EY Techathon 5.0 Detailed Submission

Date of submission: 12/01/2025

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THE TEAM

Team Name: arya0035john

Problem Statement : Healthcare - Empowering traveling doctors with AI





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Role in Solution Development : Building, integrating ML models	Role in Solution Development : Integrating & building ML models	Role in Solution Development : Full stack developer	Role in Solution Development : UI design & Database management	Role in Solution Development : Full stack developer

Executive Summary

Rural healthcare often faces significant challenges, including limited resources, insufficient medical tools, and unreliable internet connectivity. The **AI Healthcare Navigator** is a mobile platform designed to address these issues by empowering traveling doctors to provide better care for chronic conditions like diabetes and hypertension.

The platform streamlines healthcare delivery through intuitive features such as straightforward data entry for patient information like blood pressure, glucose levels, and symptoms. Its **offline functionality** ensures that doctors can continue to collect and store patient data even in areas with poor connectivity, with automatic synchronization once the internet is available.

A key highlight of the platform is the **What-If Health Simulation**, which enables doctors to model potential outcomes of lifestyle or treatment changes, such as dietary adjustments, helping them offer personalized and proactive care recommendations.

By focusing on accessibility, simplicity, and advanced AI-driven insights, the AI Healthcare Navigator serves as a practical and scalable solution to enhance patient care in underserved regions. It bridges the gap between technology and rural healthcare, equipping doctors with tools that improve efficiency and outcomes while addressing the unique challenges of resource-limited settings.

Problem statement

Define the exact problem that you intend to solve and your understanding of the same. Share the below details:

Target Industry: Healthcare and Medical Industry
Industry Type: B2C
User Group: Traveling Doctors and Healthcare Providers
User Department: Primary Care and Chronic Disease Management
Solution Scenario: The AI Healthcare Navigator is a mobile app for doctors like Ravi, working in rural areas to manage chronic conditions.

- Login & Setup: Ravi logs in and sets up his profile.
- Data Entry: He inputs patient data (e.g., blood pressure, glucose levels) offline, syncing later.
- AI Insights: The app analyzes data, predicts risks, and sends alerts for critical issues.
- What-If Simulation: Ravi tests lifestyle changes to predict their impact on health.
- Dashboards: Visual tools help track patient progress over time.
- Sync & Reporting: Offline data syncs and reports are generated and shared.
- Feedback: Continuous learning from patient data improves care.

Problem statement

Proposed Data Flow:

- Capturing Data: Ravi enters patient info manually or gets it from devices (like glucose monitors).
- Offline Storage & Syncing: Data is stored on the phone when offline and synced to the cloud when internet is available.
- AI Analysis: The app analyzes the data, predicts risks, and suggests treatment options. Ravi can also test “What-If” scenarios, like changing the patient’s diet.
- Insights & Alerts: If there’s an issue (like high blood pressure), the app alerts Ravi gives recommendations, displayed in easy-to-read graphs.
- Review & Reporting: Ravi tracks patient progress and creates reports, which can be shared with other doctors.

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

Please elaborate on the solution value proposition to the target user group. How will your solution cover the problem areas?
Response: Our solution, the AI Healthcare Navigator, is designed to simplify the work of traveling doctors who visit rural areas. It helps them collect patient data like glucose levels and blood pressure even without internet connectivity, syncing the data later when the connection is available. Using AI, the app provides insights, predicts risks, and gives personalized recommendations for chronic conditions like diabetes and hypertension. Features like the "What-If" simulation let doctors check how small changes, like diet adjustments, can improve patient health. The app also includes dashboards and visual tools to make tracking progress easy. Additionally, digital twin technology helps create a virtual model of the patient’s health, making treatment planning more proactive and efficient. Overall, the app is a perfect mix of advanced tech and ease of use, specifically designed for resource-limited areas.

What are the impact metrics that you propose to use to analyse the effect of the solution?
Response: We plan to measure the success of our solution using these metrics:

- **Patient Outcomes:** Track improvements in chronic conditions like stable glucose levels or reduced hypertension.
- **Doctor Efficiency:** Measure the time saved in making decisions using AI insights compared to manual analysis.
- **User Engagement:** Monitor the number of active doctors and patients using the app regularly.

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

What are the technologies (languages, platforms, APIs, hardware, sponsored tools, technologies stacks, framework etc.) involved?

