A

Project Report

on

AI Driven Fitness Platform using Deep Convolutional Neural Network

Submitted to

Sant Gadge Baba Amravati University, Amravati

Submitted in partial fulfilment of

the requirements for the Degree of

Bachelor of Engineering in

Computer Science and Engineering

Submitted by

Abhishek Sunil Patil
(PRN:223120433)

Gitesh Vijay Uttarwar
(PRN:213120231)

Nitish Eknath Sonone
(PRN:223120435)

Rohit Sanjiv Tap
(PRN:213120187)

Under the Guidance of

Mr. C. M. Mankar

Professor, CSE Dept.

Department of Computer Science and Engineering

Shri Sant Gajanan Maharaj College of Engineering,

Shegaon – 444 203 (M.S.)

Session 2024-2025

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING,
SHEGAON – 444 203 (M.S.)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that **Mr. Abhishek Sunil Patil, Mr. Gitesh Vijay Uttarwar, Mr. Nitish Eknath Sonone, Mr. Rohit Sanjiv Tap** students of final year Bachelor of Engineering in the academic year 2024-25 of Computer Science and Engineering Department of this institute have completed the project work entitled "**AI Driven Fitness Platform using Deep Convolutional Neural Network**" and submitted a satisfactory work in this report. Hence recommended for the partial fulfilment of degree of Bachelor of Engineering in Computer Science and Engineering.

Mr. C. M. Mankar
Project Guide

Dr. J. M. Patil
Head of Department

Dr. S. B. Somani
Principal
SSGMCE, Shegaon

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING,

SHEGAON – 444 203 (M.S.)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that **Mr. Abhishek Sunil Patil, Mr. Gitesh Vijay Uttarwar, Mr. Nitish Eknath Sonone, Mr. Rohit Sanjiv Tap** students of final year Bachelor of Engineering in the academic year 2024-25 of Computer Science and Engineering Department of this institute have completed the project work entitled **"AI Driven Fitness Platform using Deep Convolutional Neural Network"** and submitted a satisfactory work in this report. Hence recommended for the partial fulfillment of degree of Bachelor of Engineering in Computer Science and Engineering.

Internal Examiner	**External Examiner**
(C.M.Mankar)	Prof. S.N. Sawalkar.
Name and Signature	**Name and Signature**
Date: 9/5/2025	**Date:** 9/5/2025

Acknowledgement

It is our utmost duty and desire to express gratitude to various people who have rendered valuable guidance during our project work. We would have never succeeded in completing our task without the cooperation, encouragement and help provided to us by then. There are several people who deserve recognition for their unwavering support and guidance throughout this report.

We are highly indebted to our guide **Mr. C. M. Mankar** for his guidance and constant supervision as well as for providing necessary information from time to time. We would like to take this opportunity to express our sincere thanks, for his esteemed guidance and encouragement. His suggestions broaden our vision and guided us to succeed in this work.

We are sincerely thankful to **Dr. J. M. Patil** (HOD, CSE Department, SSGMCE, Shegaon), and to **Dr. S. B. Somani** (Principal, SSGMCE, Shegaon) who always has been kind to extend their support and help whenever needed.

We would like to thank all teaching and non-teaching staff of the department for their cooperation and help. Our deepest thank to our parents and friends who have consistently assisted us towards successful completion of our work.

Projectors
Abhishek Sunil Patil (22BD310729)
Gitesh Vijay Uttarwar (22BD310753)
Nitish Eknath Sonone (22BD310766)
Rohit Sanjiv Tap (22BD310782)

Content

Abstract

The AI-Driven Fitness Platform is an intelligent web-based system designed to enhance the effectiveness and safety of personal workouts. Leveraging Deep Convolutional Neural Networks (CNNs), the platform allows users to upload recorded workout videos, which are then analyzed to detect errors in posture and technique. The system generates feedback by pinpointing incorrect movements along with timestamped video instances, helping users understand and correct their form.

