

Group Number: T06

- App Name: RayVita

- Team Members:

Ziheng Wang, Dongxu Xia, Di Wu, Renzhe Zhao

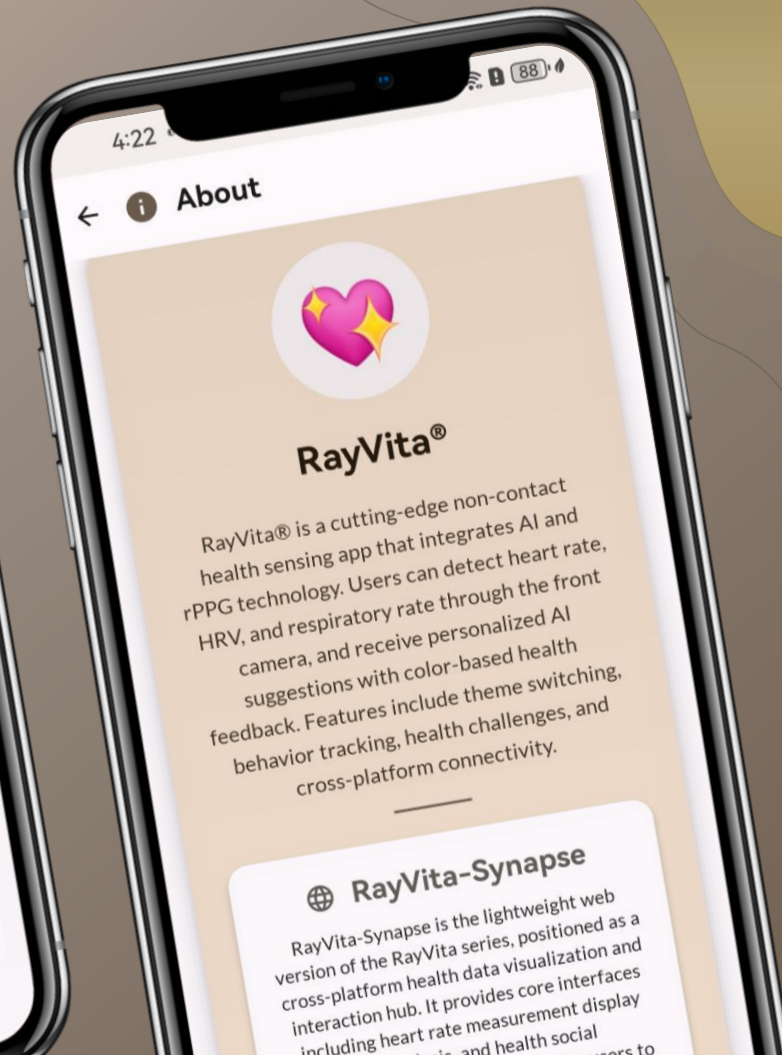
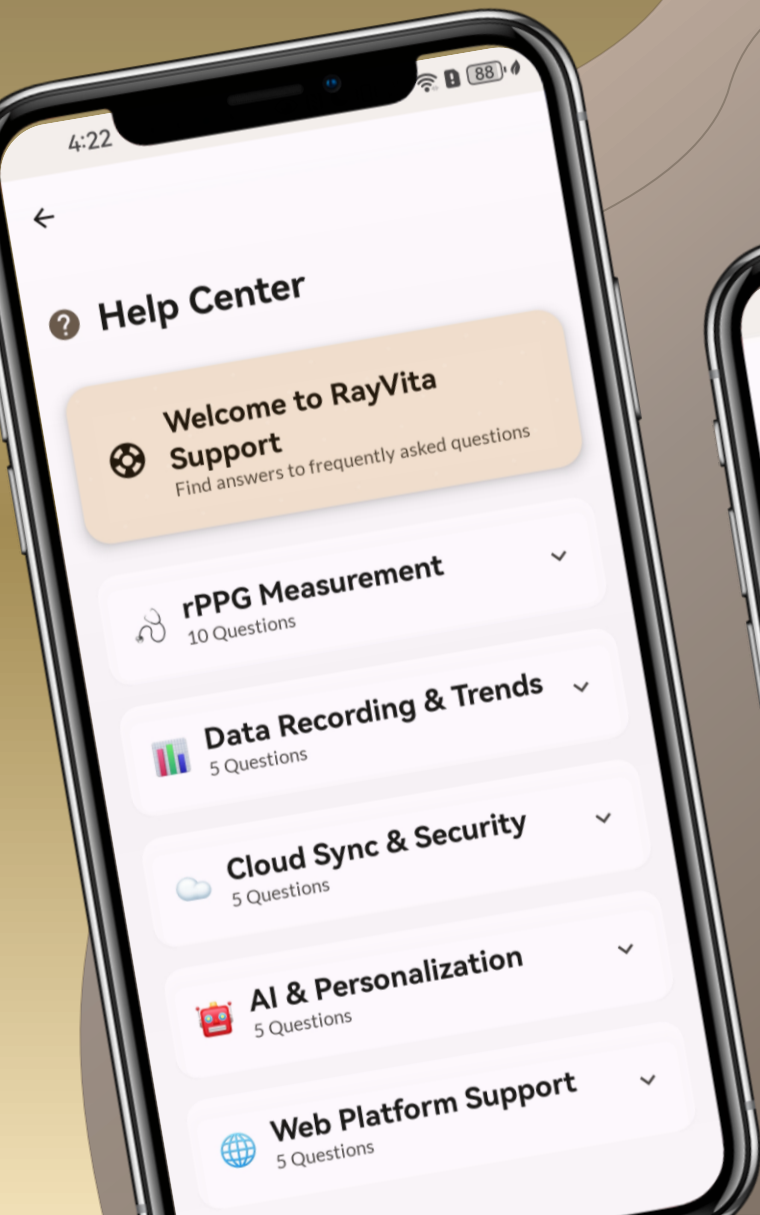
- Instructor: Associate Professor Weiwei Jiang

RayVita

Your rPPG Health Companion

Start Now





Welcome To RayVita Application

Introduction

RayVita is a smart health monitoring and lifestyle app powered by remote photoplethysmography (rPPG) technology. It provides non-contact physiological measurement, AI-driven insights, and personalized visual experiences.

Purpose & Audience

01

People caring about health without wearable devices

02

Students, developers, and healthcare explorers

Motivation

03

Bringing rPPG to Daily Life

04

AI-powered
Personalized Wellness

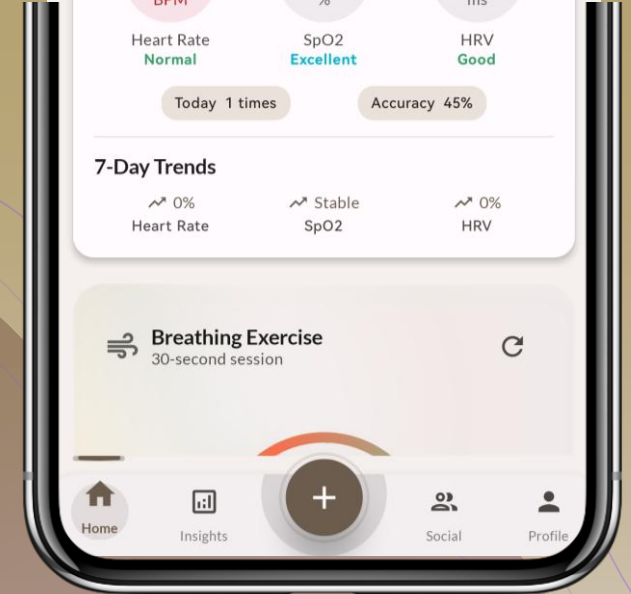
Novelty

05

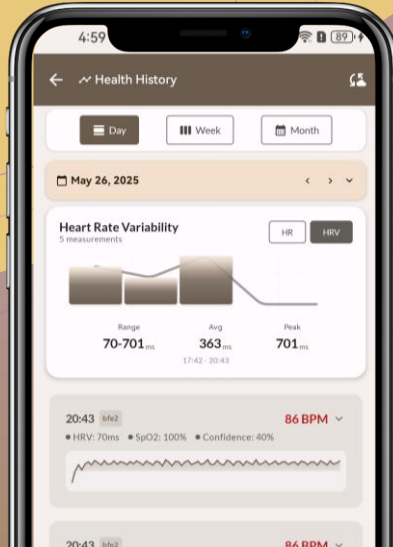
Seamless fusion of AI, health, and aesthetics