- **UI design** : Figma
- **Frontend :** Html, ReactJS, Tailwind CSS, DaisyUI
- **Backend :** Express js, Node js
- **AI and ML :** Kaggle, Python, Pandas, Numpy, Matplotlib, Seaborn, TensorFlow, Scikit-learn, cross-validation
- **Databases :** Firebase (for offline storage), MongoDB
- **APIs :** Google Health API, RESTful APIs for seamless data transfer and integration

EY

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

Please state the assumptions, constraints and solution decision points (Reason behind choosing a technology)
Response:

Assumptions:

1. **Internet Availability**: While the platform is designed to function offline, a stable internet connection is assumed to be required periodically for data syncing and updates.
2. **User Familiarity with Technology**: It's assumed that healthcare providers using the platform are familiar with basic web applications and can access the internet using desktop or laptop devices.
3. **Reliable Data Input**: The system assumes that healthcare providers will input patient data (e.g., symptoms, vital signs) accurately and consistently.
4. **Understanding of Health Terminology**: It is assumed that the users of the platform (doctors and healthcare providers) possess in-depth medical knowledge and are well-versed in health terminology, particularly regarding chronic diseases such as diabetes, hypertension, and other conditions related to their practice

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

Please state the assumptions, constraints and solution decision points (Reason behind choosing a technology)
Response:

Constraints:

1. **Intermittent Internet Connectivity**: While the platform offers offline functionality, inconsistent internet access in remote areas may still cause delays in syncing critical data, which may impact the timeliness of updates, alerts, or new insights.
2. **Data Synchronization Latency**: The process of syncing data when the internet connection is restored may introduce delays in updating patient information or receiving critical alerts, potentially affecting the timeliness of decision-making.
3. **Scalability of Data**: Handling large volumes of healthcare data (from multiple patients) in rural areas may be challenging, especially if the devices or infrastructure are not equipped to manage big data analytics efficiently.
4. **Complexity of AI Features**: Advanced AI-based features like health simulations and predictions may require more computing power, and some of these features might not run smoothly on lower-end devices typically available in rural areas.
5. **User Training**: Although the platform is designed to be user-friendly, there might still be a need for training healthcare providers to efficiently use the advanced AI features and the offline capabilities of the system.

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

Please state the assumptions, constraints and solution decision points (Reason behind choosing a technology)
Response:

Solution Decision Points:

1. **Frontend Framework – ReactJS and Tailwind CSS**:
    - **Reason**: React enables dynamic, component-based UIs with efficient rendering, while Tailwind provides rapid, utility-first styling.
2. **Backend – Node.js and Express.js**:
    - **Reason**: Node.js and Express.js offers high-performance, rapid routing, efficient I/O handling, and seamless API creation in a lightweight, flexible framework.
3. **AI and ML – Kaggle, Python, Pandas, Numpy, Matplotlib, Seaborn, TensorFlow, Scikit-learn, Cross-validation**:
    - **Reason**: Kaggle offers datasets, while Python and its libraries like Pandas and Numpy handle data manipulation and preprocessing. Matplotlib and Seaborn are used for visualizations, and TensorFlow powers scalable machine learning models. Scikit-learn is employed for algorithms, and cross-validation ensures model accuracy by testing across different data subsets.
4. **Offline Data Storage – Firebase**:
    - **Reason**: Firebase is chosen for its real-time database and offline-first capabilities.

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

How easily can your solution be implemented and how effective will it be?
Response: The solution can be implemented efficiently using the chosen technologies due to their well-established nature and robust documentation. Frontend and backend components can be developed independently and integrated gradually, which allows for a smooth development process. Tools like Firebase for offline storage and TensorFlow for AI model deployment make it easier to implement key features without reinventing the wheel. With ReactJS for the frontend and Node.js for the backend, we ensure a modular, scalable, and maintainable solution.

The effectiveness of the solution lies in its ability to address real-world healthcare challenges, especially in rural areas. By combining AI-based insights, offline access, and simple interfaces, the solution offers doctors actionable insights for chronic disease management. This leads to better decision-making, early detection of risks, and improved patient care, making it highly impactful in underserved healthcare environments.

How robust / secure / easily scalable and extensible is the solution?
Response: The solution is designed to be robust, secure, scalable, and extensible.

