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- **Problem Statement ID :** SIH25001
- **Problem Statement Title :** Smart Community Health Monitoring and Early Warning System for Water-Borne Diseases in Rural Northeast India
- **Theme :** MedTech / BioTech / HealthTech
- **PS Category :** Software
- **Team ID :** 5CF64FE4
- **Team Name :** Code with Comali

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PROPOSED SOLUTION

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Idea / Solution:

Data Collect: Health data and water samples from remote areas.

Store: Secure, centralized system for all data.

Upload: Instant mobile app data entry for authorized users.

Analyze: AI assesses health risk levels and disease spread.

Alert: Timely warnings guide quick response and support.

How it address the problem:

1. Timely Outbreak Detection
2. Resource Optimization
3. Enhanced Surveillance
4. Secure and Tiered Access

Uniqueness:

- Unifies **AI forecasting, IoT monitoring, and social data in one system.**
- Uses a **simple app** for real-time local data and alerts.
- **Involves community** health workers for direct insights.
- Offers instant risk ratings for **fast action**.
- Fully **integrates all features**; unlike others, it’s a complete solution.
- Shares instant, localized disease **prevention and hygiene tips** in community languages.

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TECHNICAL APPROACH

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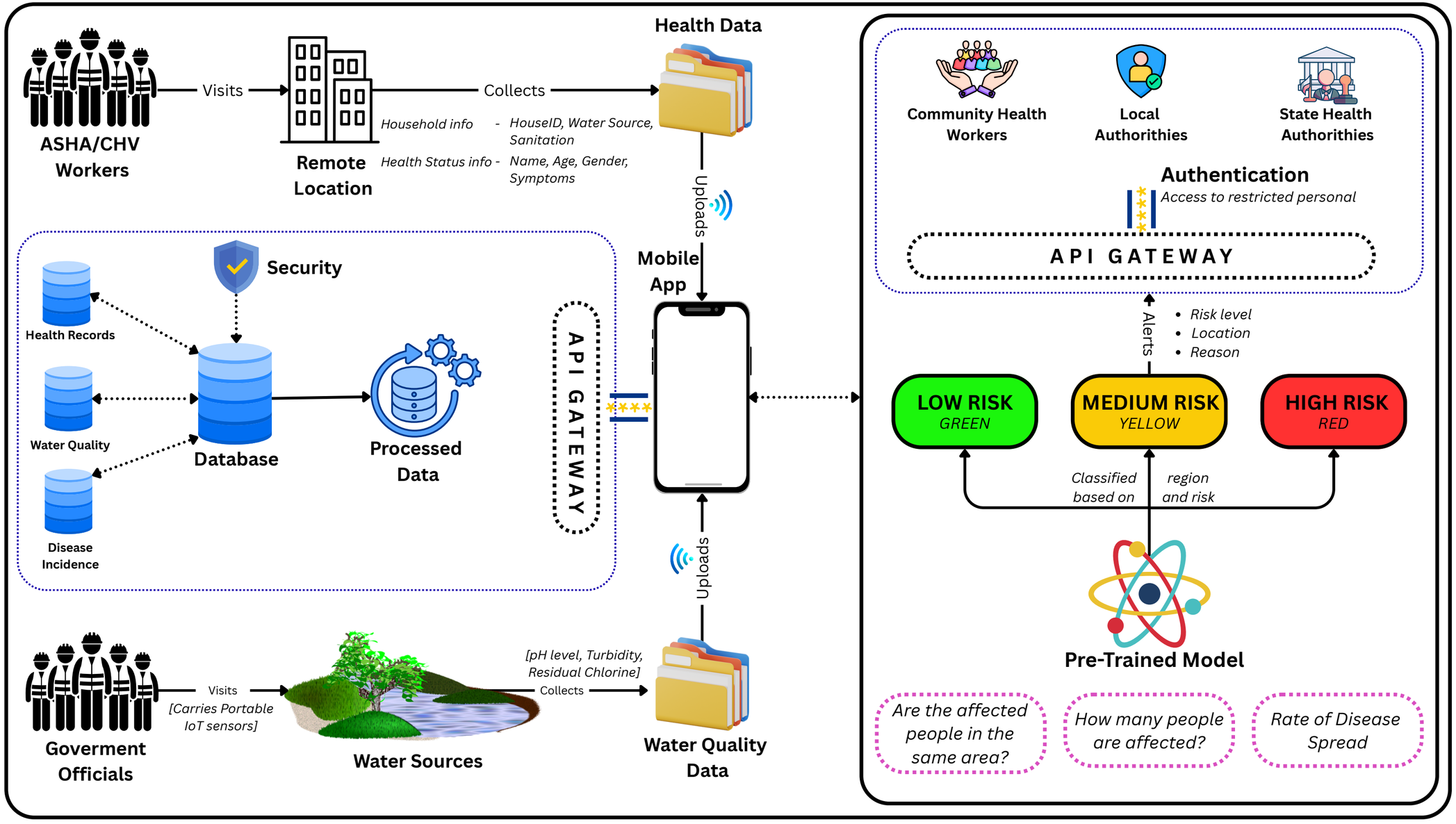
Proposed System Architecture



