Project Progress Review

Hackathon by ValueHealth Inc.

Team Name: **FiveCare**
Project Title: **SyncMyCare**

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Abstract

This document reviews our project progress for the ValueHealth Hackathon. We cover workflows, dataset creation, architecture diagrams, and personas.

Contents

1 Workflow

The process workflow maps the user journey from document upload to AI-driven report generation and notification.

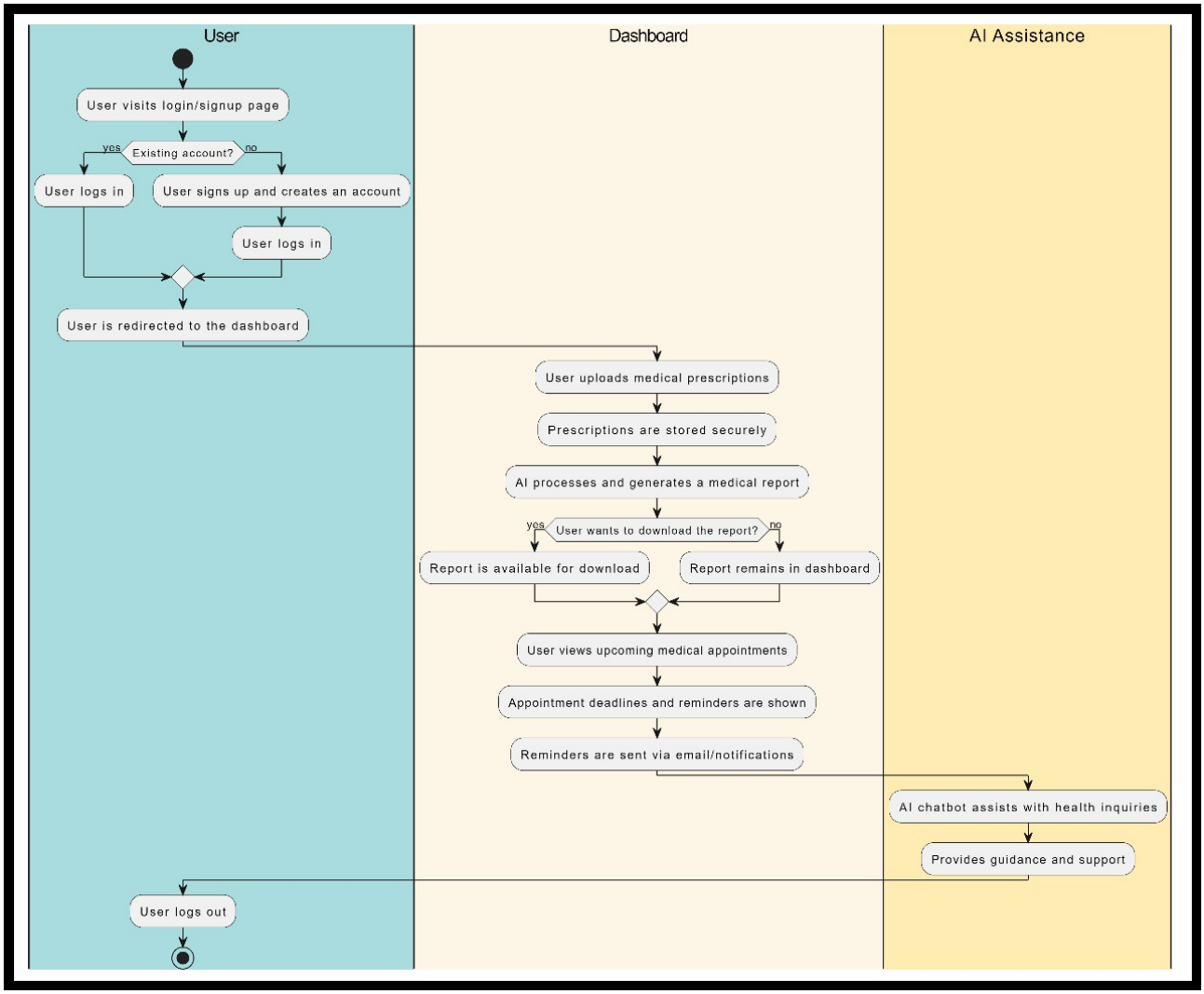

Figure 1: User journey diagram

2 Dataset Creation and Sources of Data

The dataset will be custom-created from verified sources, ensuring model training with reliable, real-world data. Key steps will include:

Process	Details
Data Collection	• Medical records will be aggregated from hospitals. Privacy regulations will be strictly followed during data collection.
Synthetic Data Generation	• Tools like Faker will be used to generate synthetic prescription data. Patient conditions, medications, and prescriptions will be simulated to diversify the dataset. • Existing datasets (e.g., MIMIC-III) will be augmented with hypothetical prescription data, such as drug types and dosages. Synthetic data will reflect real-world prescription patterns for better model training.
OCR and NLP for Prescriptions	• OCR tools such as Tesseract and Google Vision API will be utilized to extract text from scanned or photographed prescriptions. • NLP techniques like entity recognition will be applied to identify key information such as medication names, dosages, and frequency from the OCR-extracted text.
Data Preprocessing	• Data will be cleaned and structured to ensure compatibility with machine learning algorithms. • The data will be normalized to handle inconsistencies across various sources.
Public Data Sources	• Public datasets, including MIMIC-III and FDA's open drug data, will be leveraged for testing and validation. Public data will be cross-referenced with other verified medical records to enhance accuracy.
Research-Grade Data	• Research-grade data will be accessed through partnerships with academic and healthcare institutions. • This data will be integrated into the project to ensure a robust and comprehensive training dataset.
Cross-Validation with Drug Databases	• Drug information will be cross-validated using trusted databases such as FDA, RxNorm, and DrugBank. Prescription data accuracy and consistency will be ensured by comparing it with official drug databases.

Table 1: Processes and Key Details for Data Collection and Preprocessing

3 Architecture diagrams

Architecture includes system, data flow, and backend structures.

3.1 System Architecture

The frontend, backend, AI module, and third-party APIs handle document processing, notifications, and user management.