06

AI-generated
personalized theme

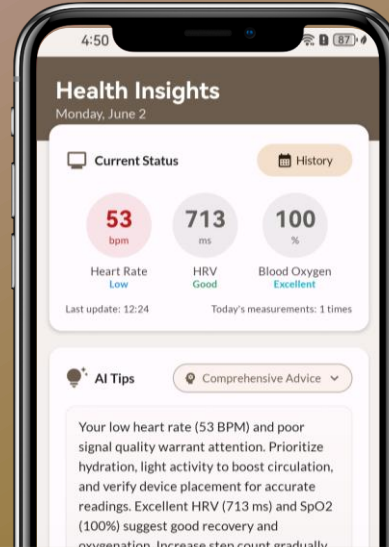


Types Of Features In Apps



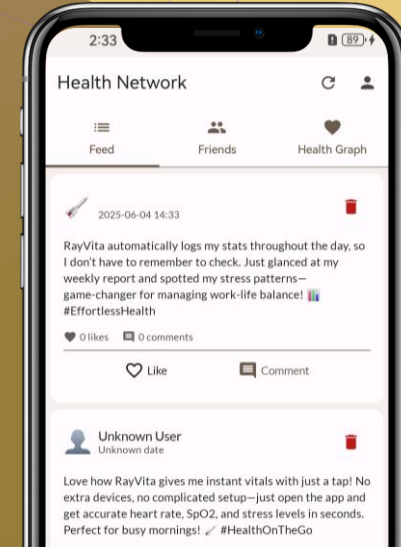
Feature 01

rPPG-based heart rate & HRV



Feature 02

Daily AI health tips



Feature 03

Social System

Home Page

Welcome to RayVita
All-in-One AI Health Companion

Quick access to health data



Breathing training,
daily tips
, achievements

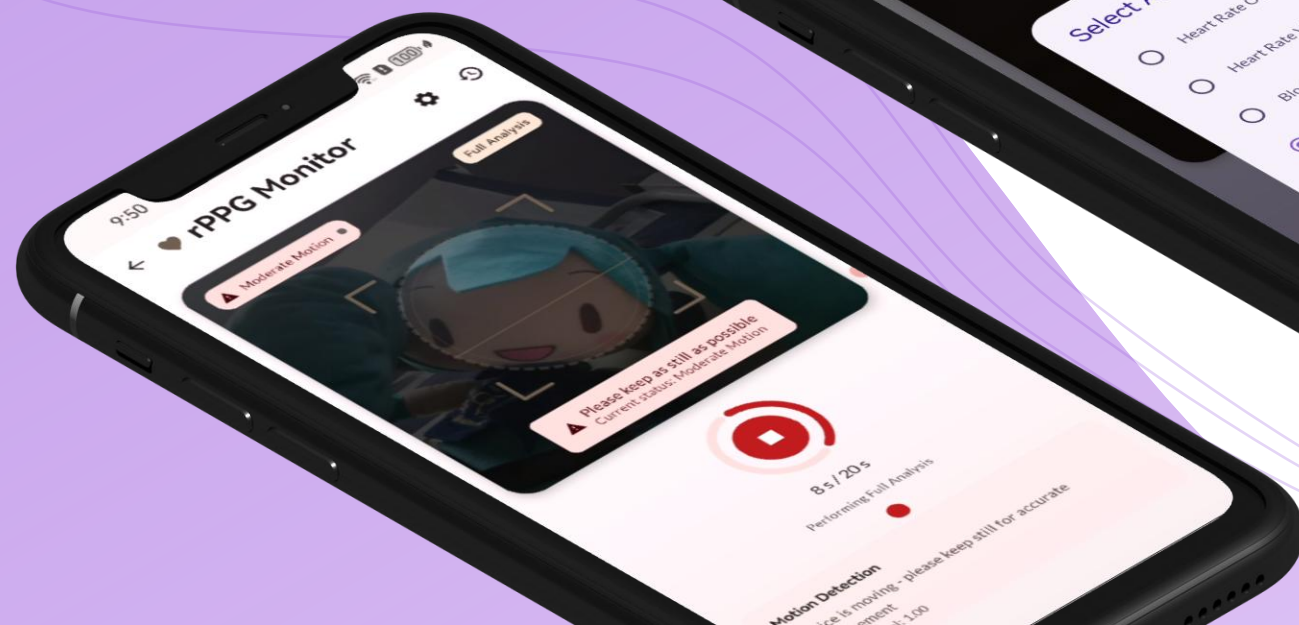
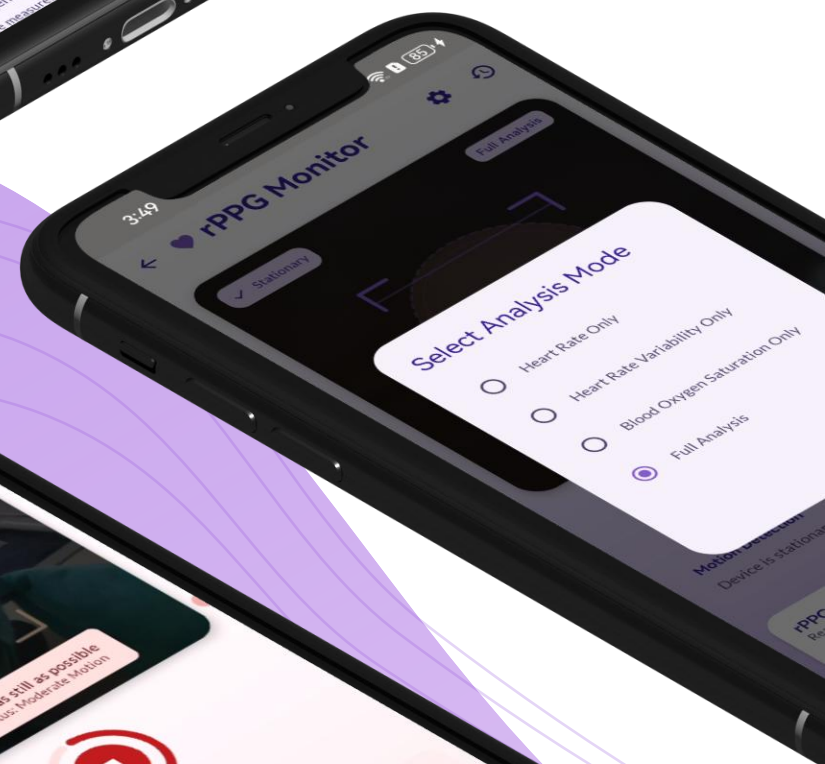
Dynamic banners and
theme-based layout

Contactless rPPG Scan

<5%^[1]
MAR

Activates the accelerometer to prompt the user to remain still.

