AI for Bharat Hackathon

Powered by aws

Team Name : LeanX365

Team Leader Name : Nanda kumar

Team Member's Name : Aravindan & Deiveegam

Problem Statement : AI-Enabled Decentralized Care Orchestration for India

India's healthcare system is overburdened because nearly 70% of hospital visits are for conditions that could be managed locally, due to the lack of intelligent, coordinated, and India-specific care routing.

Brief about the Idea:

Problem Statement:

India faces a critical healthcare crisis where 70% of patients visit hospitals for issues that could be handled locally, creating bottlenecks and delays.

Solution: Our AI-Enabled Decentralized Care Orchestration System addresses this by:

- Intelligently routing patients to appropriate care levels
- Using AI assistance with mandatory human oversight
- Coordinating care across entire healthcare networks
- Optimizing for India's unique challenges (multilingual, low-bandwidth, cost-effective)

The system reduces hospital overload by 30% while improving care access and continuity across India's diverse healthcare landscape.

How Different from Existing Ideas:

- Hybrid AI-Human approach vs. fully automated or manual systems
- Network-wide orchestration vs. single hospital focus
- Serverless AWS architecture vs. expensive infrastructure
- India-specific design vs. generic solutions
- Cost-effective ($45-75/month) vs. expensive enterprise systems

How It Solves the Problem:

- Intelligent triage reduces inappropriate hospital visits by 30%
- Human oversight ensures medical safety and accountability
- Network coordination improves resource utilization
- Cultural adaptation increases adoption and effectiveness

USP (Unique Selling Proposition):

- Human-Supervised AI: AI assists, humans decide
- India-First Design: Multilingual, low-bandwidth, culturally sensitive
- Cost-Effective Serverless: Enterprise features at startup costs

List of key features offered by the solution

🩺 **1. Smart Triage & Care Routing**
- Rule-based clinical triage (Emergency → Self-Care)
- AI invoked **only when rules are insufficient** (max 1 AI call per case)
- Routes patients to the *right care level*, not default hospitals

👷 **2. Human-Supervised Responsible AI**
- Mandatory human approval for all AI recommendations
- Supervisor judgment is always final (AI assists, humans decide)
- Complete audit trail for safety, trust, and accountability

🔗 **3. End-to-End Care Continuity**
- Single Care Episode ID for the full patient journey
- Cross-provider history, referrals, and outcomes tracked
- Seamless handoffs with no repeated data entry