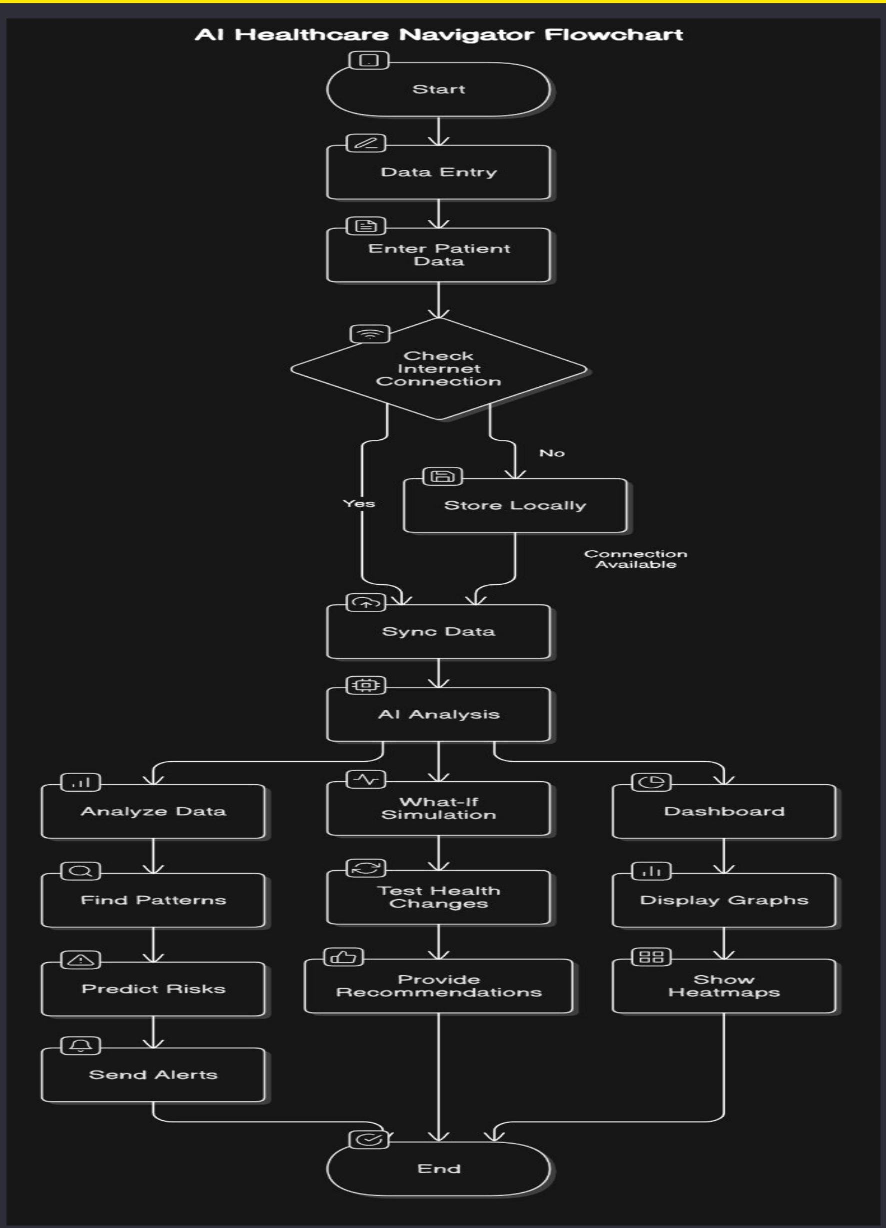
- **Robustness**: The system is built to handle real-time data collection and sync efficiently, even in areas with poor connectivity.
- **Security**: Firebase and MongoDB offer secure, managed data storage with built-in security features, ensuring HIPAA-compliant handling of healthcare data.
- **Scalability**: The solution is highly scalable, with cloud-based technologies like Firebase and MongoDB ensuring easy scaling of both data storage and application performance.
- **Extensibility**: The modular architecture allows for easy addition of new features, such as integrating new AI models, adding additional data sources, or expanding the app's functionality. Using RESTful APIs ensures seamless integration with third-party services and future updates.

Explain, in brief, how you intend to solve the problem at hand. Preferably include the following (Methodology/approach):

