

Pregnancy Guide And Exercise Monitoring System

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ABSTRACT

Smart computing and artificial intelligence are playing a vital role in modern healthcare applications, particularly in personalized and remote care systems. This paper presents a Pregnancy Guide and Exercise Monitoring System, a smart AI-enabled web application designed to ensure safe physical activity and informed pregnancy care. The system leverages computer vision-based pose estimation using MediaPipe Pose to monitor pregnancy-safe exercises in real time, enabling posture analysis and repetition counting directly on the client side to preserve user privacy. In addition to exercise monitoring, the system provides trimester-specific pregnancy guidance, nutrition recommendations, health tracking, automated reports, and notification services. A role-based architecture allows secure access for patients, doctors, and administrators, supporting remote monitoring and system management. The proposed solution demonstrates how emerging smart computing technologies can enhance maternal healthcare through intelligent, accessible, and scalable digital systems.

Keywords: Pregnancy, Exercise, Monitoring, nutrition

INTRODUCTION

Pregnancy is a sensitive phase that demands safe physical activity, continuous monitoring, and personalized healthcare guidance to ensure the well-being of both mother and fetus. Although medical experts recommend regular exercise during pregnancy, improper posture and lack of supervision can lead to health risks. Most existing pregnancy and fitness applications provide static exercise videos or general guidelines without real-time posture correction or intelligent monitoring. With recent advancements in smart computing and artificial intelligence, particularly in computer vision-based pose estimation, it has become possible to analyze human movements accurately in real time. This paper presents a Pregnancy Guide and Exercise Monitoring System, an AI-powered web-based application that utilizes MediaPipe Pose to perform real-time posture detection and repetition counting during pregnancy-safe exercises while ensuring user privacy through client-side processing. In addition to exercise monitoring, the system offers trimester-specific pregnancy guidance, nutrition recommendations, health tracking, automated report generation, and notification services. A role-based access mechanism enables secure interaction among patients, doctors,

and administrators, supporting remote monitoring and informed healthcare management through an intelligent and scalable digital platform.

PROBLEM STATEMENT

Pregnant women often lack access to personalized guidance and real-time supervision while performing physical exercises, which can lead to incorrect posture and potential health risks. Existing pregnancy and fitness applications mainly provide static information and general exercise videos without intelligent monitoring, posture correction, or pregnancy-specific safety feedback. Additionally, these systems offer limited support for continuous health tracking and remote monitoring by healthcare professionals. Therefore, there is a need for an intelligent, smart computing-based solution that ensures safe exercise monitoring, personalized pregnancy guidance, and secure interaction between patients and healthcare providers.

OBJECTIVES

- To design and develop an AI-powered pregnancy care system for safe exercise monitoring.

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

- To implement real-time posture detection and repetition counting using computer vision techniques.
- To provide instant feedback and safety alerts during pregnancy-safe exercises.
- To offer trimester-specific pregnancy guidance and nutrition recommendations.
- To enable health tracking, automated report generation, and notifications.
- To support secure role-based access for patients, doctors, and administrators.

LITERATURE REVIEWS

Authors	Year	Title / Focus	Merits	Remarks
Lugaresi et al.	2019	MediaPipe: A Framework for Perception Pipelines	Enables real-time pose estimation with high accuracy	Not specific to pregnancy care
Bazarevsky et al.	2020	BlazePose: Real-Time Body Pose Tracking	Lightweight and efficient pose tracking	Requires domain-specific customization
Thompson et al.	2022	Computer Vision-Based Exercise Monitoring	Improves exercise posture and feedback	General fitness, not pregnancy-focused
Patel and Mehta	2022	AI-Based Remote Health Monitoring Systems	Supports personalized and remote healthcare	Limited real-time activity monitoring
ACOG	2022	Exercise During Pregnancy Guidelines	Provides medically approved exercise practices	No AI or monitoring support
Kumar et al.	2023	AI in Maternal Healthcare	Highlights AI potential in pregnancy care	Lacks practical implementation
Alharbi et al.	2024	Attention-Based Video Summarization Models	Enhances activity understanding	Not designed for healthcare use
Ge et al.	2024	Smart Computing in Healthcare Systems	Demonstrates smart system integration	Does not include posture monitoring

