high reliability.
- Scalability: The **Microservices** architecture allows easy expansion without disrupting core functionality.
- Cloud-Based Deployment: Can be hosted on **AWS**, **GCP**, or **Azure**, providing high availability.

Economic Feasibility

- Cost Savings: Reduces hospital labor costs by automating vitals monitoring & reporting.
- Revenue Potential: Hospitals can integrate this as a subscription-based **SaaS** for patient home monitoring.
- Long-Term **ROI**: Early detection of critical conditions reduces **ICU** admissions and emergency costs.

Market Viability

- Growing Demand: Healthcare AI market is expected to reach **\$208 billion** by 2030 .
- Regulatory Compliance: Designed to meet **HIPAA** & **GDPR** standards for patient data protection.
- Competitive Edge: Unlike traditional monitoring systems, our **AI-powered** approach offers predictive & preventive healthcare.

Impact & Benefits

Impact on Healthcare System

- Improved Patient Outcomes & Reduced Mortality Rates
 - Early Detection of Critical Changes – AI-generated custom **vital thresholds** detect risks before they become life-threatening.
 - Personalized Treatment Plans – AI-driven insights optimize medications, diets, and recovery plans.
- Result:** Reduced ICU admissions, faster recoveries, and better patient health!

Reduced Burden on Healthcare Staff

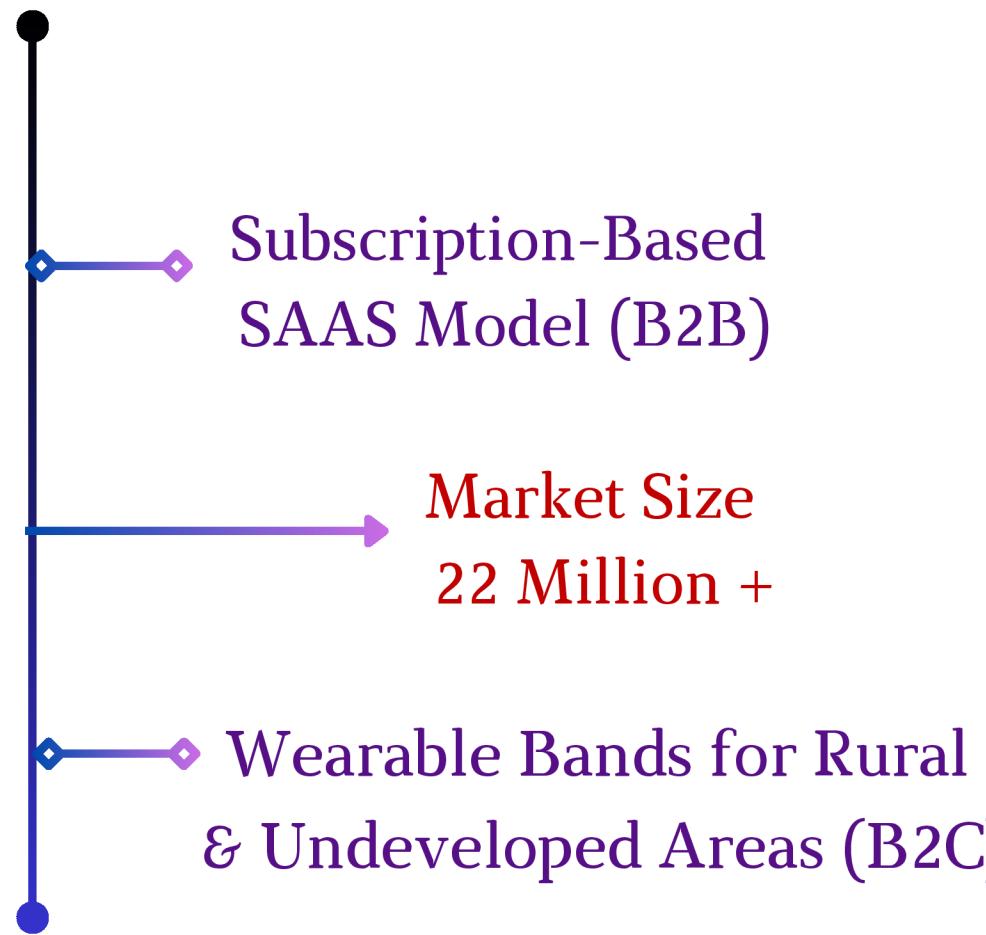
- Minimizes Manual Monitoring Effort – Nurses no longer need to track vitals manually every hour.
 - GenAI-Powered Decision Support – Doctors receive automated medical reports & treatment recommendations.
 - Efficient Patient Management – Automated system allows hospitals to handle more patients without additional staff.
- Result:** Increased hospital efficiency & reduced burnout for healthcare workers!

Expansion to Remote & Rural Healthcare

- Telemedicine Integration – Enables doctors to monitor patients remotely, reducing hospital visits.
 - Access to Quality Healthcare in Remote Areas – Even rural hospitals can use **AI** insights for better patient management.
 - IoT & Cloud-Based Monitoring for Home Patients – Chronically ill or elderly patients can be monitored from home.
- Result:** Bridging the gap in rural healthcare & enabling **24/7** home monitoring!

Business Model

REVENUE STREAMS



Scalability & Growth Potential

- Directly offered to **hospitals, clinics, and old age homes**.
- **Target Audience:** Healthcare facilities where patients require continuous monitoring.
- **Pricing:** ₹100 per patient per day.
- **Revenue Estimation:**
 - If a city has **50 hospitals** with **100 beds** each, potential revenue = ₹5 lakh per day.
 - Scales up significantly across multiple cities and states.
- AI-powered wearable devices sold to **doctors, clinics, and individuals**.
- **Target Audience:** Rural healthcare providers and underserved populations.
- **Objective:** Enable remote monitoring and telemedicine support.
- **Pricing Strategy:** Competitive and affordable for wider adoption.

- **High Market Demand** – Rising need for continuous patient monitoring in hospitals & elderly care.
- **Recurring Revenue Model** – Subscription ensures long-term financial stability.
- **Affordable & Accessible** – Rural expansion ensures inclusion of underserved populations.
- **Global Expansion Possibilities** – Potential for international adoption in both urban and rural healthcare

Resources & References

◆ Technological Stack :

Microservices Architecture – Ensures scalability and modular development.

Real-Time Data Processing – Redis-based data collection for instant updates.

Generative AI & ML Models – Custom AI to generate risk assessments, diet plans, and medical reports.

Wearable IoT Devices – Smart sensors for real-time vitals tracking.

◆ Healthcare Industry Insights :

World Health Organization (WHO) reports on remote patient monitoring & telemedicine.

Studies on AI applications in healthcare diagnostics and risk prediction.

Market research reports on SaaS in the healthcare industry and wearable medical devices.

◆ Regulatory & Compliance References :

HIPAA (Health Insurance Portability and Accountability Act) – Ensures patient data privacy.

FDA & CE Certifications – Compliance for wearable medical devices.

National Digital Health Mission (NDHM) Guidelines – India's policy on digital healthcare records