After model inference, heart rate (HR) and heart rate variability (HRV) results are shown.



Reference:
[1]Sun, Z., & Li, X. (2023). Contrast-Phys+: Unsupervised and Weakly-supervised Video-based Remote Physiological Measurement via Spatiotemporal Contrast. IEEE T-PAMI.

Health History Trends & Sync

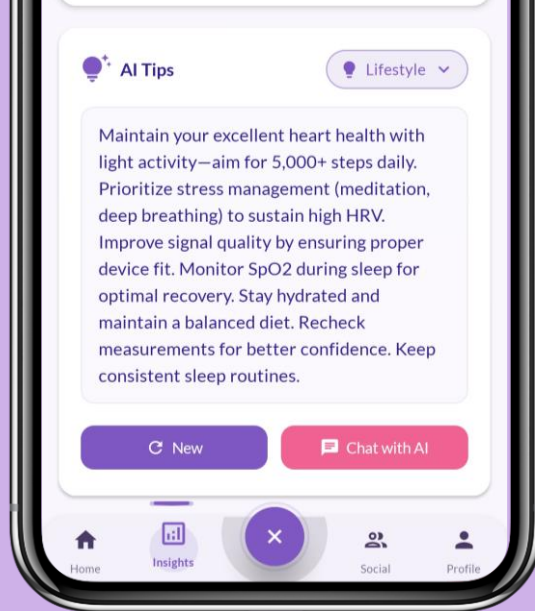
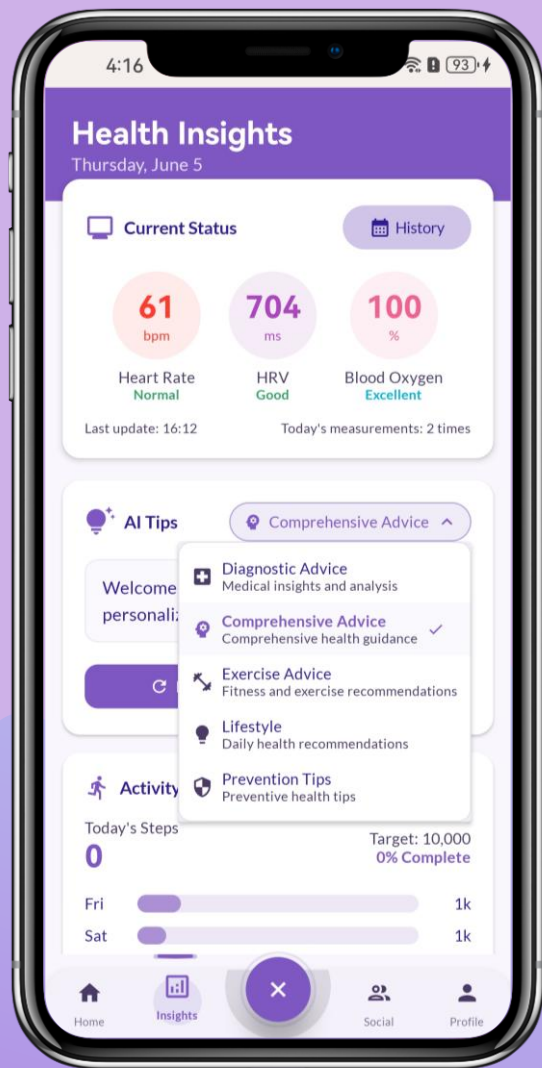
Your Data, Your Timeline

Visualize health changes over time with smooth charts

Cloud sync via secure token; all records stored locally by default

Responsive layout with weekly and monthly summaries and quick access





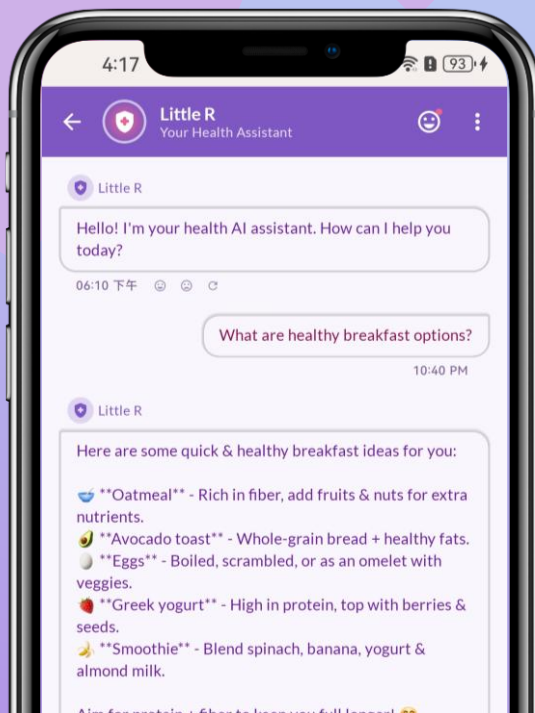
AI Health Assistant

Minimalist Guidance, Max Value

Daily tip card powered by health AI model

Focused and personalized for user habits

Chat and ask for help with our AI Agent little R



5+

Tips mode

Login RayVita Account

01

Account

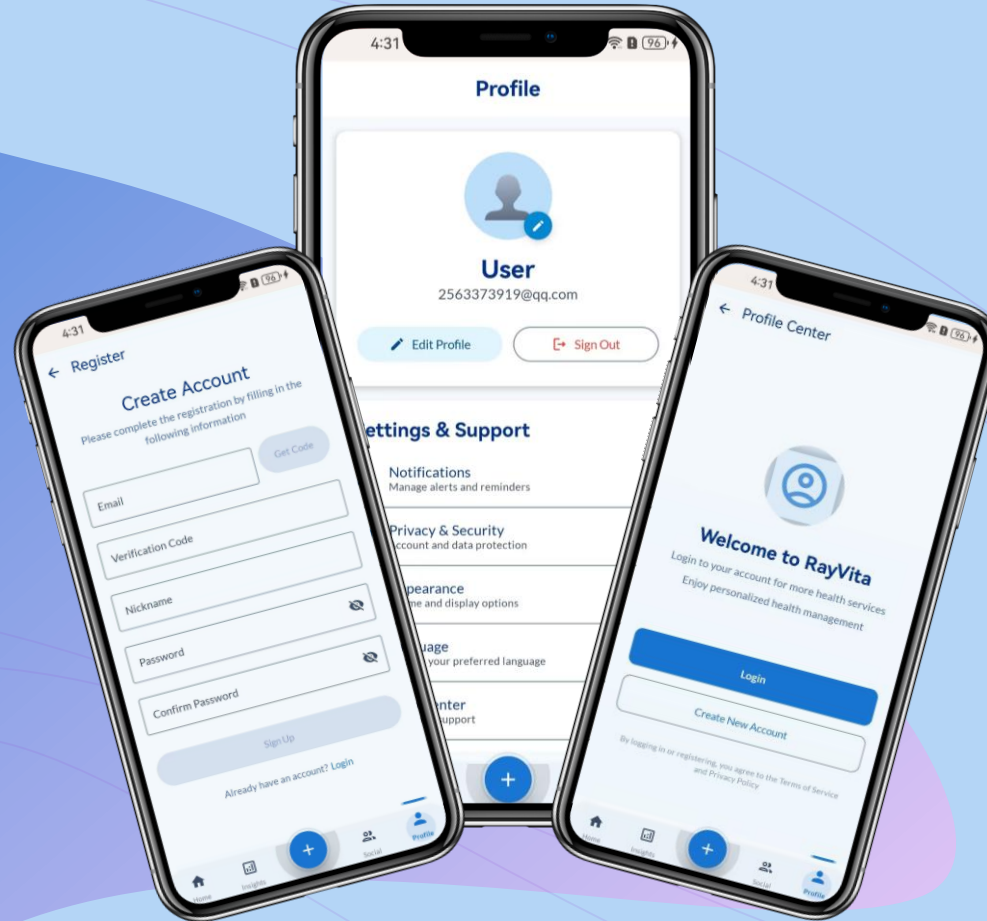
RayVita implement login and register with MySQL db in our cloud server

2025

10+ Users

2027

101+ Users ?