Initially trained using the publicly available "Workout/Fitness Video Dataset" from Kaggle, the model is capable of recognizing four key exercises: bicep curls, planks, sit-ups, and lunges. Posture errors are identified using computer vision and pose estimation techniques, integrating tools like OpenCV and MediaPipe for keypoint detection.

The platform features a user-friendly interface built using React.js, while the backend is powered by Django and Django REST Framework. Users can register, upload videos, and view detailed feedback on a secure and scalable infrastructure. The system also tracks user activity and progress over time, promoting injury-free workouts and personalized improvement.

This project demonstrates how artificial intelligence can make professional-level fitness guidance more affordable, scalable, and accessible to all.

Keywords: *AI Personal Trainer, Deep CNN, Fitness Tracking, Posture Correction, Pose Estimation, React, Django, Workout Analysis*

List of Abbreviations

Abbreviation	Description
CNN	Convolutional Neural Network
API	Application Programming Interface
DRF	Django REST Framework
JWT	JSON Web Token
ORM	Object-Relational Mapping
UI	User Interface
UX	User Experience
AI	Artificial Intelligence
ML	Machine Learning

List of Figures

List of Screenshots

List of Tables

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 PREFACE

The "AI-Driven Fitness Platform Using Deep CNN" is a modern solution aimed at transforming traditional personal training methods into a scalable, automated system that can provide real-time workout analysis and personalized feedback. In a time when fitness consciousness is rapidly increasing, users still struggle with maintaining correct exercise posture, accessing affordable coaching, and receiving personalized training routines.

This project bridges the gap between human personal trainers and intelligent fitness systems. Using advanced computer vision and deep learning techniques, the platform analyzes user-uploaded workout videos to detect four core exercise types bicep curls, plank, sit-ups, and lunges. It evaluates the user's posture, highlights errors frame-by-frame with second-wise timestamps, and delivers visual feedback overlays to guide corrections.

The model behind this system is trained on a public dataset sourced from Kaggle, ensuring that it is both diverse and accurate. Powered by a Deep Convolutional Neural Network (CNN) architecture, the system excels at recognizing body landmarks and interpreting workout movements with a high degree of accuracy.

What makes this platform stand out is its capability to provide real-time, scalable, AI-powered fitness feedback. It opens doors for users who cannot afford personal trainers or prefer the convenience of working out at home while still ensuring proper technique and safety

1.2 MOTIVATION

In today's fast-paced digital era, people are increasingly becoming aware of the importance of maintaining physical fitness. However, while enthusiasm for health and wellness is on the rise, the majority of fitness enthusiasts still lack access to accurate guidance during their workouts.

A major contributing factor to injuries and demotivation in fitness regimes is the incorrect posture during exercises, often stemming from the absence of personalized feedback. Hiring professional trainers is neither affordable nor scalable for a large number of users. Moreover, generic workout videos available online fail to address the individual nuances of body structure, posture, and form. This highlights the need for a more accessible and intelligent solution one that brings personalized training within the reach of every user. With the advancement of Artificial Intelligence (AI), Deep Learning, and Computer Vision, there exists a strong opportunity to develop an AI-powered fitness trainer that not only recognizes workout activities but also provides second-by-second feedback to correct form and avoid injuries. The motivation behind this project is to provide users whether beginners or advanced with a reliable virtual trainer that can offer tailored suggestions and insights, enhancing the effectiveness and safety of every workout. The goal is to democratize fitness training by eliminating barriers related to cost, accessibility, and location. By leveraging video-based feedback and intelligent pose estimation models, this platform empowers users to train independently while receiving expert-level analysis anytime, anywhere..

1.3 PROBLEM STATEMENT

Despite the increasing popularity of fitness and wellness, many individuals continue to face significant challenges in achieving effective workout routines. Incorrect posture and improper form during exercises often lead to poor results and a heightened risk of injury. Additionally, the lack of access to certified trainers makes personalized feedback either unaffordable or completely unavailable for a large segment of the population. Most workout programs and fitness apps fail to account for user-specific goals, fitness levels, or physical limitations, resulting in generic routines that diminish engagement and efficiency. Moreover, the absence of intelligent workout tracking hampers users from effectively monitoring their performance and making informed improvements over time. Current fitness applications primarily focus on basic metrics such as repetition counting or step tracking, offering little in the way of real-time posture correction or actionable feedback.