METHODOLOGY

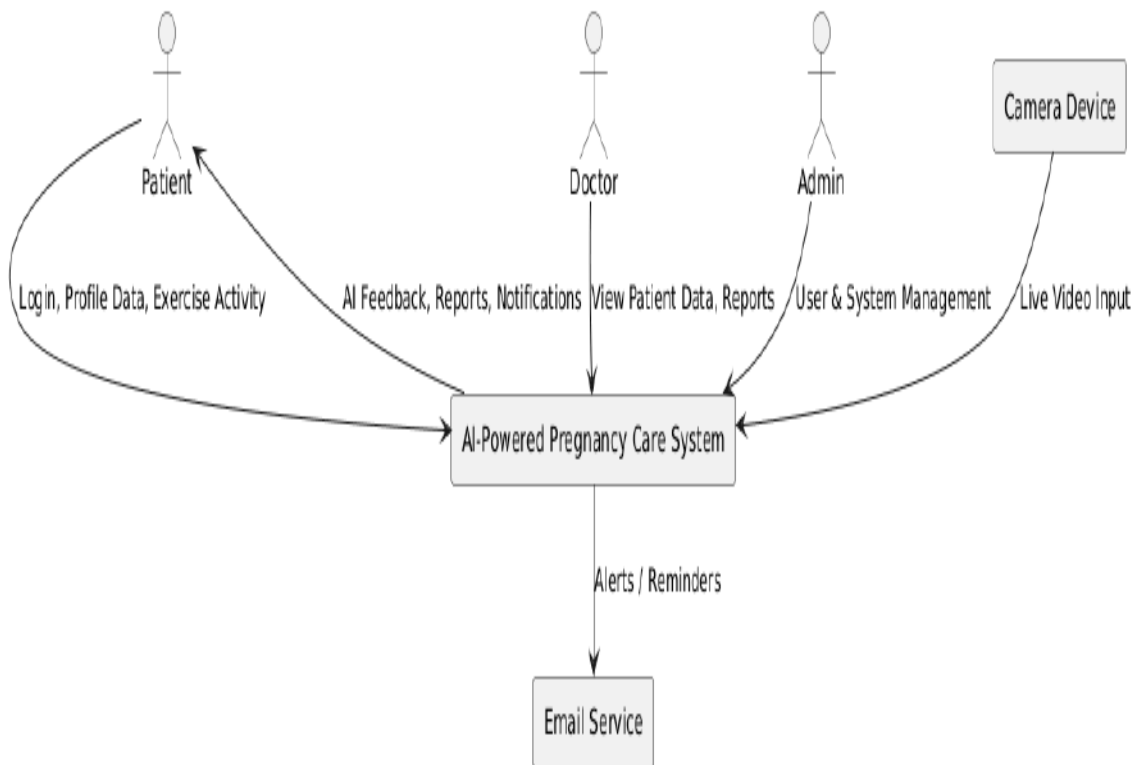
The proposed system follows an AI-driven methodology to ensure safe and personalized pregnancy care. Live video input from the user’s camera is processed locally using MediaPipe Pose to perform real-time posture detection and repetition counting during pregnancy-safe exercises, ensuring privacy by avoiding video transmission to the server. The frontend, developed using React, provides user interaction and exercise guidance, while the backend,

implemented using Django REST Framework, manages authentication, data processing, and role-based access. User data, exercise records, and health information are securely stored in a relational database. Additional modules provide pregnancy guidance, nutrition recommendations, health tracking, reports, and notifications, enabling effective remote monitoring and smart healthcare support.