🏥 **4. Network-Wide Provider Orchestration**
- Real-time provider availability and capacity visibility
- Intelligent ranking by distance, cost, and patient preferences
- Automated referrals, escalations, and follow-ups
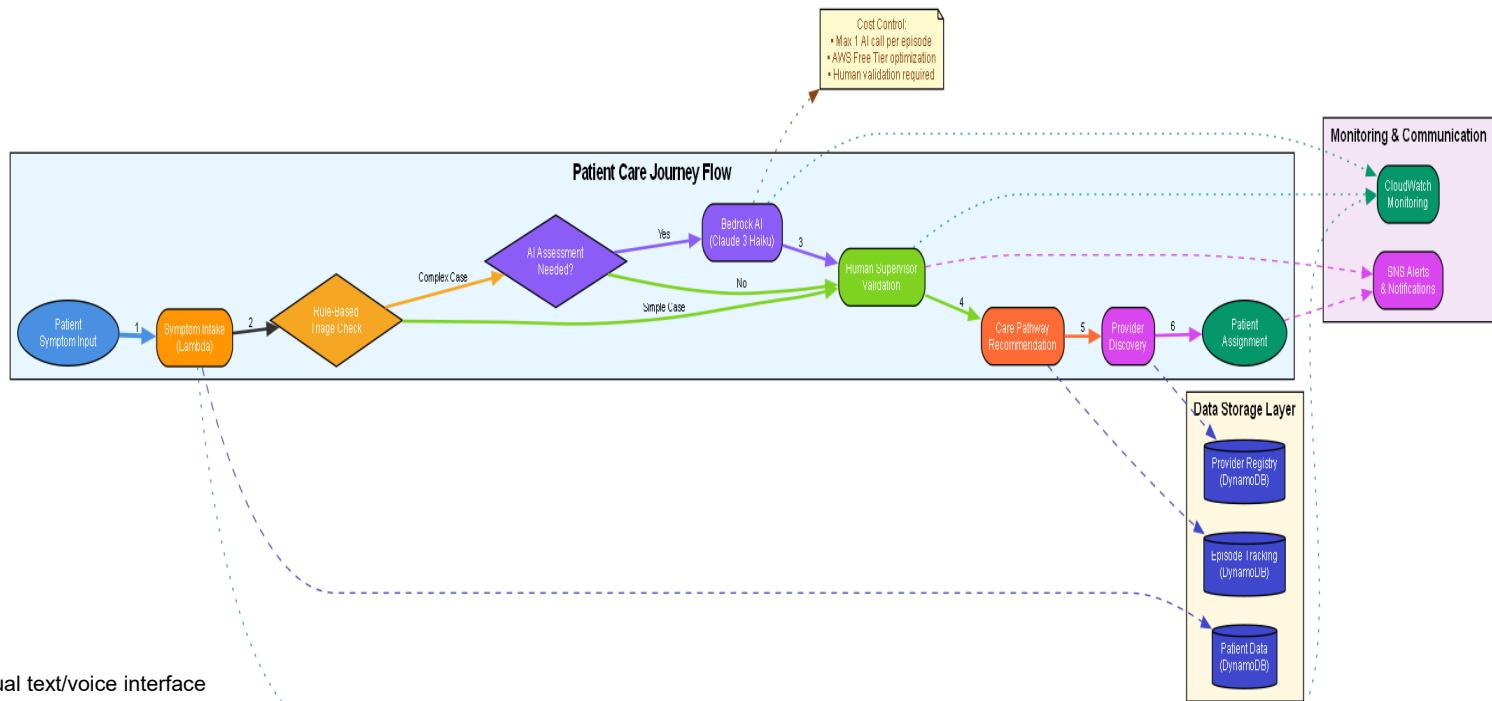
IN **5. India-First Patient Experience**
- Multilingual support (Hindi, English, regional-ready)
- Voice input and low-bandwidth, offline-capable PWA
- Cultural preferences and rural connectivity built-in

💰 **6. Scalable & Cost-Efficient Architecture**
- Fully serverless AWS architecture (pay-per-use, no lock-in)
- Target: **30% reduction in unnecessary hospital visits**
- Affordable for clinics, states, and large-scale public deployment
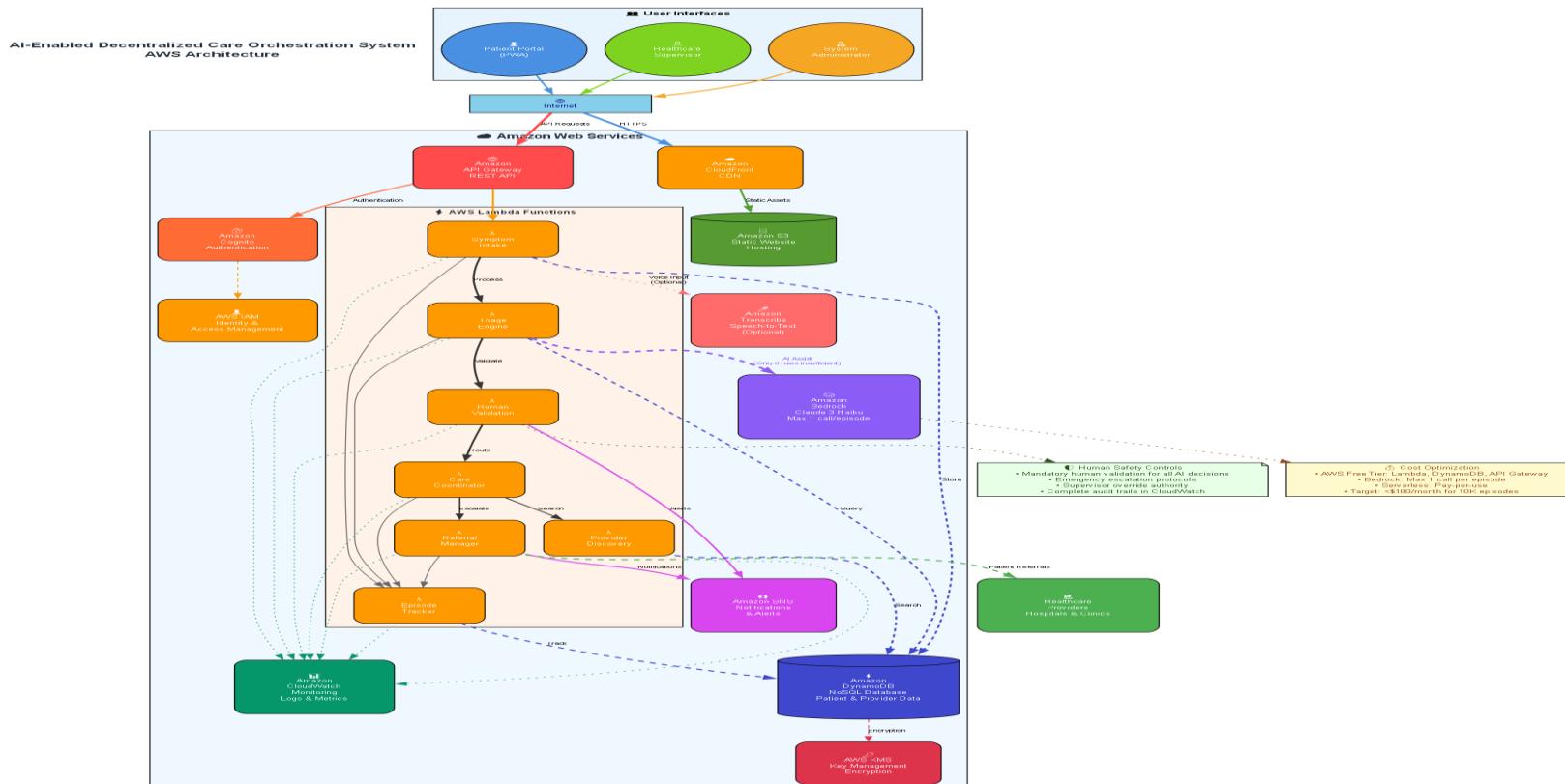
Process flow diagram or Use-case diagram