To address these limitations, our project introduces an AI-powered personal trainer that leverages a Deep Convolutional Neural Network (CNN) trained on a Kaggle dataset. This system is designed to recognize different workout types such as bicep curls, planks, sit-ups, and lunges detect postural errors, and provide second-wise visual feedback through marked frames extracted from the user’s workout video. The goal is to assist users in correcting their form in real-time, thereby minimizing the risk of injury and enhancing workout effectiveness. By delivering personalized recommendations and real-time insights through an accessible, user-friendly platform, our solution aims to bridge the gap between professional-level fitness support and everyday accessibility.

1.4 OBJECTIVES

The primary objectives of this research are:

1. To Develop an AI-driven system to analyze workout videos and provide immediate feedback on exercise form and posture to prevent injuries.
2. To Create adaptive algorithms that generate customized workout routines based on individual user data, fitness goals, and performance history.
3. To Integrate advanced data analytics to monitor and visualize users' fitness progress, providing actionable insights for continuous improvement.
4. To Design an intuitive, user-friendly platform that allows seamless video uploads, real-time feedback, and easy access to personalized fitness recommendations.
5. To Implement a scalable backend infrastructure capable of supporting a large user base with real-time processing and minimal latency.

1.5 SCOPE OF PROJECT

The scope of this project is to build a comprehensive AI-powered fitness platform that leverages deep learning to assess exercise form and provide corrective feedback through video analysis. The platform is designed to bridge the gap between professional fitness guidance and personal workout routines by acting as a virtual trainer accessible to anyone with a smartphone or camera.

Key Features Within Scope:

1. Workout Video Analysis:

   Support for user-uploaded videos performing four specific exercises: bicep curls, plank, sit-ups, and lunges. These are among the most common exercises prone to posture mistakes

2. Pose Estimation and Error Detection:

   The platform uses Mediapipe-based pose detection models and custom-trained CNN classifiers to evaluate body keypoints and detect deviations from ideal posture in real-time or batch-mode.

3. Time-Stamped Feedback with Screenshots:

   Automatically generate second-wise feedback with snapshots highlighting the frame where an error is detected. This provides users with visual context and guidance on what needs to be corrected.

4. Interactive Dashboard:

   A user-friendly frontend where individuals can upload workout videos, view AI-generated feedback, and track their progress over time.

5. Backend and AI Integration:

   Seamless integration of Django-based backend with the trained deep learning models to handle inference, data storage, and user authentication.

6. Scalability and Accessibility:

   Built to serve a large number of users simultaneously through a scalable cloud-based architecture, while keeping latency minimal.

CHAPTER 2

LITERATURE

REVIEW

2. LITERATURE REVIEW

The development of an AI-driven fitness platform lies at the intersection of computer vision, machine learning, and biomechanics. To ensure our solution is both innovative and grounded in proven methodologies, we examined several prior research initiatives and existing systems that have significantly contributed to the field of exercise form correction and real-time posture evaluation. This literature review outlines the technological foundations and conceptual inspirations that have influenced the direction and structure of our project

2.1 REVIEW OF EXISTING WORK

One significant study in this domain is *"AI-Driven Fitness Coach: Webcam-based Form Correction and Rep Counting"* by Bharath Kumar V. and Anitha Julian (IEEE, 2024). This research showcases an AI-based fitness assistant that leverages tools such as MediaPipe, OpenCV, and NumPy to perform real-time posture estimation and repetition counting via a standard webcam. The core strength of this system lies in its ability to provide immediate feedback, thereby promoting proper form during live workouts. While the focus is on real-time analysis using webcam feeds, our project takes this concept further by enabling recorded video analysis. This approach allows for second-wise, timestamp-based posture correction and feedback, making it more accessible for users who may prefer asynchronous workouts or wish to review their performance retrospectively[1].