DESIGN

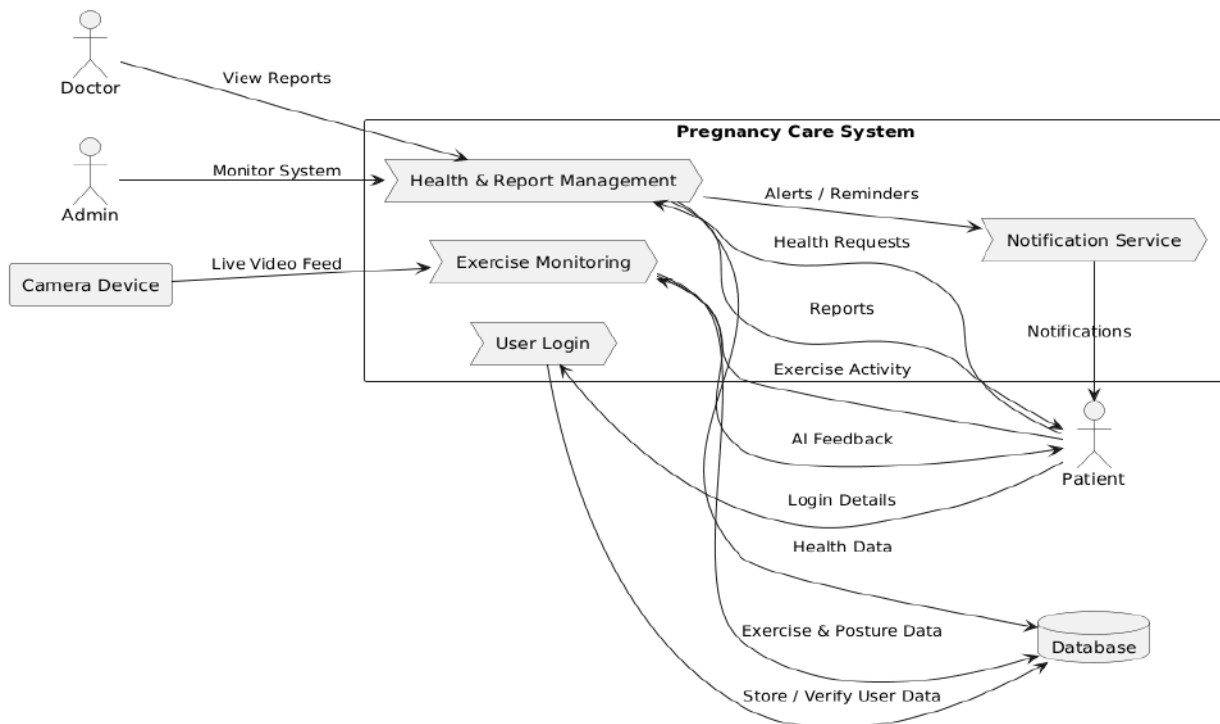
1. Context diagram

Context Diagram - AI Powered Pregnancy Care System

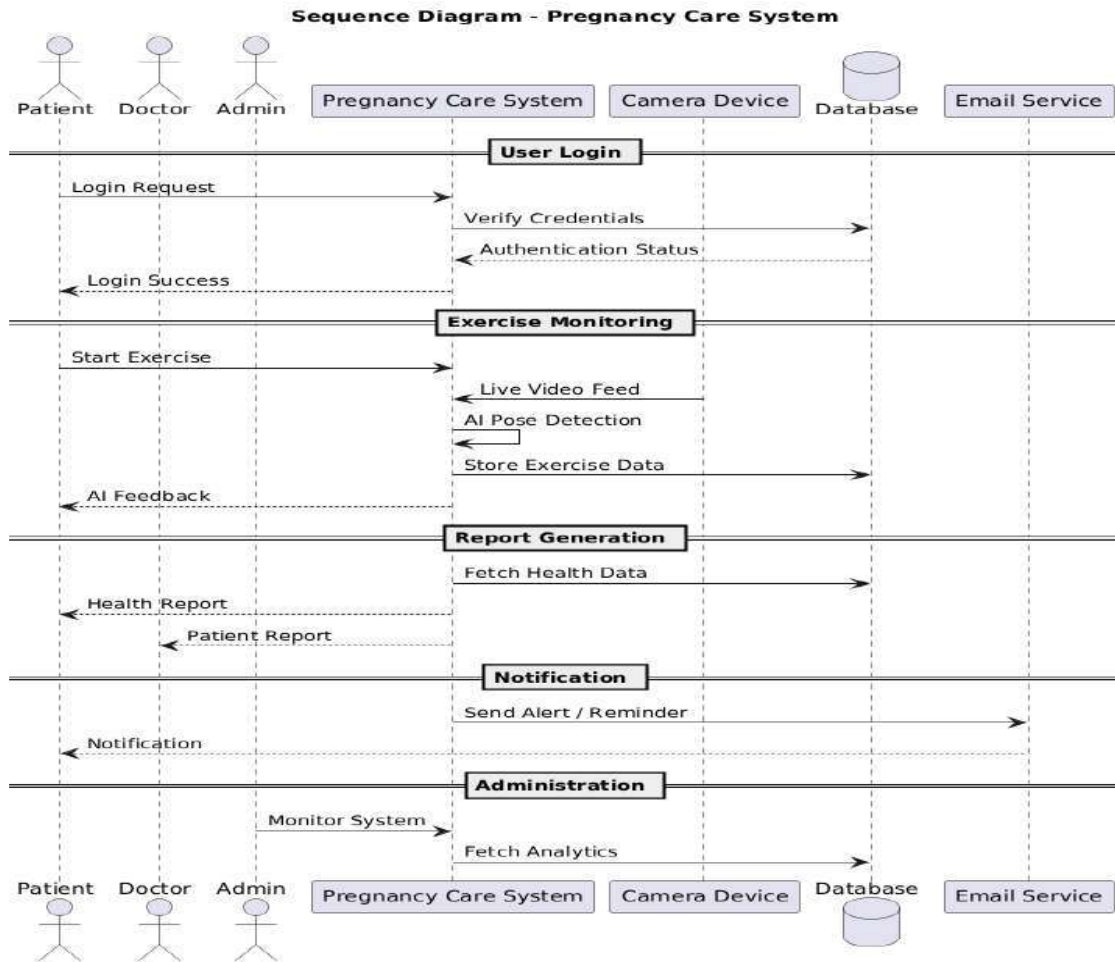


2. Use case diagram

Simple DFD with Notification - Pregnancy Care System



3.Sequence diagram



RESULTS AND DISCUSSION

Starting Page

The starting page introduces the AI-Powered Pregnancy Care Application and guides users to begin the system through login or registration and provides three login options: **Patient Login**, **Doctor Login**, and **Admin Login**, allowing users to access the system based on their roles.

Patient Login

Allows patients to securely log in and access exercise monitoring, nutrition guidance, and health reports.

Doctor Login

Enables doctors to log in and view patient health data and exercise reports in read-only mode.

Admin Login

Allows administrators to access system management, user control, and analytics features.



Fig1: starting



Fig 1.1 : login window

Patient Login

The patient login provides secure access for registered users to the AI-Powered Pregnancy Care Application. After successful authentication, patients can view and update their personal and pregnancy details, perform AI-monitored pregnancy-safe exercises, access trimester-specific nutrition guidance, receive notifications and reminders, and view weekly health reports. This login ensures personalized care while maintaining data privacy and security.

