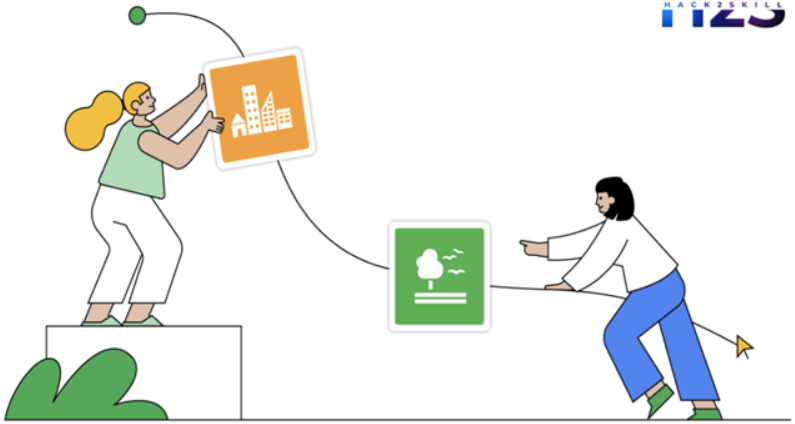
Google Developer Groups | ADB

Powered by H2S HACK2SKILL

Solution Challenge

AI for a better tomorrow



a. **Team name: Solutioneers**
b. **Team leader name: Malaika Khattak**
c. **Problem Statement:** In low-resource settings, early detection of pneumonia is often delayed due to lack of diagnostic tools and continuous monitoring. This results in preventable complications, hospitalizations, and higher mortality rates.

Solution And How It Work:

Collect Vital Signs:

Healthcare workers manually input basic vital signs — temperature, heart rate, oxygen saturation (SpO_2), and respiratory rate — using affordable devices.

Analyze Data with Machine Learning:

The system processes these inputs through a trained ML model (e.g., Random Forest) to predict pneumonia risk levels: Low, Moderate, or High.

Display Real-Time Results:

The risk assessment is instantly shown on an easy-to-use web app interface accessible on any device with a browser.

Support Clinical Decisions:

Health workers use this risk information to decide who needs urgent care or monitoring, enabling faster and more effective intervention.

a. How HealthBridge AI is Different

Uses basic vital signs easily measured with low-cost tools—no expensive equipment needed.

Works with manual input, so no continuous sensors or complex devices required.

Provides AI-powered risk predictions (Low, Medium, High) for quick decision-making.

Accessible via a simple web app—runs on any device with a browser, no installation needed.

Specifically designed for low-resource, remote settings where advanced medical tools aren't available.

Unique Selling Proposition (USP)HealthBridge AI uniquely combines affordable vital sign monitoring with AI-driven pneumonia risk prediction in a simple, browser-based tool — enabling early detection and timely care in low-resource and remote healthcare settings without the need for expensive equipment or specialized training.

Key Features of HealthBridge AI

Basic Vital Sign Input

Manual entry of temperature, heart rate, oxygen saturation (SpO_2), and respiratory rate using affordable devices.

AI-Powered Pneumonia Risk Prediction

Machine learning model classifies patients into Low, Moderate, or High risk for pneumonia based on vital signs.Real-Time Results DisplayInstant risk assessment shown on a clean,

User-Friendly Web Application

No installation or technical skills required; designed for easy use by healthcare workers in low-resource settings.