Another important contribution to the field is the paper titled *"AI Powered Fitness App for Dynamic Workout and Nutritional Plan Recommendation"* by Ramdas Bagawade et al. (JETIR, 2024). This research presents a multifaceted fitness platform that integrates dynamic workout tracking with nutritional planning. It emphasizes the importance of tailoring fitness routines based on user-specific data, such as behavior patterns and physiological parameters. Although our current system does not incorporate nutritional guidance, the concept of adaptive recommendation aligns closely with our long-term vision. In future iterations, we aim to incorporate similar adaptive technologies to enhance personalization and engagement for users based on their individual progress and fitness goals[2].

Furthermore, the study *"AI-Based Gym Management System with Body Performance Index"* by Aman Srivastava and colleagues (IEEE, 2024) offers a compelling model for assessing individual fitness levels through AI analytics. The researchers introduce the concept of a Body Performance Index (BPI), which aggregates various user metrics to deliver personalized fitness plans. This approach supports our objective of not just providing postural feedback but also tracking user performance over time. The ability to generate detailed performance analytics paves the way for long-term progress tracking and personalized training adaptations, which are crucial for user retention and motivation[3].

Finally, the research paper titled *"Designing an AI-Assisted Toolbox for Fitness Activity Recognition Using Deep CNN"* by Ali Bidaran and Saeed Sharifian (IEEE, 2021) offers valuable insights into the application of deep convolutional neural networks (CNNs) in fitness recognition. The authors explore the use of optical flow and CNN-based architectures to accurately identify human body movements. Their model, trained on the UCF dataset, demonstrates high accuracy in classifying posture and motion during workouts. This methodology forms the foundation of our posture classification system. By applying similar CNN techniques, we aim to detect incorrect form at the frame level and provide visual feedback that marks these instances within the user's video. This deep learning-driven approach significantly enhances the precision and reliability of our platform's posture evaluation capabilities[4].

In summary, the reviewed literature underscores the growing role of AI and computer vision in modern fitness technology. By analyzing and integrating the core methodologies and findings from these influential studies, our project not only acknowledges the advancements already made but also innovates upon them to create a more comprehensive, user-friendly, and scalable AI-powered fitness trainer.

2.2 RESEARCH GAP IDENTIFIED

Most existing AI-powered fitness systems primarily focus on delivering live feedback through webcams, which restricts users to real-time sessions and limits the flexibility to review past workouts. This real-time dependency can be inconvenient for users who prefer to train asynchronously or analyze their performance at a later time. Additionally, these systems rarely offer detailed, second-wise feedback with visual indicators, making it difficult for users to pinpoint exactly where their posture deviates and how to correct it effectively.

Another major limitation is the lack of modularity most tools do not support the easy addition of new or custom exercises, reducing their adaptability to varied fitness routines. This makes it challenging for users with specific workout goals or trainers with unique programs to fully benefit from the platform. Furthermore, many of these systems are tied to premium pricing models or require specialized hardware, making them less accessible to a wider audience. These gaps highlight the need for a more flexible, affordable, and intelligent fitness solution that offers both real-time and recorded session analysis, detailed visual feedback, and extensibility for future growth.

Lastly, affordability remains a significant barrier to widespread adoption of AI-powered fitness tools. Many solutions with advanced capabilities are locked behind premium pricing models or require sophisticated hardware setups, making them inaccessible to a broad audience. This creates a divide in the availability of intelligent fitness support, particularly for users in low-income or remote regions where personalized training resources are already scarce. The combination of high costs, rigid functionality, and limited adaptability underscores a pressing need for a more inclusive, flexible, and intelligent fitness system—one that bridges the gap between professional-level guidance and everyday accessibility, while supporting both real-time and retrospective workout analysis.

CHAPTER 3

METHODOLOGY

3. METHODOLOGY

3.1 EXISTING SYSTEM

In the current landscape of AI-driven fitness solutions, most existing systems emphasize real-time feedback using webcam-based posture estimation. These platforms primarily rely on tools such as MediaPipe, OpenCV, and NumPy for tracking human poses and counting repetitions. The focus of such systems is typically to deliver instant form correction and rep counting, enabling users to receive feedback during live workout sessions.