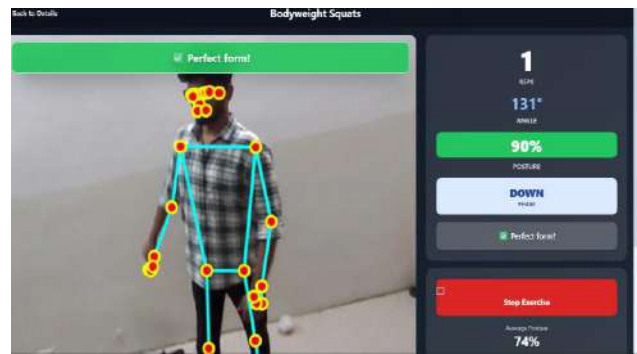


Fig 1.5: monitoring sys

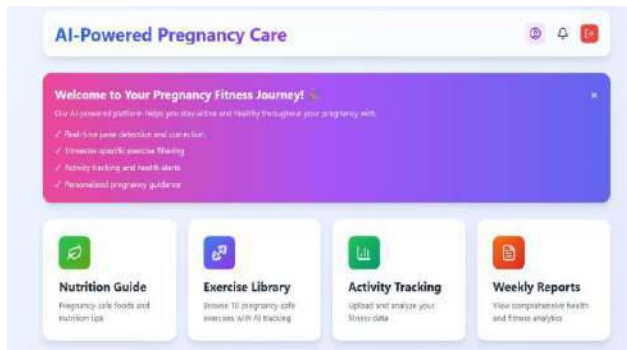


Fig 1.2: patient Home page

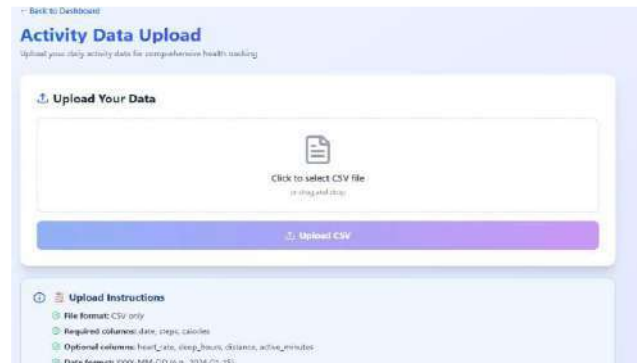


Fig 1.6: activity data uplad

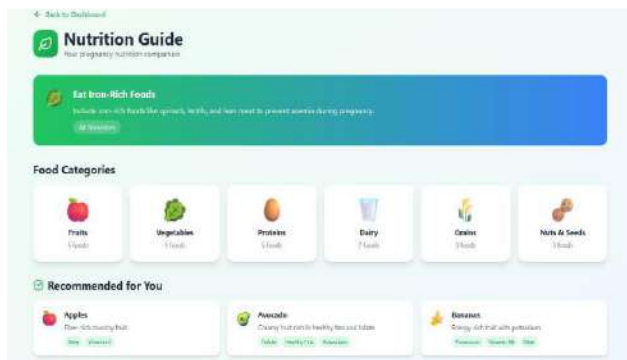


Fig 1.3: Nutritional Guide

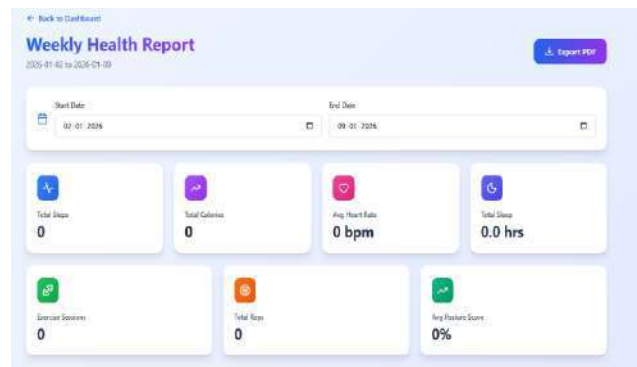


Fig 1.7: weekly health report

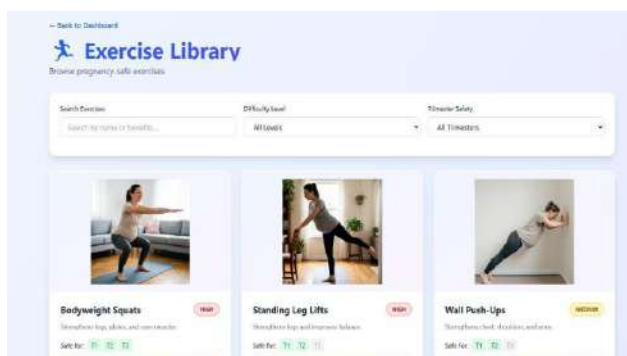


Fig 1.4: Exercise Library

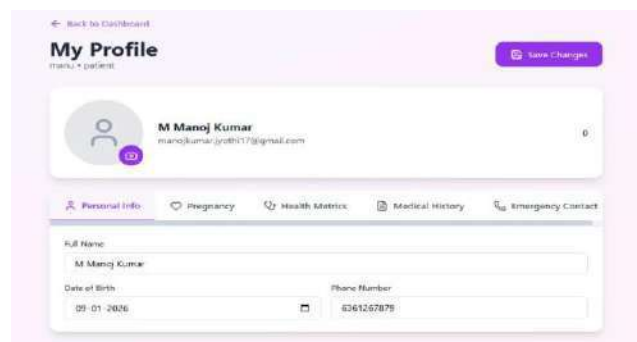


Fig 1.8: My Profile

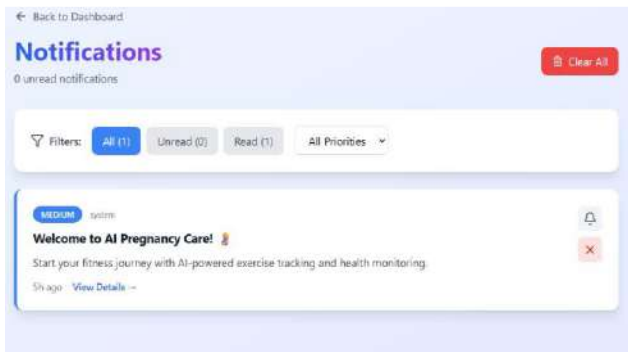


Fig 1.9:Notification

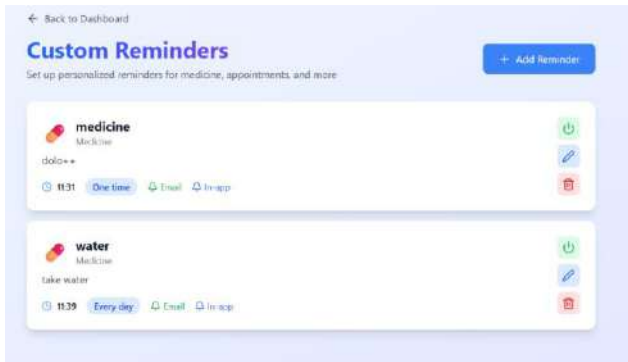


Fig 2.0:Custom Reminders

DOCTOR LOGIN

The doctor login allows authorized healthcare professionals to securely access the system. After logging in, doctors can view patient profiles, monitor exercise performance, review health reports, and analyze pregnancy-related data in read-only mode. This feature supports remote patient monitoring while ensuring data security and integrity.