6-Step Patient Care Journey:

1) Symptom Input - Multilingual text/voice interface
2) Rule-Based Triage - Clinical protocols assess urgency
3) AI Assessment - Only when rules insufficient (max 1 call)
4) Human Validation - Mandatory supervisor approval
5) Care Routing - Intelligent provider matching & guidance
6) Episode Tracking - Complete care continuity & outcomes

Architecture diagram of the proposed solution:

Technologies to be used in the solution:

Category	Technology	Purpose
Frontend	Progressive Web App (PWA)	Cross-platform patient interface
	React/TypeScript	Modern, responsive UI framework
API & Auth	Amazon API Gateway	RESTful API management
	Amazon Cognito	User authentication & authorization
Compute	AWS Lambda (7 services)	Serverless microservices
	Node.js/TypeScript	Runtime environment
Data Storage	Amazon DynamoDB	NoSQL database for patient/provider data
	Amazon S3	Static asset hosting
AI/ML	Amazon Bedrock (Claude 3 Haiku)	AI-assisted triage (limited usage)
	Amazon Transcribe	Voice-to-text conversion

Category	Technology	Purpose
Communication	Amazon SNS	Critical notifications & alerts
	WebSocket API	Real-time updates
Monitoring	Amazon CloudWatch	System monitoring & logging
	AWS X-Ray	Distributed tracing
Security	AWS KMS	Data encryption
	AWS IAM	Access control & permissions
Deployment	AWS CDK/CloudFormation	Infrastructure as Code
	GitHub Actions	CI/CD pipeline

Estimated implementation cost (MVP):

AWS Service	Tier	Monthly Cost	Usage Scenario
AWS Lambda	Free Tier	$0	7 microservices, 1M requests
Amazon DynamoDB	Free Tier	$0	25GB storage, 25 RCU/WCU
API Gateway	Free Tier	$0	1M API calls
S3 + CloudFront	Free Tier	$0	PWA hosting & CDN
Amazon Cognito	Free Tier	$0	50,000 MAU
CloudWatch	Free Tier	$0	Basic monitoring
Amazon Bedrock	Pay-per-use	$30-50	Limited AI calls (1 per episode)
Amazon SNS	Standard	$5-10	Critical notifications
Amazon Transcribe	Optional	$10-15	Voice input processing
	TOTAL	$45-75	10,000 care episodes/month