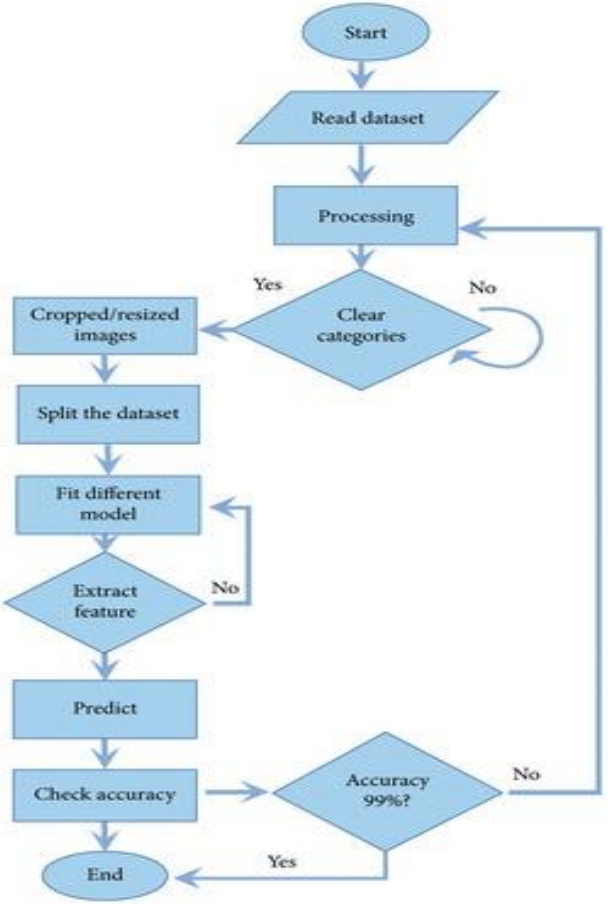
Explainable AI (Optional)

Provides transparent insights into predictions through model interpretability techniques like SHAP.

Low-Cost and Scalable Solution

Designed for deployment in rural clinics, mobile health units, and community health programs.Offline Capable (Optional)Potential for local deployment without continuous internet connectivity to suit remote areas.

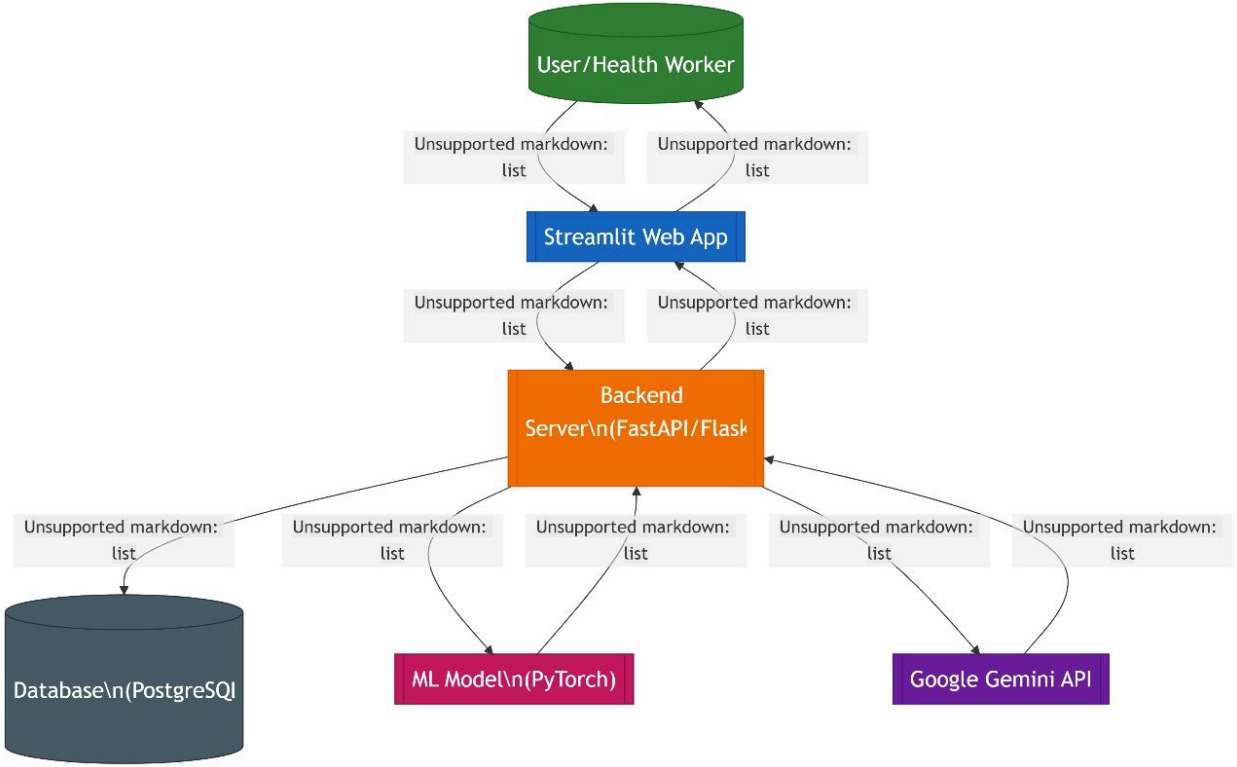
USE-CASE DIAGRAM:



Existing Apps:

Feature	Existing Systems	PneumoBridge AI
Hardware Required	Yes (Pulse oximeters, X-ray, etc.)	No (Manual input only)
Continuous Monitoring	Required	Not required (one-time input OK)
Works Offline	Rare	Possible with local deployment
Explainability	Usually No	Optional SHAP integration
Cost	High	Very Low (open-source + basic tools)
Target Users	Clinicians in hospitals	Frontline health workers, rural clinics

Architecture diagram of the proposed solution



Technologies Used:

Python : Programming language
Pandas / NumPy : Data preprocessing
Scikit-learn : ML model (Random Forest Classifier)
Streamlit : Web-based frontend interface
Google Gemini API : For generating explanations in natural language
SHAP (optional) : Model interpretability

Estimated software and hardware cost:

Item	Description	Cost Estimate
Developer Time (Team Project)	Student/fellowship contribution	$0 (Self-built)
GitHub Hosting (Open-source)	Free GitHub repo	$0
Streamlit Cloud (App Hosting)	Free tier available	$0
Google Gemini API (Limited usage)	Free under **Maker Suite** limits (100s of calls/mo)	$0

Item	Description	Estimated Cost (USD)
Digital Thermometer	Basic clinical thermometer	$5–$10
Finger Pulse Oximeter	Measures SpO_2 and heart rate	$10–$15
Manual Respiratory Rate Entry	Based on observation or stopwatch	$0
Smartphone/Tablet Access	Any basic Android phone/tablet	Existing or $50–$100

Vital Sign Input

Body Temperature (°C)

Enter temperature

Heart Rate (bpm)

Enter heart rate

Oxygen Saturation (SpO_2)

Enter SpO_2 level

Respiratory Rate (breaths/min)

Enter respiratory rate

Submit

AI-Powered Pneumonia Risk Prediction

Risk Level: Moderate

Your vitals indicate a moderate risk of pneumonia.