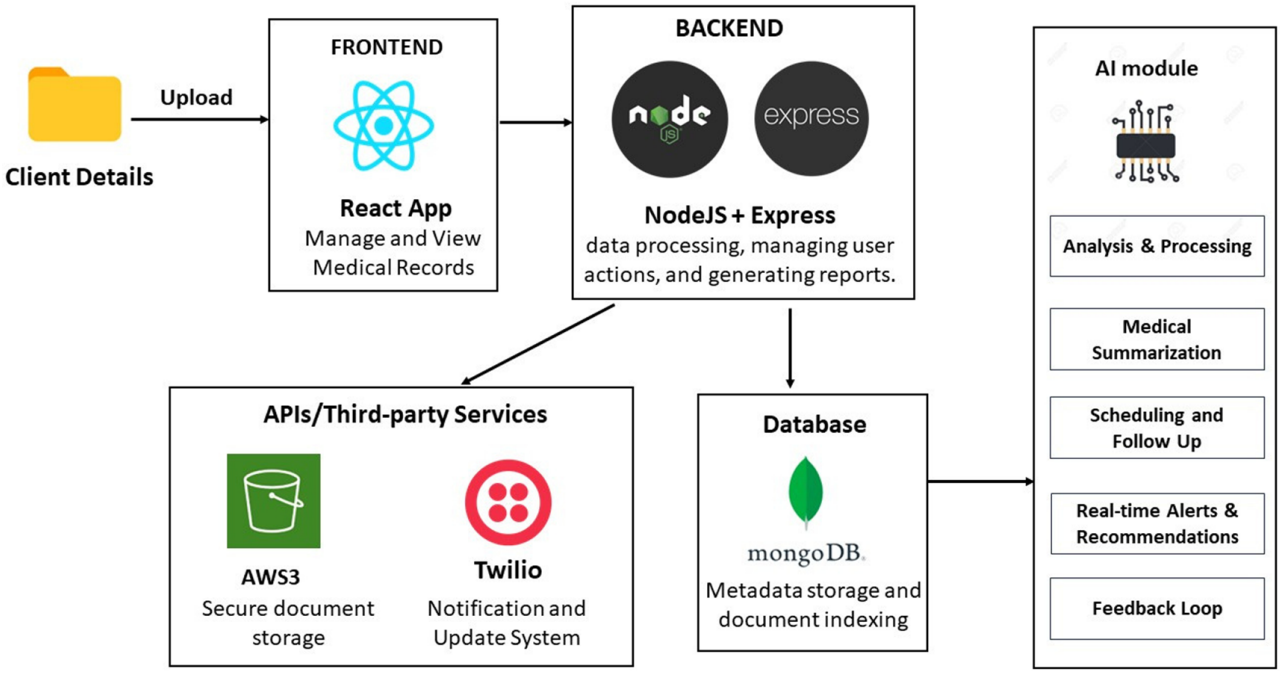

Figure 2: System Architecture Diagram

3.2 Data Flow

Users upload documents, which are validated, processed, and stored. AI generates the report, and Twilio sends alerts when risks are identified.

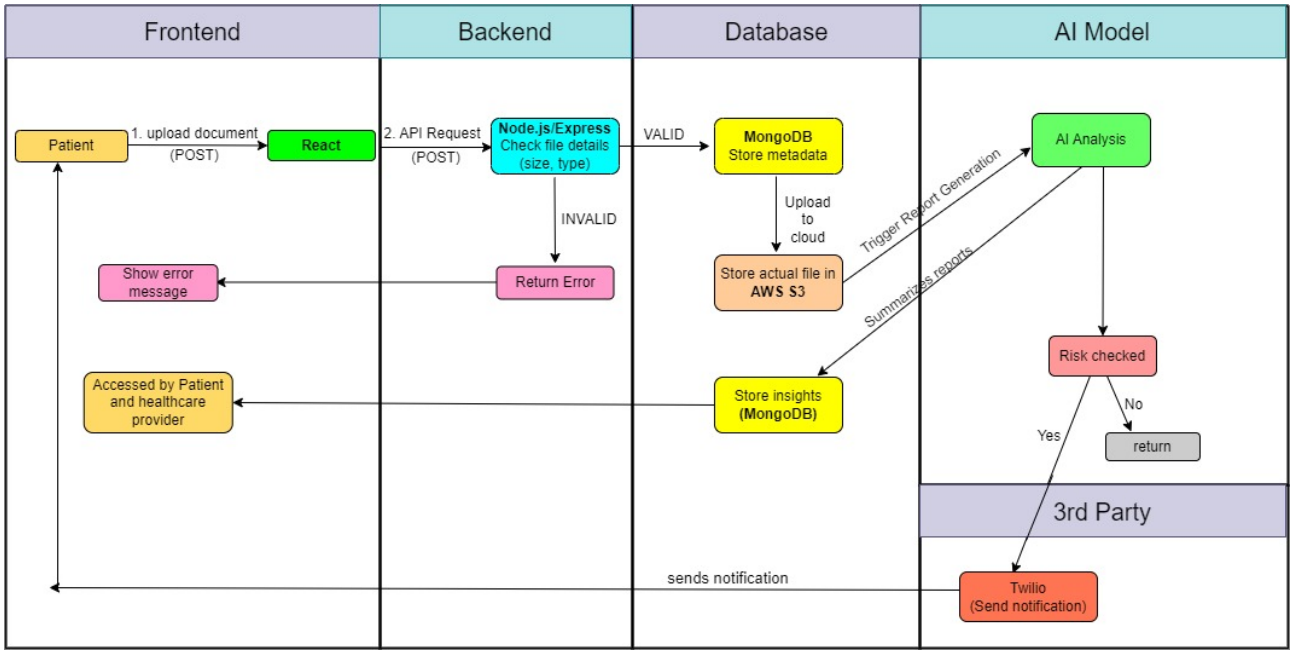

Figure 3: Data Flow Diagram

3.3 Backend Architecture

The backend architecture diagram outlines the components of the backend server, detailing how it handles user management, data processing, and AI integration.