Estimated implementation cost (Production):

Monthly Users	Estimated Cost
10K	$70
100K	$300–450
1M	$2,500–4,000
10M	$18K–30K

Still far cheaper than:
- Traditional SaaS
- On-prem healthcare systems
- Any Indian hospital ERP
- Pay-per-use model scales with adoption
- No upfront infrastructure investment required

AWS AI for Bharat - Healthcare Track Alignment

Addressing India's Healthcare Challenges:
- Reduces 70% inappropriate hospital visits through intelligent routing
- Multilingual support for diverse Indian population
- Low-bandwidth design for rural connectivity challenges
- Cost-effective solution accessible to all economic segments

Responsible AI Innovation:
- Human-supervised AI ensures medical safety and accountability
- Limited AI usage (1 call per episode) maintains cost control
- Transparent decision-making with complete audit trails
- Builds trust through human oversight at every critical decision

Measurable Impact Potential:
- 30% reduction in hospital overload within 6 months
- 50% faster time to appropriate care for patients
- 40% reduction in patient travel costs and distance
- Scalable to serve millions across India's healthcare network

Technical Excellence:
- Production-ready AWS serverless architecture
- 23 formal correctness properties with property-based testing
- Comprehensive security and compliance framework
- Ready for immediate pilot deployment and scaling
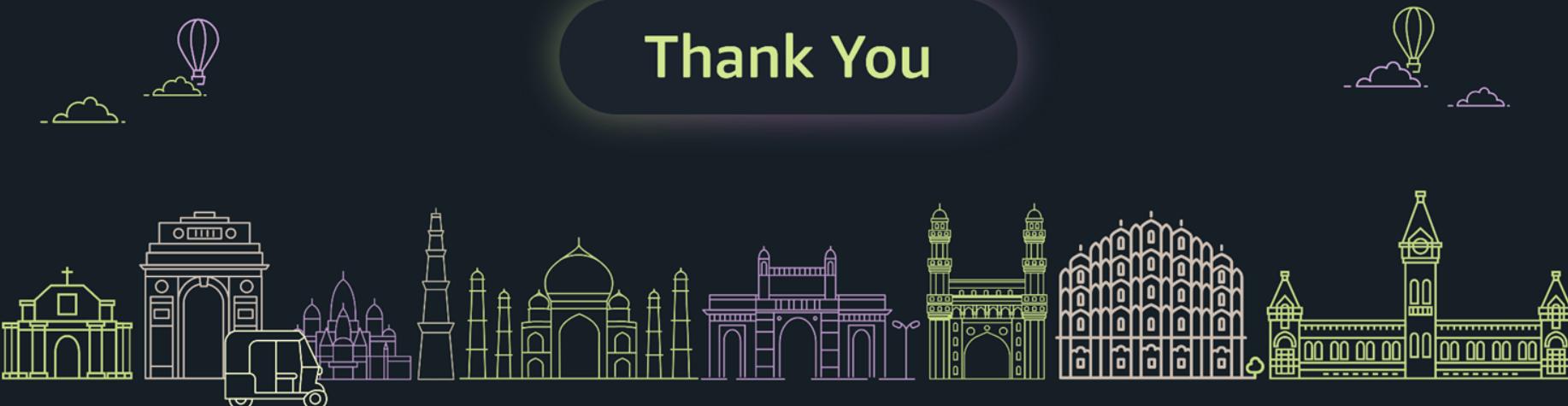
Screens

Patient Portal (PWA)

- Multilingual symptom input (Hindi/English)
- Voice-to-text capability for low-literacy users
- Offline-capable for poor connectivity areas
- Simple, intuitive interface optimized for mobile

Healthcare Supervisor Dashboard

- Real-time validation queue with patient context
- AI recommendation review and override controls
- Emergency alert system with escalation protocols
- Complete audit trail and decision tracking

Provider Network Interface

- Real-time capacity and availability updates
- Patient referral acceptance and management
- Care episode context and history access
- Quality metrics and performance analytics

System Administrator Console

- Network-wide monitoring and health metrics
- Provider onboarding and credential management
- System configuration and rule customization
- Cost tracking and optimization insights