02

Preference

You can change language, theme, notification setting here

2026

100+ Users ?

2028

102+ Users ?



Need Multilingual Experience ?

RayVita enables seamless language switching for users, with English as the default option.

01

Currently, users can also select Simplified Chinese for a tailored experience.

02

Future updates will introduce additional languages to enhance global accessibility.

Currently, only Simplified Chinese and English are implemented. Other languages will be added in subsequent versions.

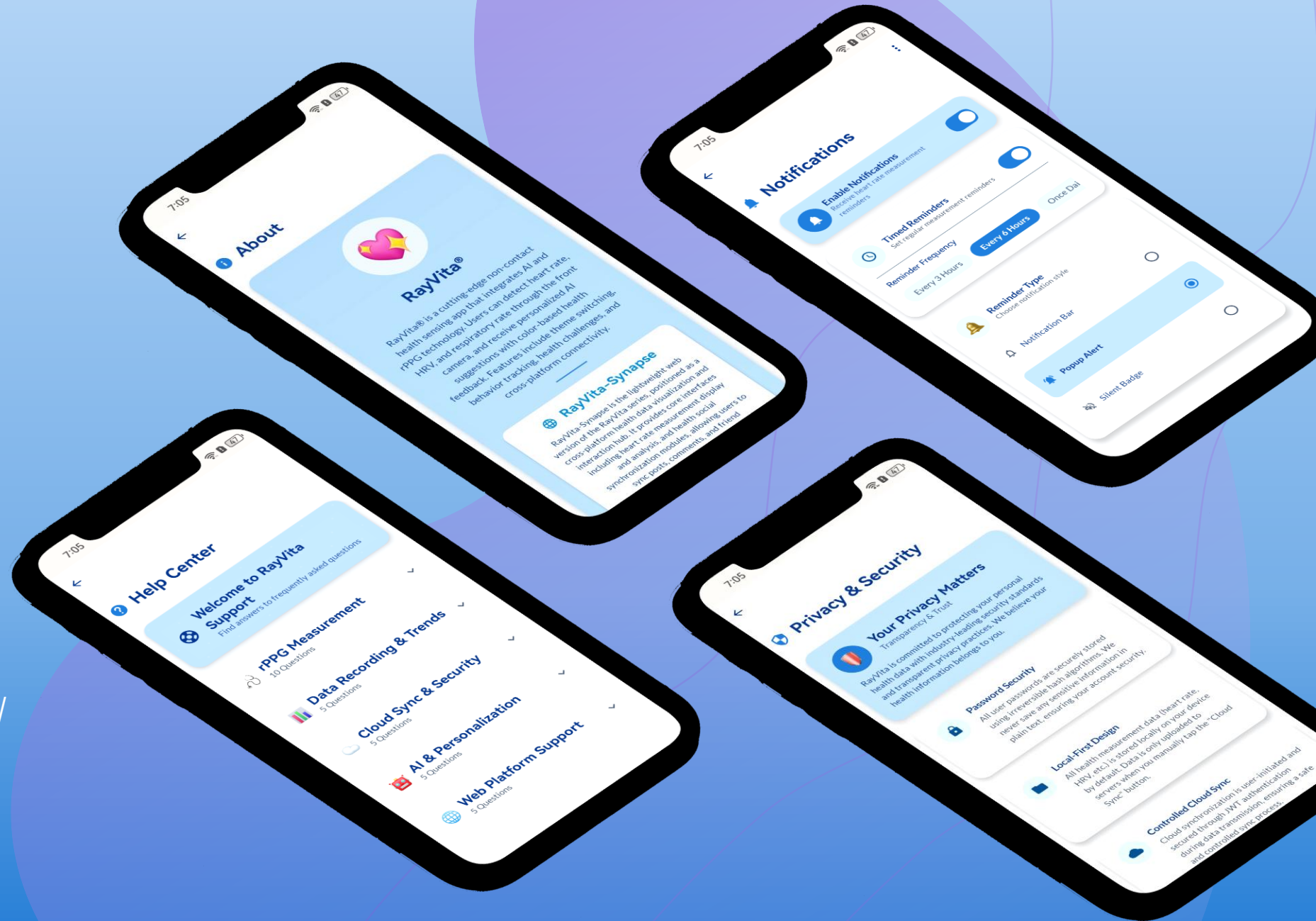
More Options

Informed & In Control

Notification frequency, auto measure toggle

About: Team, funding, thanks (w/ easter egg)