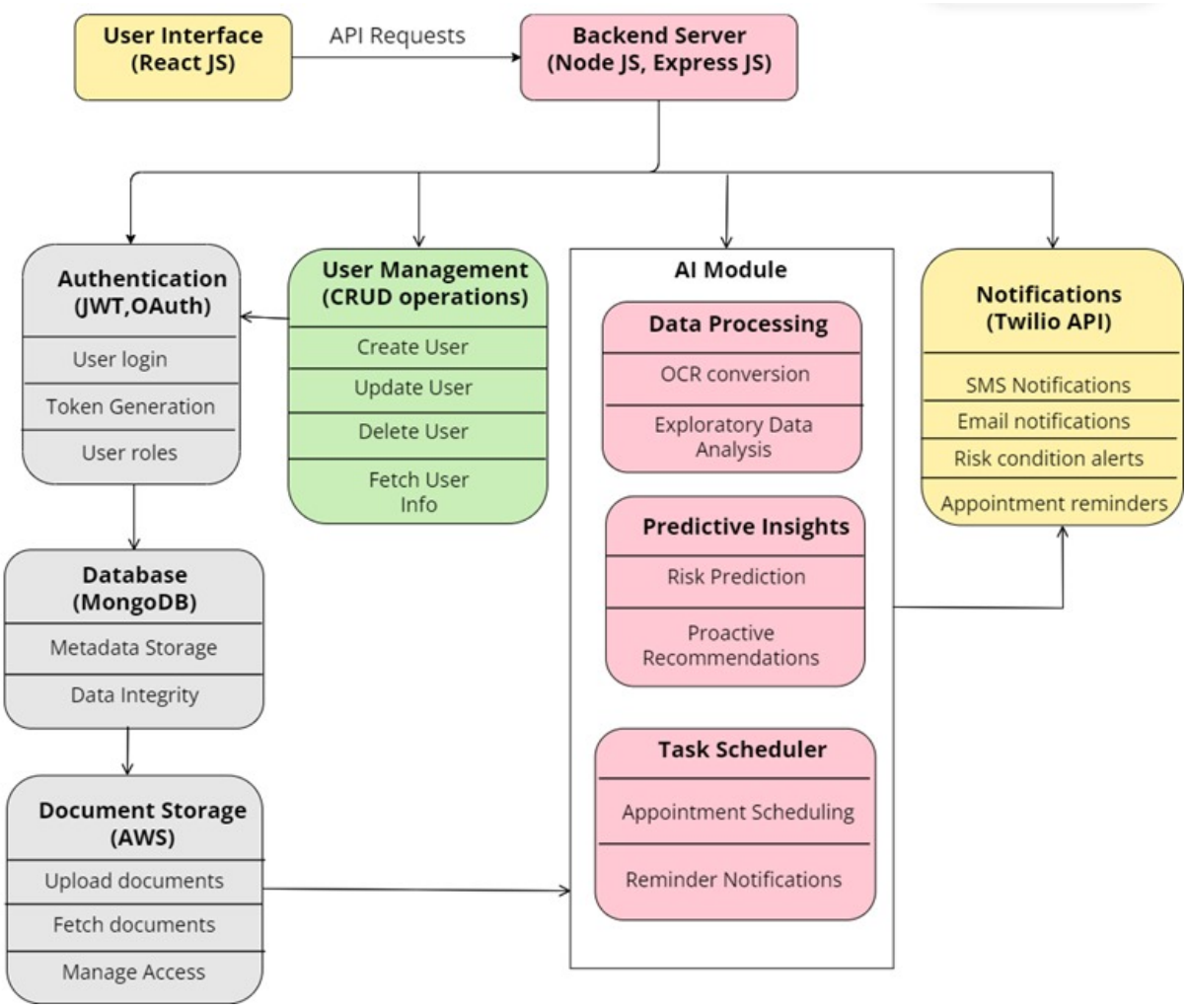

Figure 4: Backend Architecture Diagram

4 List of Personas

In this section, we outline the key personas involved in the solution and demonstrate how each one benefits from the Unified Medical Record (UMR) system. The comparison shows the stark contrast between the experiences of patients and doctors with and without UMR.

Persona	Key Benefit/Issue	Impact	Experience/Workflow
Patient Without UMR	Lack of access to a centralized medical record system leads to incomplete medical information.	Increased risk of medical errors and adverse drug interactions, as the doctor cannot view the full medical history in real-time.	Missed opportunity to check for drug interactions before prescribing new medications.
Patient With UMR	Centralized access to medical history ensures that all prescriptions, reports, and allergies are available to the doctor.	Reduced risk of drug interactions and medical errors. Saves time and avoids carrying multiple documents.	UMR ensures that the patient's health information is up-to-date and shared securely, enhancing the overall quality of care.
Doctor Using UMR	Saves time by providing immediate access to patient records and relevant health data.	Reduces the chances of medical errors, especially related to drug interactions, leading to better treatment outcomes.	UMR improves workflow by allowing doctors to focus more on diagnosis and treatment, as all relevant information is in one place.
Healthcare Administrator	Centralized records make patient data management more efficient.	Reduces administrative burden and errors, leading to more efficient record-keeping.	Scheduling and care coordination between departments become seamless as all necessary information is easily accessible.