See Why

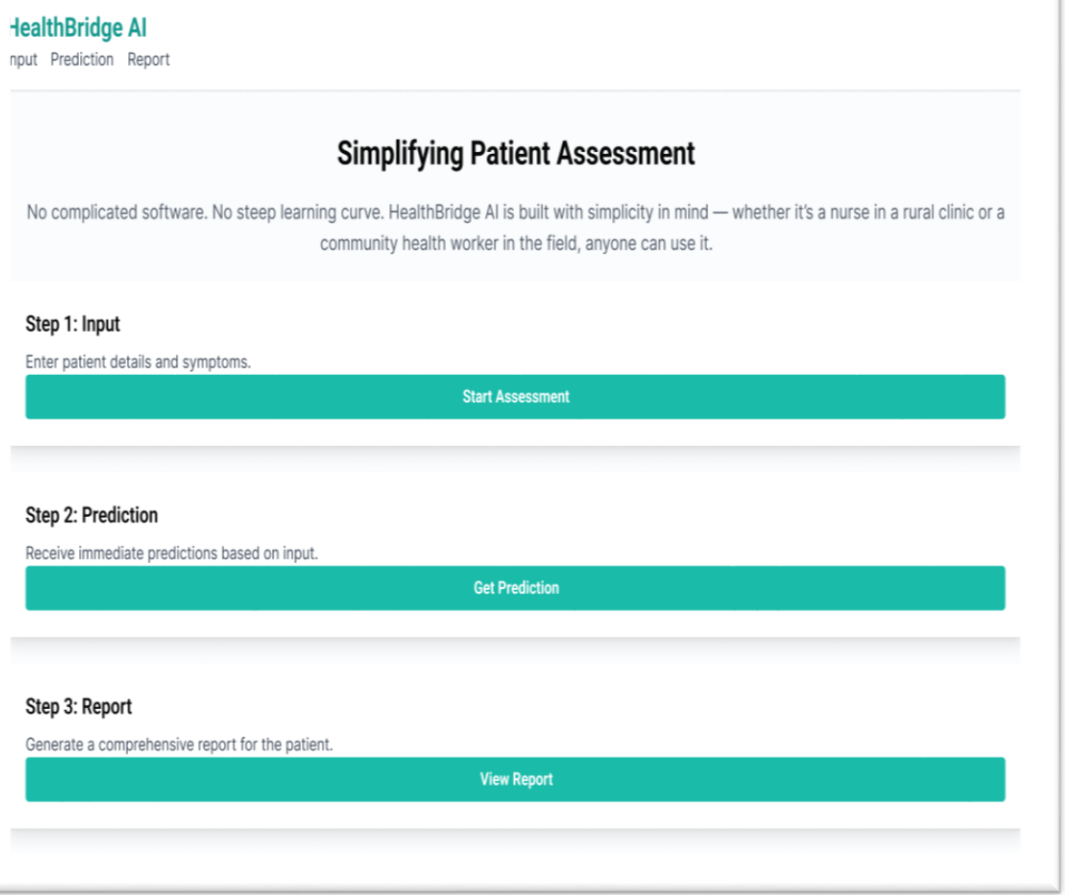
Real-Time Results Display

Risk Level: Low

Your vitals indicate a low risk of pneumonia.

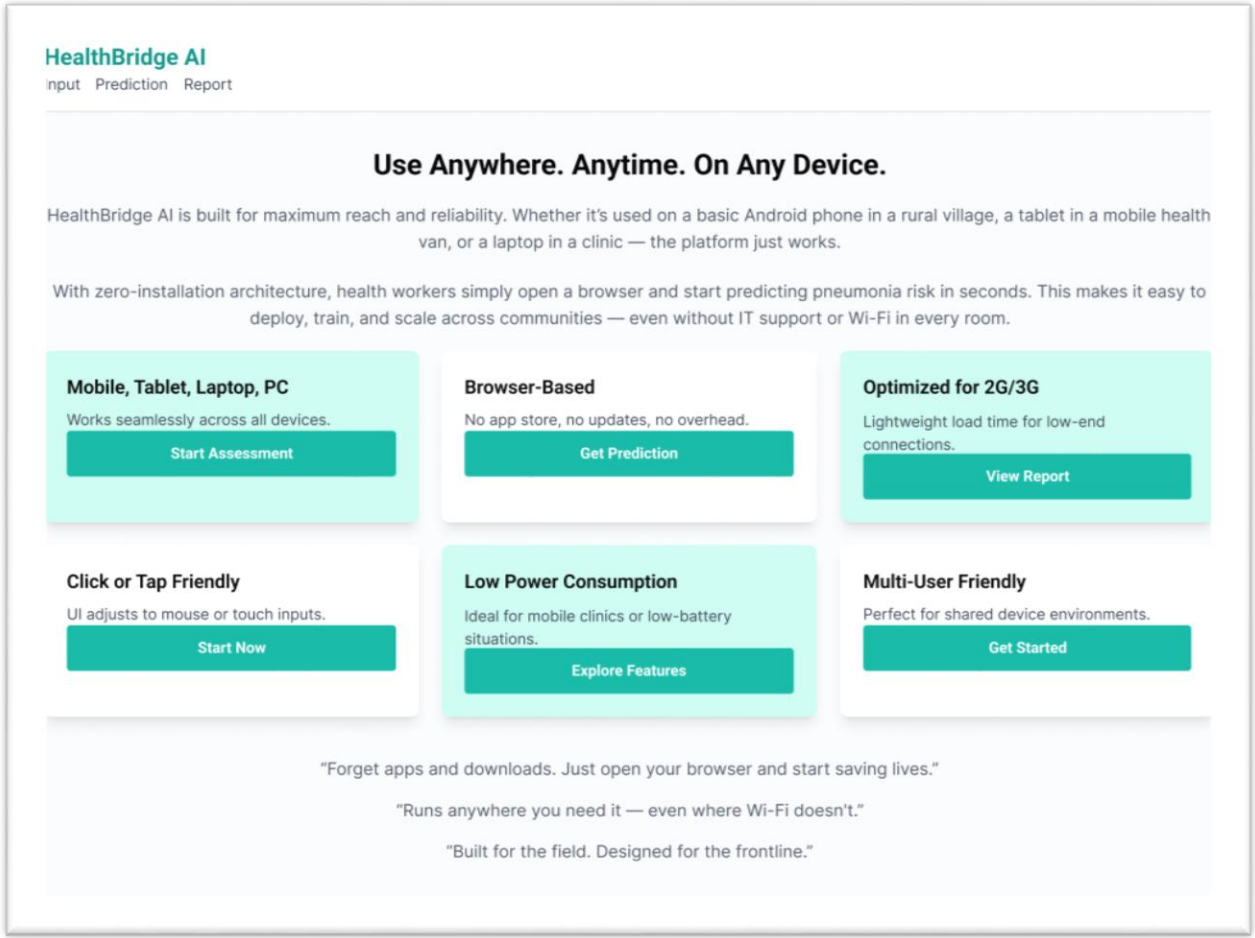
Timestamp: 2023-10-01 14:30
Summary of Inputs: Temperature - 36.5°C, SpO_2 - 98%, Heart Rate - 72 bpm, Respiratory Rate - 16 breaths/min