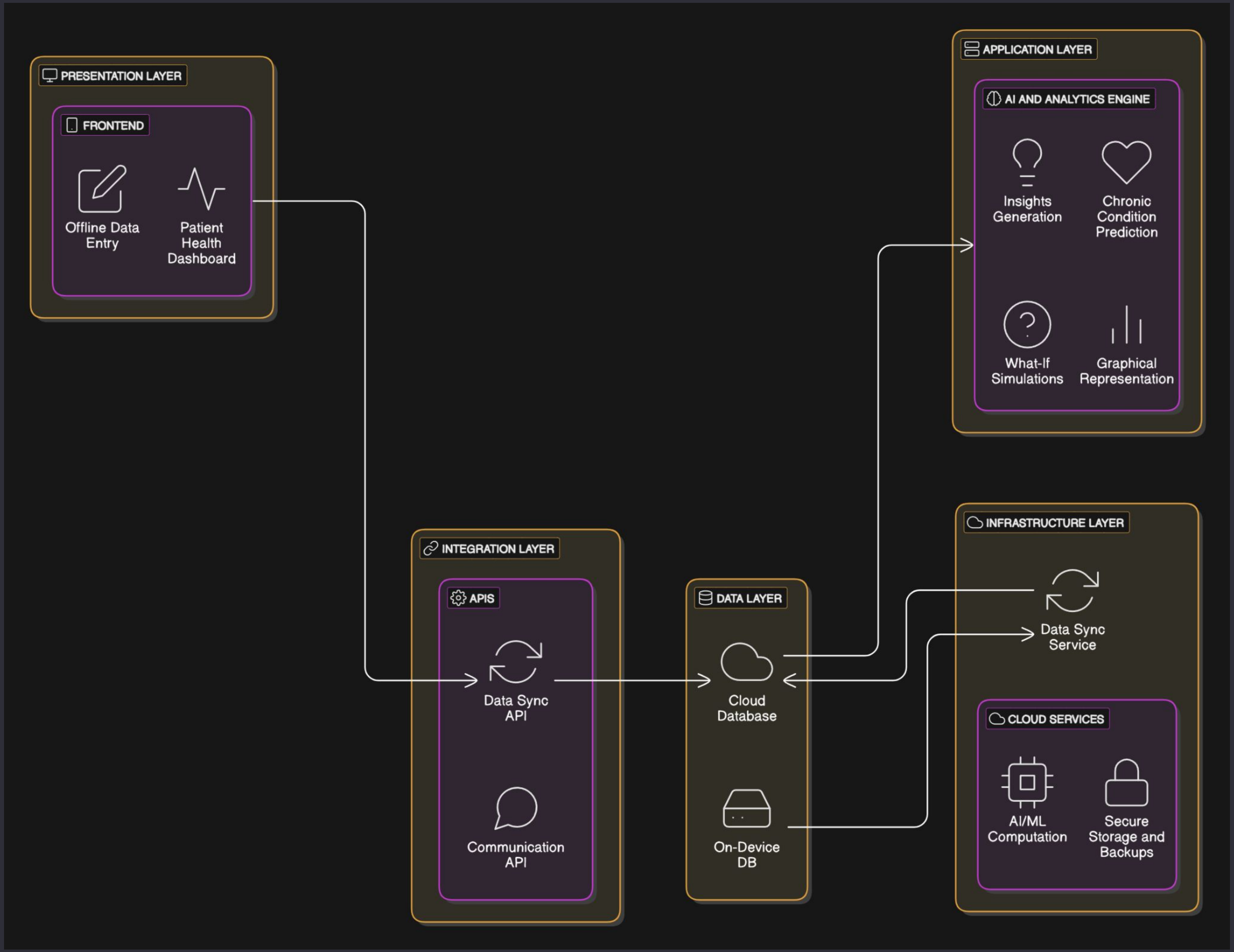
What are the solution components that you would like to build and demonstrate; if you progress through next round.
Response: If we progress to the next round, the key solution components that I would like to build and demonstrate include:

1. **Frontend Development**: A fully functional user interface (UI) built using ReactJS, Tailwind CSS, and DaisyUI, providing a smooth and intuitive experience for doctors to input patient data, view analytics, and receive AI-based insights.
2. **AI and Data Analytics Engine**: An integrated AI model using TensorFlow and Scikit-learn for analyzing patient data, predicting risks, and generating personalized health recommendations. This will include cross-validation to ensure model accuracy.
3. **Offline Data Syncing**: Firebase-based offline storage that allows data entry even in areas with poor connectivity. The data will sync automatically when the connection is restored, ensuring uninterrupted usage.
4. **Health Simulation and Prediction**: A “What-If” health simulation feature to let doctors test how different lifestyle changes impact a patient’s health, helping them make proactive decisions.
5. **Backend Development**: A RESTful API-based backend built with Node.js and Express.js to handle data processing, user authentication, and seamless data transfer between frontend and database.
6. **Data Visualizations**: Dashboards using Chart.js to display key patient metrics like blood pressure, glucose levels, and health trends in an easy-to-understand format, helping doctors track patient progress effectively.