Technology Stack

IOT

React Native

JavaScript

ExpressJS

NodeJS

Scikit Learn

FireBase

MySQL

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FEASIBILITY AND VIABILITY

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CHALLENGES

Contamination hotspot

Reservoirs risk local contamination since still water prevents dispersal.

Connectivity and network issue

Unstable rural internet may disrupt database storage

Language issue

Lack of multilingual support may hinder ASHA workers limited to native language.

Finance

Stationary IoT devices are costly due to numerous water sources across regions.

STRATEGY

Smart Backtracking

Use health records to trace exposure and deploy portable IoT sensors for targeted detection.

Delayed Upload

Syncs automatically once connectivity is restored

MultiLingual Support

Implement multi-lingual support in the app

Portable IoT Sensor

Cost-effective than installing permanent devices at every source

Cost Structure:

- Development and maintenance of the mobile app
- Data storage & hosting
- IoT Sensor/Hardware Costs
- API & Cloud Services
- User Support & Training

Revenue Streams:

Government funding for the service

Key Partners:

- ASHA workers
- Panchayat / Village Water & Sanitation Committee
- PHED / Jal Jeevan Mission
- District Health Office / NHM
- IoT/AI technical partner
- State Government (Health & Jal Shakti)

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IMPACT AND BENEFITS

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Use Case:

1. Rural Communities :

- Get warnings about unsafe water sources.
- Receive SMS/voice alerts in local language to take preventive measures (boiling water, using purification tablets).
- Reduced medical costs and sick days.

2. Local Healthcare Workers (ASHA / ANMs / Village Clinics)

- Can monitor high-risk areas and prepare for possible cases.
- Know where to stock medicines like ORS, antibiotics, and water purification tablets.
- Can spread targeted health awareness.

3. Government Health Departments (State & District level)

- Identify outbreak hotspots early.
- Allocate resources (doctors, testing kits, ambulances) efficiently.
- Plan long-term sanitation & infrastructure projects (safe water supply, drainage).

Impacts

- Early detection of outbreaks
- Improved community health
- Empowered communities
- Reduced healthcare burden
- Real-time AI + IoT monitoring
- Stronger health infrastructure

Benefits

- Saves lives and reduces disease spread
- Access to clean water and timely treatment
- More aware and resilient population
- Financial relief and higher productivity
- Smarter, data-driven decisions Sustainable and resilient communities

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RESEARCH AND REFERENCES

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- Linking ecosystems to public health based on combination of social and environmental data" (Nature Scientific Reports, April 2024)
- Advancing healthcare through multimodal data fusion" (PMC, October 2024)
- EPIWATCH, an artificial intelligence early-warning system as a model for outbreak surveillance
- The role of Artificial Intelligence in Global Health Surveillance" (WJARR, 2024)
- "The role of community health workers in implementing AI-based health solutions in rural settings" (IJBPRU, 2024)
- "Three digital health innovations helping community health workers deliver quality care" (Last Mile Health, October 2024)