Download PDF | Start New Assessment



Provide links to your:

1. https://youtu.be/27iv0-1naPw?si=dBpOEJvNDYPAi3bf
2. https://solutioners-8q66upytrgrtmtvaptjp8z.streamlit.app/


HealthBridge AI
Input Prediction Report
Use Anywhere. Anytime. On Any Device.
HealthBridge AI is built for maximum reach and reliability. Whether it's used on a basic Android phone in a rural village, a tablet in a mobile health van, or a laptop in a clinic — the platform just works.
With zero-installation architecture, health workers simply open a browser and start predicting pneumonia risk in seconds. This makes it easy to deploy, train, and scale across communities — even without IT support or Wi-Fi in every room.
Mobile, Tablet, Laptop, PC
Works seamlessly across all devices.
Start Assessment
Browser-Based
No app store, no updates, no overhead.
Get Prediction
Optimized for 2G/3G
Lightweight load time for low-end connections.
View Report
Click or Tap Friendly
UI adjusts to mouse or touch inputs.
Start Now
Low Power Consumption
Ideal for mobile clinics or low-battery situations.
Explore Features
Multi-User Friendly
Perfect for shared device environments.
Get Started
"Forget apps and downloads. Just open your browser and start saving lives."
"Runs anywhere you need it — even where Wi-Fi doesn't."
"Built for the field. Designed for the frontline."

HealthBridge AI

Input Prediction Report Explainability

Understand Every Prediction. Build Trust with Transparency.

HealthBridge AI doesn't just predict — it explains. Every pneumonia risk prediction is backed by a clear visual breakdown of which vital signs influenced the result.

By using SHAP (SHapley Additive exPlanations), the system highlights whether oxygen saturation, temperature, heart rate, or respiratory rate had the most impact.

This fosters confidence in frontline health workers, improves understanding of patient conditions, and ensures that AI decisions aren't just accurate — they're also accountable.

For critical healthcare use, explainability isn't optional — it's essential.

Why This Prediction?

This prediction was mainly influenced by low SpO_2 and elevated breathing rate.

"AI you can trust. See what it sees."

"Understand every heartbeat, every breath, every prediction."

"We believe that why matters as much as what."

Scalable Healthtech for All

From one clinic to an entire region — HealthBridge AI adapts to your needs, not the other way around.

🌍 Rural Clinics

🚑 Mobile Health Vans

👨‍⚕️ Community Health Programs

Cost-Saving Dashboard

Runs on a $100 tablet!

Cost-Saving Badge

- ✓ Deployed in 10+ remote villages
- ✓ $0 extra hardware required
- ✓ Training time: under 30 minutes

> "We deployed HealthBridge AI across 12 rural units in just one week — no technicians, no extra cost. It's a game changer for small clinics."
> **— Dr. Sana Malik, Punjab Rural Health Initiative**

"Healthcare shouldn't be expensive to be smart."

"One solution. Any village. Zero IT headache."

"Designed for communities, not corporations."

"Built for doctors without desks, clinics without wires, and villages without signals."

Powered by

Google Developer Groups | ADB

Solution Challenge

Thank you