Help Center: 30+ FAQs on data, syncing, and privacy



Developer Playground

Test and Inspect Internally

01

Current Status

Know about current user status and cache, force logout function

02

Debug

Debug theme injection & component rendering

03

Future Extension

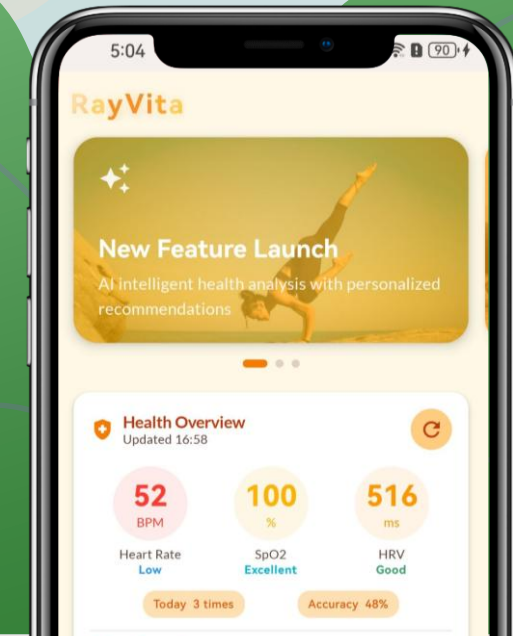
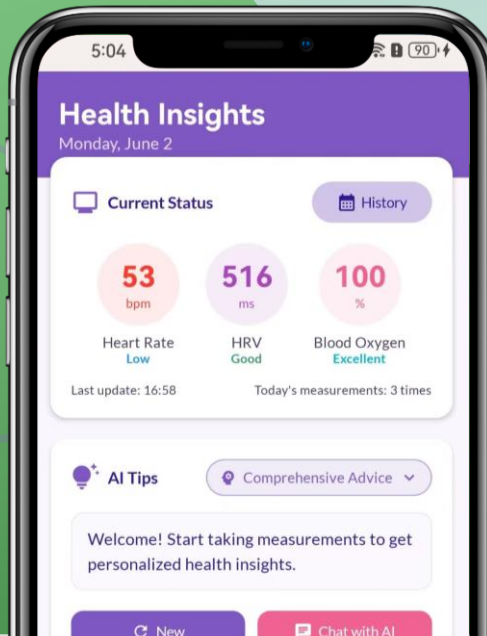
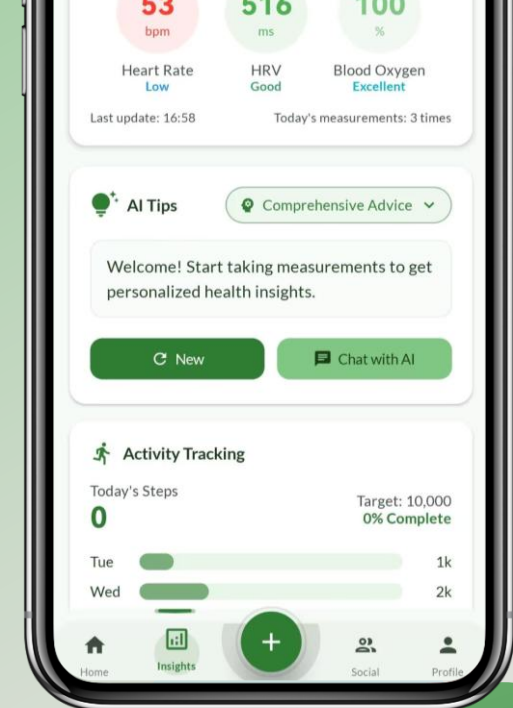
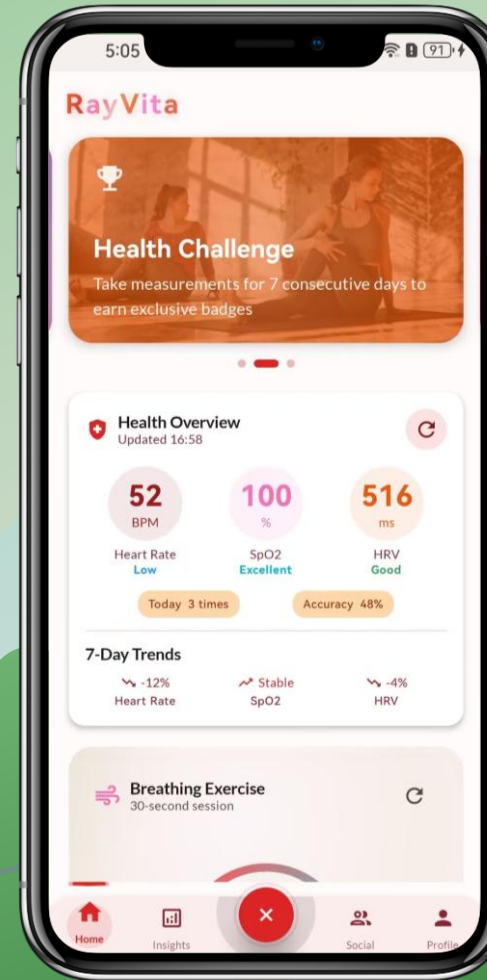
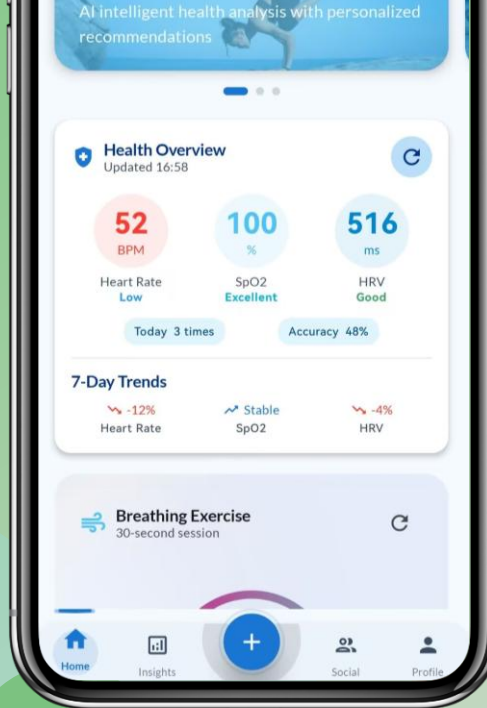
Offer more developer functions in the future



Custom Visual Themes

10+ Themes

RayVita offers over 10 built-in themes to suit all tastes, such as **Warm Earth**, **Forest Green**, **Ocean Blue**, **Violet Dream**, and tech-focused **Bio Serenity** and **Cardio Sync**. All theme designed based on Material Design principles. More series and themes will be added in future updates for greater personalization.



Create with Words

World first AI-Powered Aesthetic Personalization

 Generating...

Users input a sentence or word (e.g., "gentle sunrise")

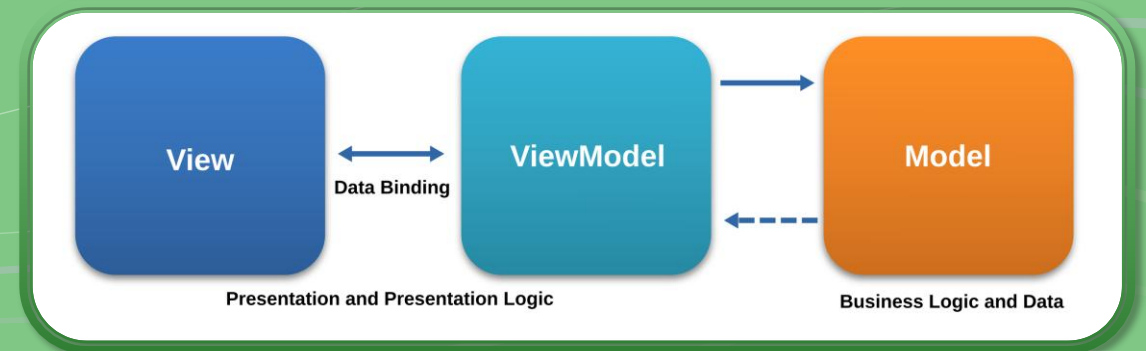
DeepSeek API returns a unique theme color set + meaning

Results cached locally for fast theme switching



Mobile Architecture

Modern Android Engineering

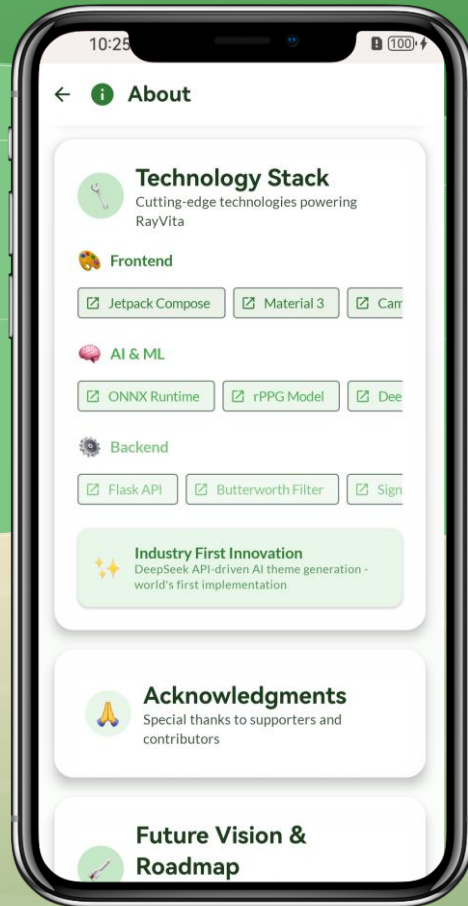


01

Kotlin + Jetpack
Compose + MVVM
Material Design
principles

02

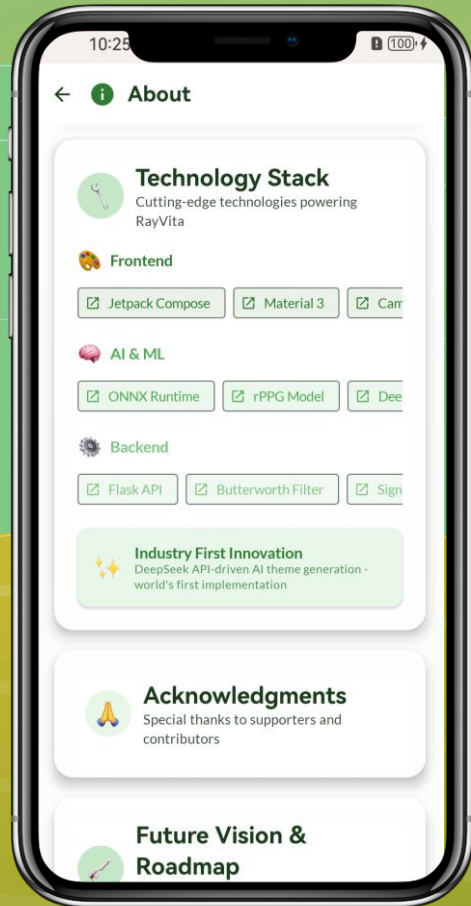
Room for local
storage, Retrofit
for APIs