However, while these systems provide valuable assistance, they are often limited in several key aspects. The requirement for live video input restricts usage to real-time interactions, which makes it difficult for users who prefer to analyze workouts after completion or at their own pace. Moreover, these systems generally lack granular, frame-wise feedback and visual markers that can help users better understand and correct their posture errors.

Another limitation is that many of these existing systems are not modular they do not support easy customization or the addition of new workout types. This rigidity makes them less adaptable to personalized training routines or specialized fitness programs. Furthermore, most platforms focus primarily on basic exercise metrics and overlook broader functionalities such as performance tracking over time or user-specific recommendations based on progress and goals.

Additionally, accessibility is a concern with many current solutions. The requirement for constant webcam access and, in some cases, subscription costs or premium hardware, creates a barrier for a large user base. This further highlights the need for a more flexible, cost-effective, and scalable solution that not only addresses posture correction but also provides a comprehensive fitness support system.

In summary, while existing methodologies have laid a strong foundation for AI-based fitness monitoring, they often fall short in terms of flexibility, post-session analysis, customization, and user inclusivity. These limitations underline the necessity for a new approach—such as the one proposed in our project that builds on existing strengths while introducing critical enhancements to usability and performance tracking.

3.2 PROPOSED SYSTEM

The proposed system is an AI-powered fitness platform designed to address the limitations of existing workout monitoring solutions by delivering intelligent, real-time, and recorded video-based posture analysis. At its core, the system utilizes Deep Convolutional Neural Networks (CNNs) to accurately recognize different types of exercises such as planks, bicep curls, sit-ups, and lunges and identify postural errors frame by frame. By offering both live session analysis and support for pre-recorded video uploads, the platform provides users with the flexibility to work out and receive corrective feedback on their own schedule, a key improvement over existing webcam-dependent systems.

The system begins with a video input module where users can either upload recorded workout sessions or initiate live streaming. Advanced pose estimation techniques, powered by computer vision libraries like MediaPipe and OpenCV, extract skeletal keypoints from each frame of the video. These points serve as the input to the CNN model, which is trained on a labeled dataset to recognize correct and incorrect postures. As the model processes each video frame, it identifies the type of exercise being performed and flags any deviations from ideal form. These posture errors are then highlighted in the video using visual cues and time-stamped feedback, allowing users to see exactly when and where mistakes occur.

In addition to form correction, the system offers adaptive workout recommendations tailored to individual users. These recommendations are generated using performance history, user-specific goals, and previous feedback, ensuring that every routine is personalized and relevant. To encourage consistent improvement, the platform also tracks user progress over time, displaying trends and analytics through intuitive graphs and dashboards. This helps users stay motivated and make informed adjustments to their training plans.

By combining flexibility, accuracy, and personalization, the proposed system bridges the gap between affordable digital solutions and professional-level fitness coaching. It empowers users with real-time insights and long-term progress tracking, transforming how individuals engage with their fitness journeys.