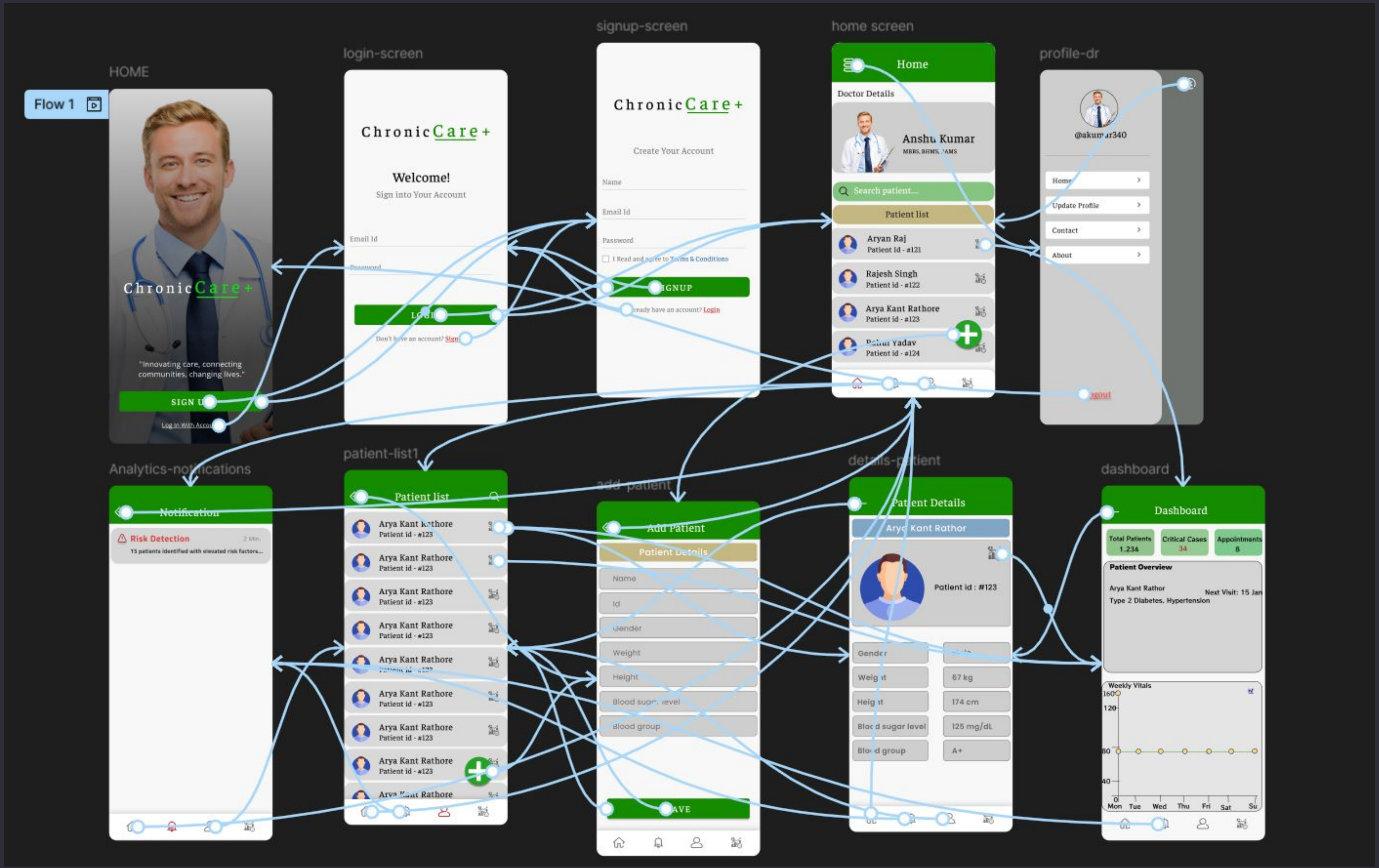
Flow Chart


AI Healthcare Navigator Flowchart
Start
Data Entry
Enter Patient Data
Check Internet Connection
No
Yes
Store Locally
Connection Available
Sync Data
AI Analysis
Analyze Data
What-If Simulation
Dashboard
Find Patterns
Test Health Changes
Display Graphs
Predict Risks
Provide Recommendations
Show Heatmaps
Send Alerts
End