ONNX Runtime integrated for edge inference: Integrated ONNX Runtime enables on-device machine learning, delivering low-latency, privacy-focused inference for intelligent features without relying on server-side processing.

API & AI Integration

Secure, Extensible Services

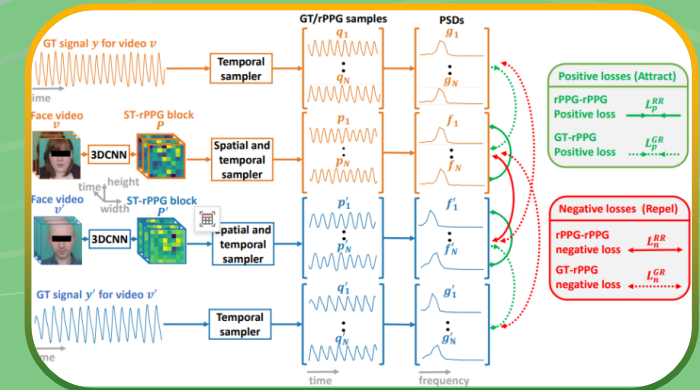
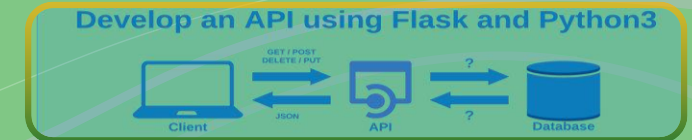
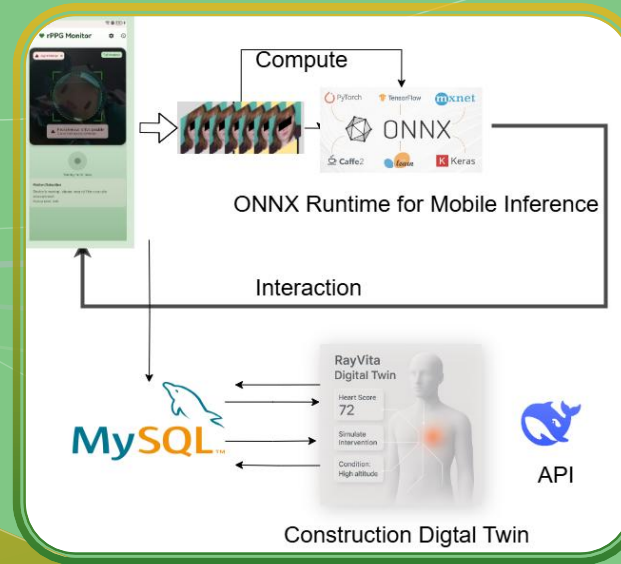


01

Flask REST APIs
(Python), JWT Auth

02

DeepSeek AI
integration (theme
gen, chat, Tips)



Contrast-Phys+ leverages 3DCNN for unsupervised/weakly-supervised rPPG measurement, using spatiotemporal contrastive learning to extract heart rate from facial videos, robust to missing or misaligned labels, enhancing on-device inference.

MySQL Database In Cloud Server

Hosted on Alibaba Cloud, MariaDB enables efficient CRUD operations for the rayvita database, supporting complex relational queries and high-performance data management for scalable backend operations.

The screenshot shows a MySQL database management tool interface. On the left, a tree view displays the database structure for 'rayvita', including tables like 'auth_log', 'capture_sessions', 'challenges', 'deactivation_log', 'friend_requests', 'friendships', 'health_measurements', 'health_tips', 'health_twin', 'notifications', 'operation_log', 'post_comments', 'post_likes', 'posts', 'rppg_samples', and 'users'. The 'health_measurements' table is selected. The main window shows a SQL query: `SELECT * FROM rayvita.health_measurements;` and a 'Result Grid' displaying the following data:

sessionId	user_id	timestamp	heartRate	rppgSignal
0e8c531d-50ef-4fd9-85ce-ec06caba822	2	1749109632153	62.2271	[8.307625, 8.464274, 7.602216, 6.8263626,
355f40e3-7997-46df-b7d2-b46896ec757e	10	1748398197893	83.3333	[3.5971339, 5.681169, 5.3015647, 4.764741
360a7195-75c7-4775-8982-8c0dc42cda90	2	1749111154423	61.1588	[9.8228035, 8.832795, 7.93131, 7.1199737,
7569c064-89ef-4f73-8fb8-527d4ac68abc	2	1749046427627	62.3145	[9.813983, 8.814557, 7.915073, 7.1055374,
afdbe998-8302-48f1-8f0b-9887e391f7ac	3	1749046791655	57.5448	[9.747191, 8.754447, 7.860977, 7.056854, €
b2a06cbf-b56a-440a-9dcd-de7db6440c47	2	1749048107495	59.9963	[-2.3858037, -1.8017752, -1.172936, -0.604
bfe205ac-4ee3-4fc0-b21f-6ebd3931ef52	2	1748263423513	86.1908	[7.283809, 7.1851974, 6.629061, 5.94493, €
d660089f-f287-4794-a3bb-1e737dc018e1	5	1748252783115	61.2981	[7.6124444, 7.678917, 6.898023, 6.1952186
eea39c99-33fd-40df-9e7a-bbb208366094	2	1748252560657	67.3701	[4.4898057, 4.0600166, 3.5820737, 3.10367
f8835f3d-c1fc-48a3-aa88-e8bf7ff5777	2	1748258569012	61.2245	[2.6870358, 2.5182097, 2.072159, 1.864156
NULL	NULL	NULL	NULL	NULL

```
210.79.151.20 - - [06/Jun/2025 17:04:51] "OPTIONS /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:04:52] "GET /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:04:53] "GET /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:04:53] "GET /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
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210.79.151.20 - - [06/Jun/2025 17:05:40] "GET /api/health_measurements/user/2 HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:05:51] "OPTIONS /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
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210.79.151.20 - - [06/Jun/2025 17:08:46] "OPTIONS /api/user/login HTTP/1.1" 200 -
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210.79.151.20 - - [06/Jun/2025 17:08:50] "GET /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:08:51] "OPTIONS /api/health_measurements/user/2 HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:08:51] "GET /api/post/feed?user_id=2&scope=all HTTP/1.1" 200 -
210.79.151.20 - - [06/Jun/2025 17:08:52] "GET /api/health_measurements/user/2 HTTP/1.1" 200 -
```

```
root@izbp1hpfonmkzrximn55jz: ~
MariaDB [rayvita]> exit;
Bye
root@izbp1hpfonmkzrximn55jz:~# sudo mysql
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 808
Server version: 10.6.22-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

Copyright (C) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> use rayvita
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [rayvita]> DESCRIBE users;
+-----+-----+-----+-----+-----+
| Field | Extra | Type | Null | Key | Default |
+-----+-----+-----+-----+-----+
| user_id | | bigint(20) | NO | PRI | NULL |
```