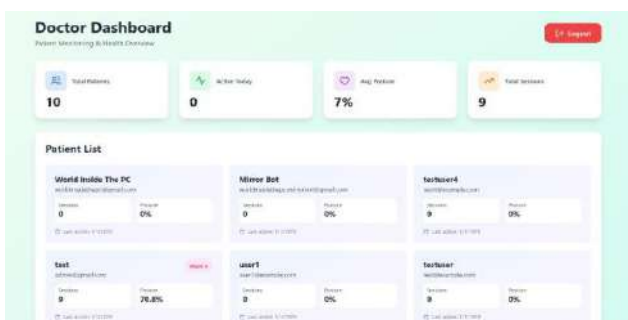


Fig 2.1:Doctor Dashboard

ADMIN LOGIN

The admin login provides secure access for system administrators to manage the overall platform. After logging in, administrators can manage users, monitor

system activities, view analytics, and ensure smooth and secure operation of the application.

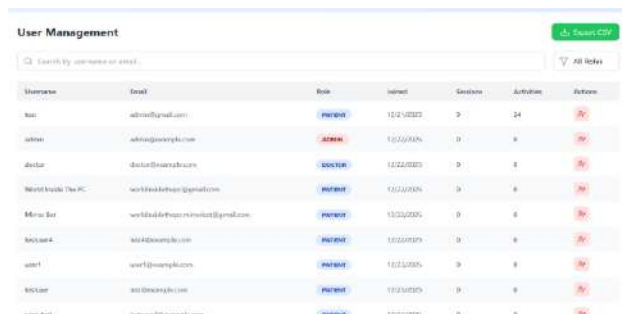


Fig 2.2: Admin Dashboard

CONCLUSION

This paper presented a Pregnancy Guide and Exercise Monitoring System that leverages smart computing and artificial intelligence to support safe and personalized pregnancy care. By integrating computer vision-based pose estimation, the system enables real-time exercise monitoring, posture correction, and repetition counting while preserving user privacy through client-side processing. In addition, the application provides trimester-specific guidance, nutrition recommendations, health tracking, and notification services with secure role-based access for patients, doctors, and administrators. The proposed solution demonstrates the effective use of emerging AI technologies in maternal healthcare and offers a scalable approach for enhancing exercise safety, remote monitoring, and overall pregnancy well-being.

REFERENCES

1. G. Lugaresi et al., “MediaPipe: A Framework for Building Perception Pipelines,” in Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, Seattle, WA, USA, pp. 1–9, June 2019.
2. V. Bazarevsky et al., “BlazePose: On-device Real-time Body Pose Tracking,” in Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, Nashville, TN, USA, pp. 1–9, June 2020.
3. TensorFlow Team, “TensorFlow.js: Machine Learning for the Web,” TensorFlow Documentation, Google, 2023.

4. Django Software Foundation, “Django: The Web Framework for Perfectionists with Deadlines,” Official Django Documentation, 2024.
5. T. McGinnis and J. Kind, “Django REST Framework: Powerful and Flexible APIs,” Django REST Framework Documentation, 2024.
6. World Health Organization (WHO), “WHO Guidelines on Physical Activity and Sedentary Behaviour,” Geneva, Switzerland, 2020.
7. American College of Obstetricians and Gynecologists (ACOG), “Physical Activity and Exercise During Pregnancy and the Postpartum Period,” ACOG Committee Opinion, no. 804, 2022.
8. R. B. Thompson et al., “Computer Vision–Based Exercise Monitoring for Healthcare Applications,” *IEEE Access*, vol. 10, pp. 112345–112356, Jan. 2022.
9. S. Patel and A. Mehta, “AI-Based Remote Health Monitoring Systems: A Survey,” *Journal of Medical Systems*, vol. 46, no. 3, pp. 1–15, Mar. 2022.

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