Architecture diagram



▶ Wireframes

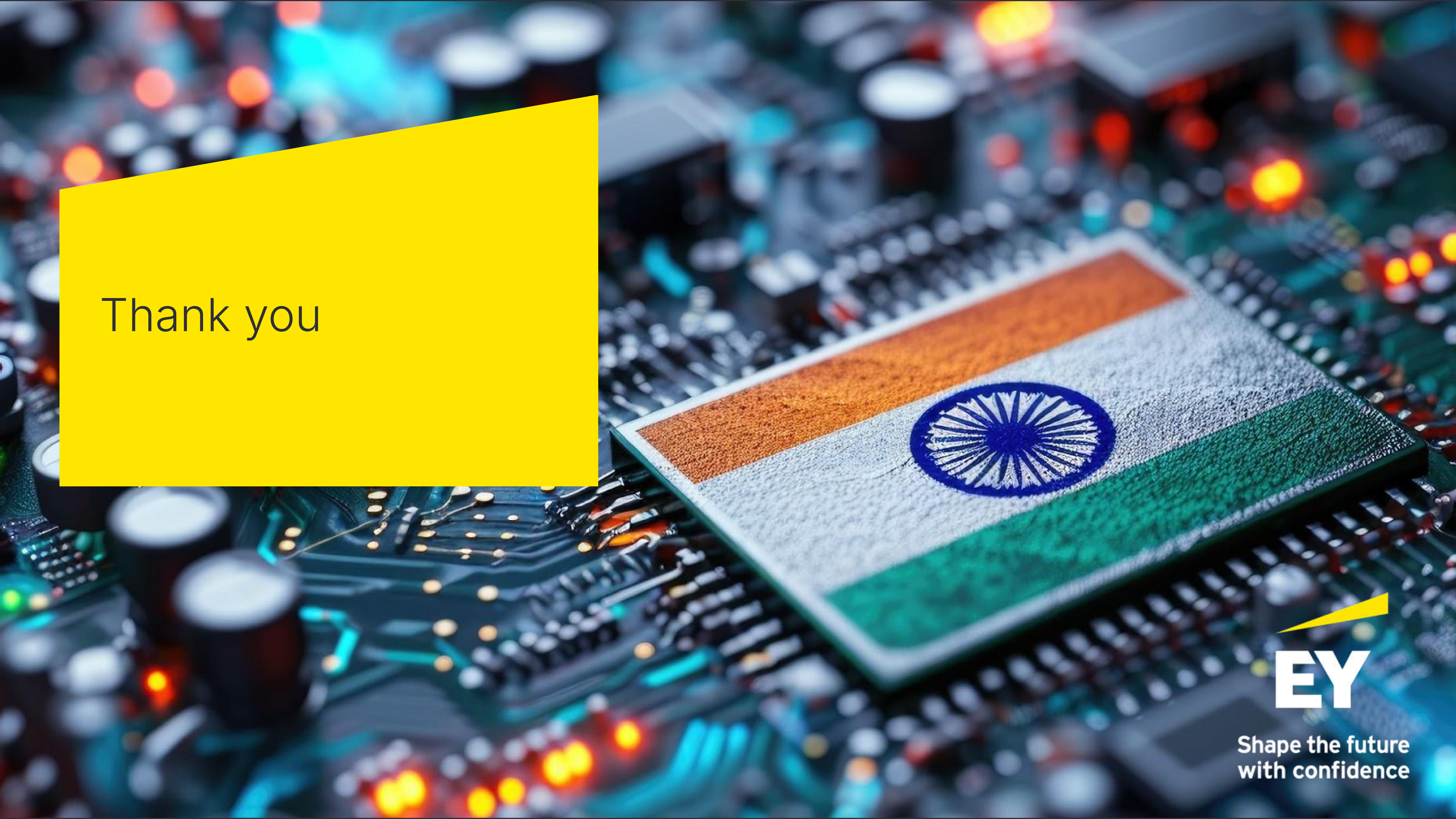

HOME
login-screen
signup-screen
home screen
profile-dr
Flow 1
ChronicCare+
Welcome!
Sign into Your Account
Create Your Account
Home
Doctor Details
Anshu Kumar
Patient list
"Innovating care, connecting communities, changing lives."
Analytics-notifications
patient-list1
add-patient
details-patient
dashboard
Notification
Risk Detection
Patient list
Add Patient
Patient Details
Dashboard
Total Patients
Critical Cases
Appointments
Patient Overview
Weekly Vitals

Github Code Repository link

→ https://github.com/vivekbarnaon/arya0035john.git

Prototype Demo Video

https://drive.google.com/file/d/1X17dTMMIWVSmtRfbR_GPDc2NXf4c8hJg/view?usp=sharing



Thank you

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