Community & Future

Now

Friend requests, feed posts, achievements

Future

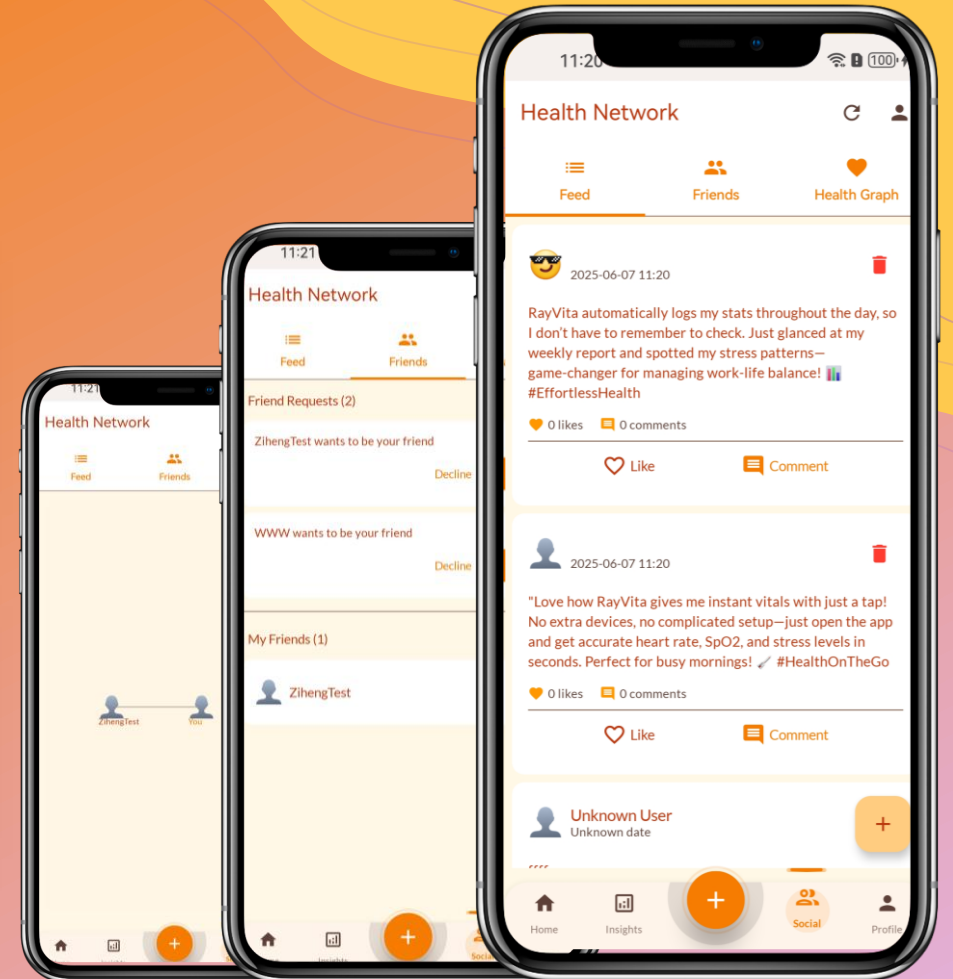
Share heart rate and HRV for collaboration and health insights.

Future

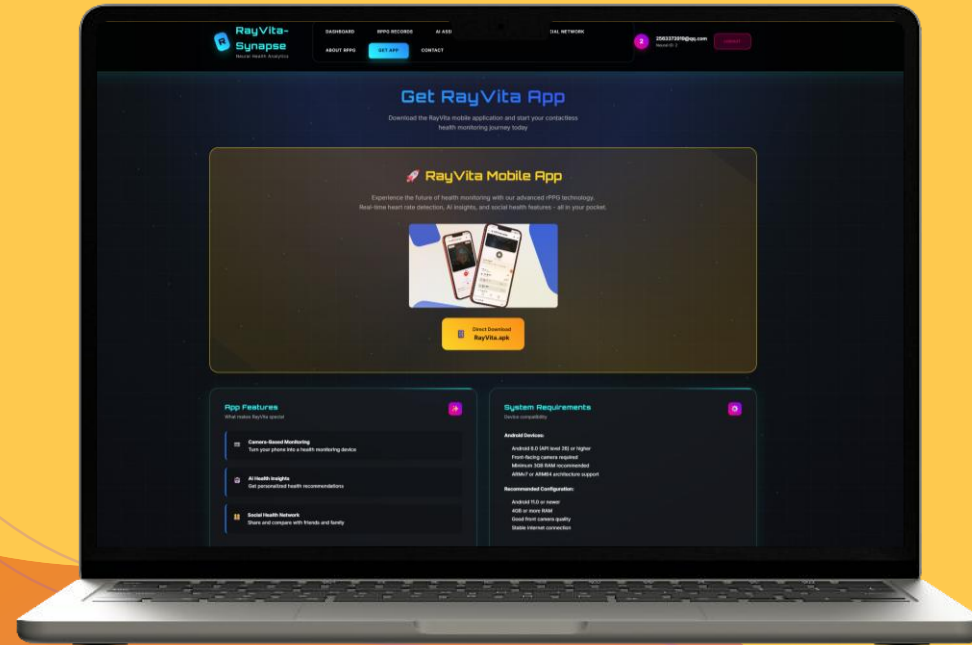
Enable friend-based challenges to track physiological metrics, boosting motivation.

Future

Support image posts for seamless visual sharing.



Cross-platform sync & Web Hub



RayVita-Synapse

RayVita-Synapse is a lightweight web version of RayVita, serving as a cross-platform hub for health data visualization and interaction. It offers heart rate measurement display, analysis, and comparison, plus social syncing for posts, comments, and friend connections. Designed for quick access and responsive use on desktop browsers.



VITA

Future Plan

Vitality

Atrial fibrillation detection from facial videos, enabling early identification of cardiac irregularities to enhance user health and longevity.