Pharmacist	Access to a patient's complete prescription history helps prevent harmful drug interactions.	Improved patient safety by reducing medication errors.	Pharmacists can consult with doctors more effectively using clear, up-to-date records of a patient's medication and treatment history.

Table 2: Key Personas and Benefits/Impacts of UMR System

5 UMR (Unified Medical Report) Format

This section demonstrates the Unified Medical Report (UMR) format that will be used in SyncMyCare. The UMR provides a detailed view of patient medical history, prescriptions, and other critical health data in an easily accessible manner.

Unified Medical Report

Patient Name: [Insert Name]
Doctor: [Insert Doctor's Name]

Date: [Insert Date]
Hospital/Clinic: [Insert Hospital Name]

Section	Details
Medical Summary	**Chief Complaints:** [Complaints Here] **Diagnosis:** [Diagnosis Here] **Physician's Comments:** [Comments Here]
Patient History	**Medical History:** [History Here] **Surgical History:** [Surgical History Here] **Family History:** [Family History Here]
Doctor's Notes	**Consultation Notes:** [Notes Here] **Follow-up Instructions:** [Instructions Here] **Special Considerations:** [Considerations Here]

Medication Name	Dosage	Frequency	Duration
[Medication 1]	[Dosage] [Dosage]	[Frequency] [Frequency]	[Duration] Medicat [Duration]

Test Name	Result	Normal Range
[Test 1]	[Result] [Result]	[Normal Range] Test 2¿ [Normal Range]

Vital Sign	Result
Blood Pressure	[BP]
Heart Rate	[Heart Rate]
Temperature	[Temperature]
Oxygen Saturation	[Oxygen]
Next Visit Date	[Date of Next Visit]
Upcoming Tests	[Upcoming Tests Here]
Referral	[Referral Information Here]

Table 1: Unified Medical Report: Summary, Prescription, Lab Results, Vital Signs, and Appointments

Figure 5: UMR Format Example

The UMR integrates AI-driven data extraction and medical insights, allowing healthcare providers to assess patient risks more effectively. The report is designed to improve patient outcomes by making critical information available at the point of care.