SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

Blood Report Fitness Evaluation System

Group Number: 6

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System Specification

Project Summary

The Blood Report Fitness Evaluation System is a comprehensive web application designed to empower users to understand their health data. Utilizing advanced Optical Character Recognition (OCR) technology, the system scans and analyzes physical blood test reports, enabling users to digitize their medical records effortlessly. Beyond simple digitization, the platform acts as an intelligent health companion, providing personalized diet plans, fitness recommendations, and health insights based on specific blood biomarkers.

Key Features

- **Smart Blood Report Analysis:** Instantly scans and digitizes over 100 medical parameters from physical reports using Tesseract.js.
- **Personalized Diet Recommendations:** Generates custom meal plans tailored to specific health conditions (e.g., Anemia, Diabetes) identified in the report.
- **Fitness Guidance:** Suggests exercise routines appropriate for the user's current health status and fitness goals.
- **Digital Lens Technology:** Advanced image preprocessing to enhance OCR accuracy, correcting for low-quality or poorly lit images.
- **Offline-First Architecture:** Fully functional Progressive Web App (PWA) that works without an active internet connection, storing data locally.
- **AI Health Assistant:** Integrated chatbot to answer general health queries and explain medical terms.

Technology Stack

- **Frontend:** React 18.3.1 for a dynamic and responsive user interface.
- **Build Tool:** Vite 5.3.1 for fast development and optimized production builds.
- **OCR Engine:** Tesseract.js 5.0.3 running entirely client-side for privacy and speed.
- **Mobile Support:** Capacitor 6.0.0 allowing deployment as a native Android application.
- **Styling:** Vanilla CSS with modern Glassmorphism design principles.
- **PWA:** vite-plugin-pwa for offline capabilities and installability.

Module Description

1. Blood Analysis Engine (bloodAnalysis.js)

This is the core intelligence module of the system. It contains a comprehensive medical knowledge base covering over 100 blood parameters. The module defines reference ranges for normal, low, and high values for each parameter. It parses the raw text extracted by the OCR engine, validates the values against likely physiological ranges to prevent errors, and identifies potential health issues.

2. OCR Scanning Interface (BloodEvaluation.jsx)

The primary user interface for data entry. This module handles image capturing and uploading. It integrates the 'Digital Lens' algorithm which preprocesses images (converting to grayscale, adjusting contrast) before passing them to the OCR engine. It features a three-tier pattern matching system to accurately extract numerical values even from noisy text, distinguishing between decimals, integers, and malformed numbers.

3. Diet & Recommendation Generator (SpecializedDiet.jsx)

Based on the analysis results, this module constructs personalized action plans. It filters through a database of dietary recommendations to suggest foods that help correct specific deficiencies (e.g., iron-rich foods for low hemoglobin). It also generates a shopping list and provides lifestyle tips tailored to the user's unique blood profile.

4. Profile & Progress Dashboard (ProfileDashboard.jsx & WeightProgress.jsx)

Manages user data persistence and visualization. This module allows users to track their health trends over time, log parameters like weight and BMI, and view their report history. It utilizes LocalStorage to ensure data remains available even when offline, providing a seamless mobile app experience.

Architectural Diagram

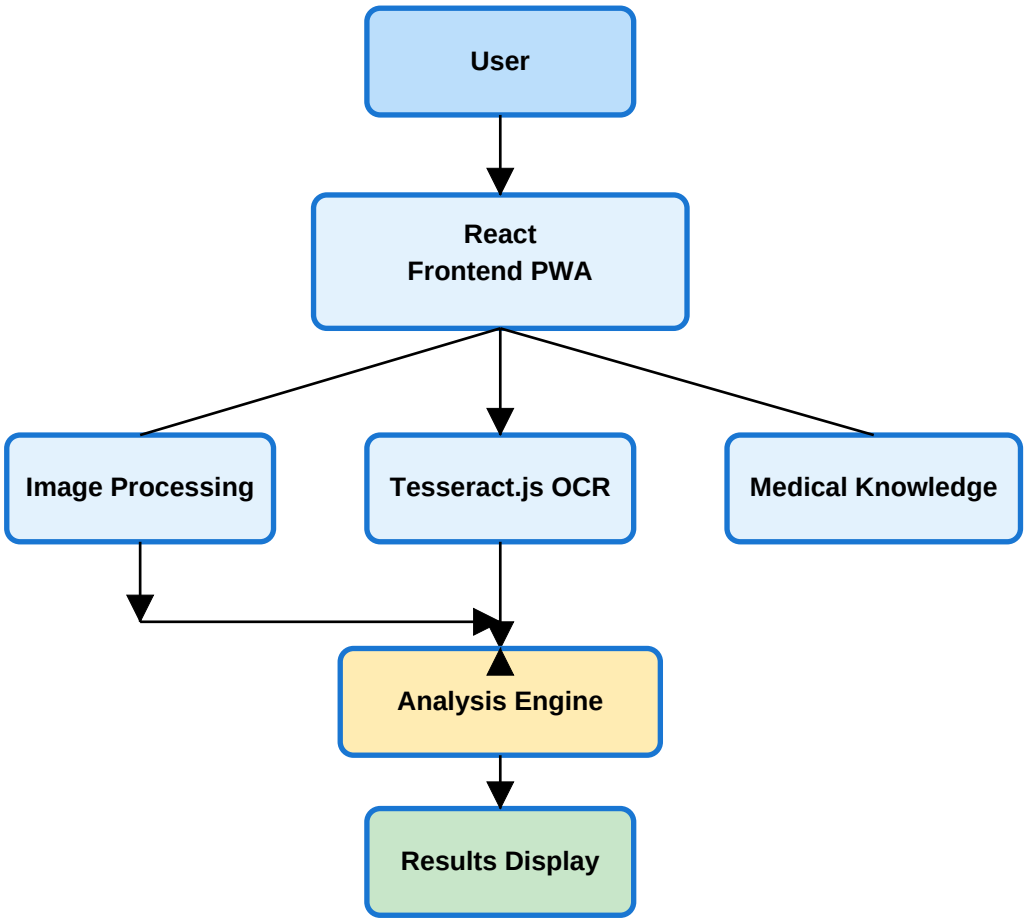

Figure 1: High-Level System Architecture and Data Flow