Insight

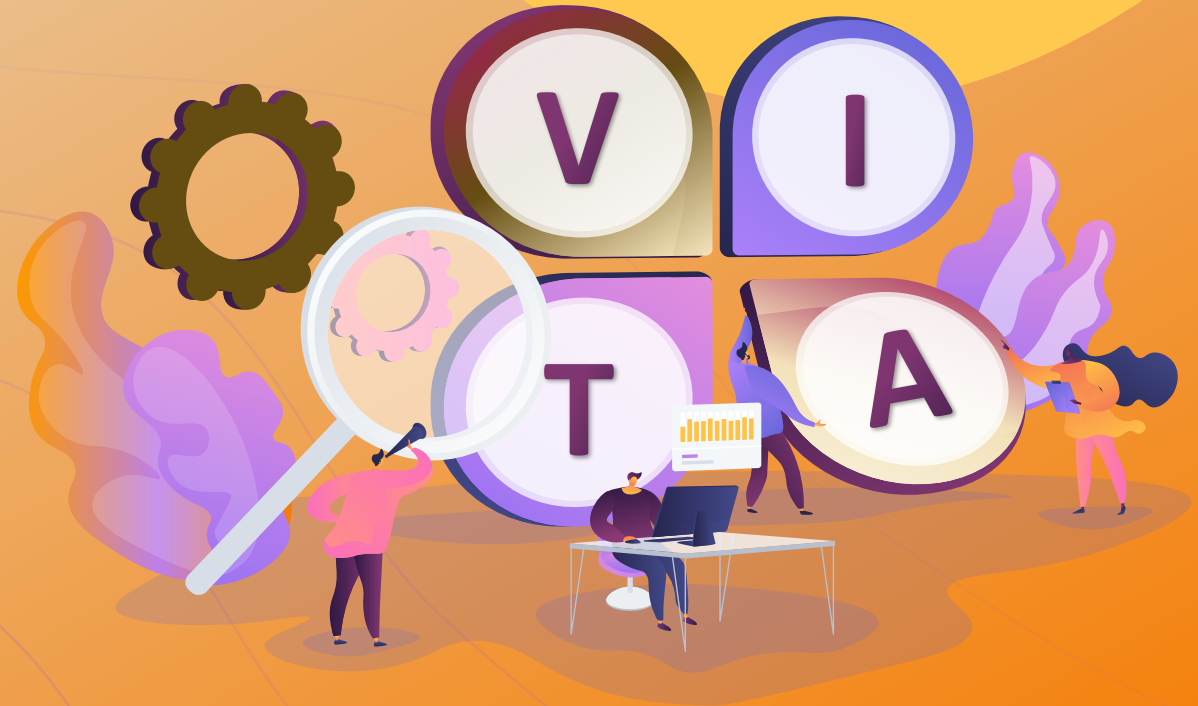
Emotion & stress tracking via video + CV, providing deep analysis of emotional states and stress levels for personalized well-being recommendations.

Technology

Real-time health data processing, utilizing advanced algorithms to continuously monitor and analyze vital signs with high accuracy and efficiency.

Action

Personalized health improvement plans, HRV-based AI theme, offering tailored exercise and lifestyle adjustments based on data

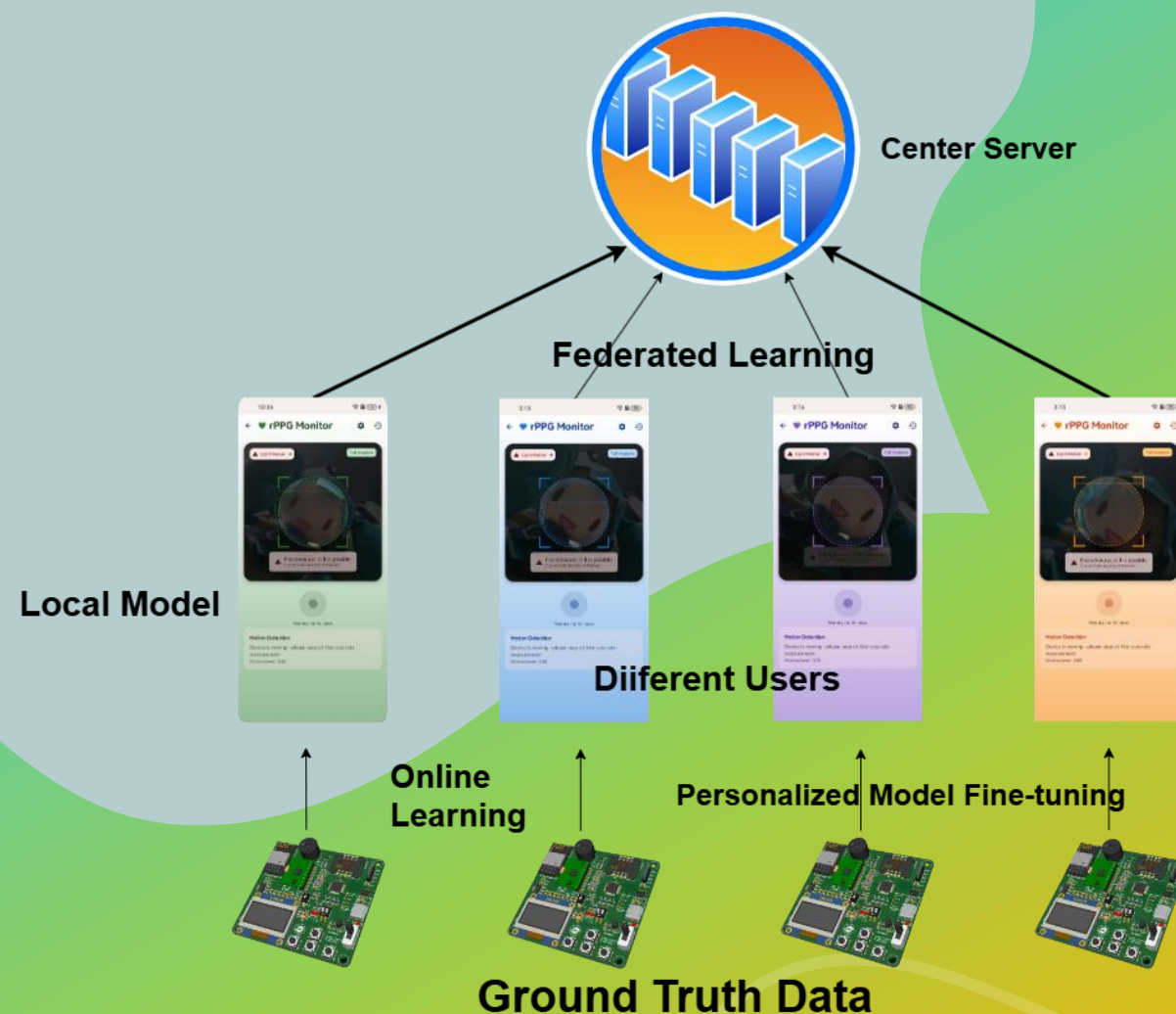


What's Next?

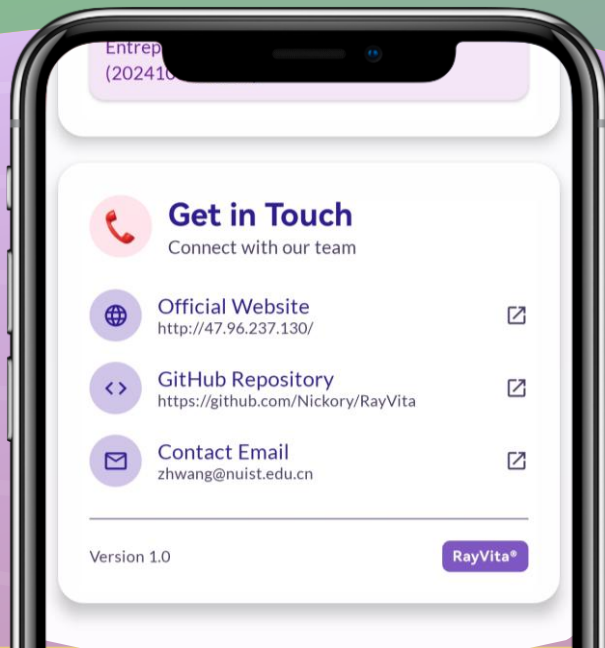
One More Thing

RayVita Perpetu Project

RayVita Perpetu is a derivative project of RayVita, focused on enhancing Android-deployed models for non-invasive heart rate and HRV measurement. It integrates hardware-collected ground truth (e.g., heart rate sensor data) for personalized model fine-tuning. Expanded to multi-user device collaboration, it adopts a framework combining federated learning and online learning, enabling local model training, shared updates to optimize a global model, and user privacy protection.



Thank You



Together, let's revolutionize health monitoring with rPPG,
personalized insights, and collaborative innovation.