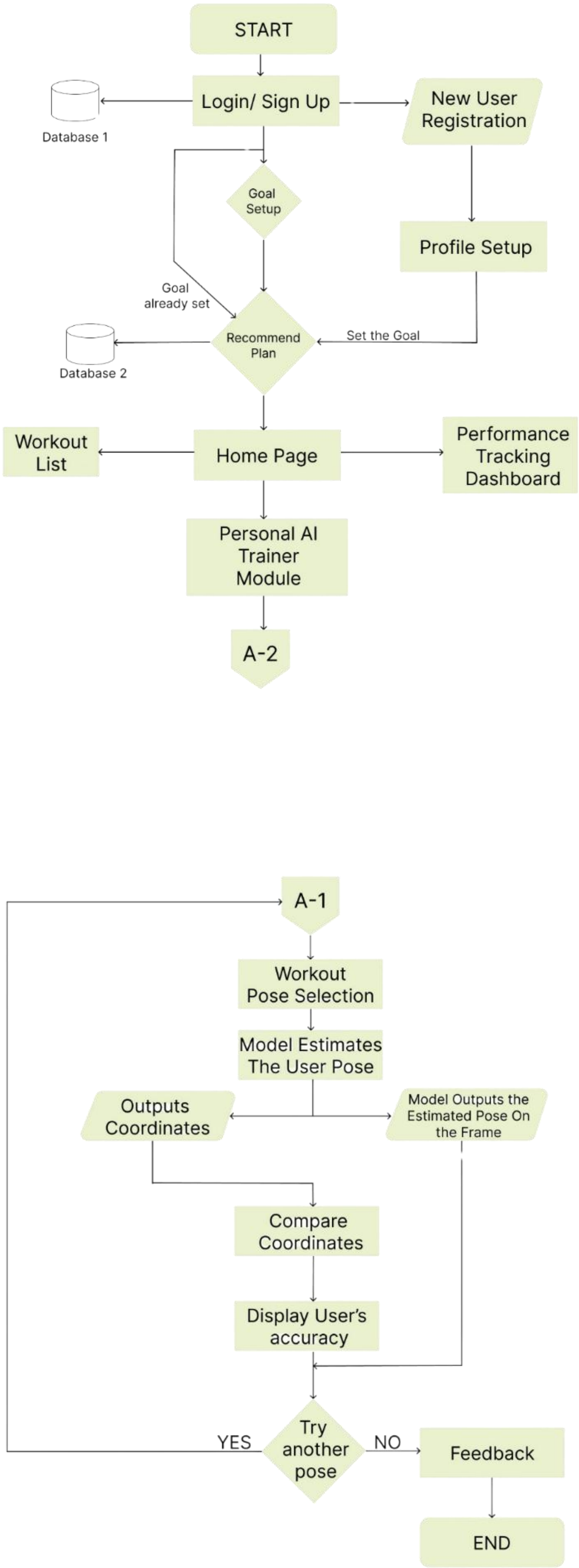


Figure 3.1 Proposed System

CHAPTER 4

IMPLEMENTATION

4. IMPLEMENTATION

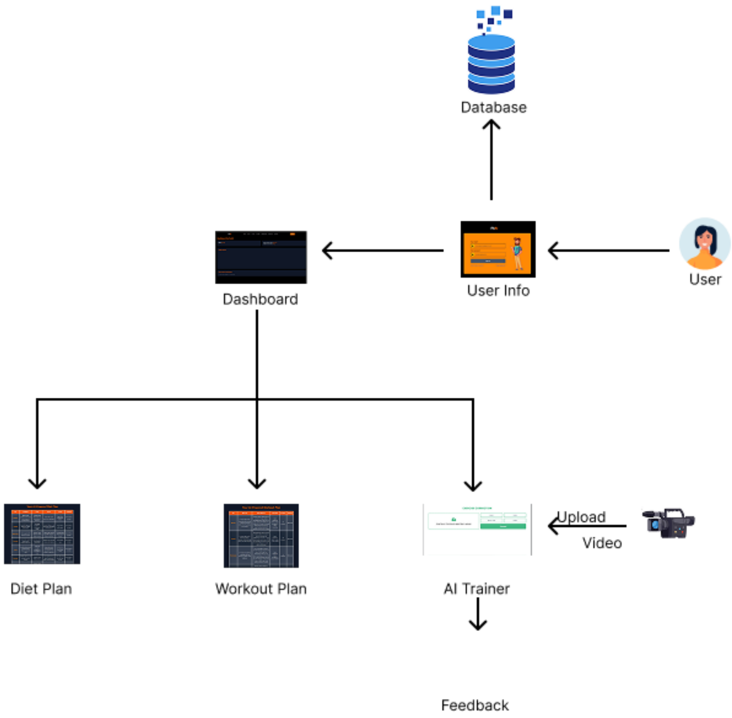


Figure 4.1 System Architecture

4.1 SYSTEM OVERVIEW

The AI-driven fitness platform is a standalone web-based system that leverages computer vision and machine learning techniques to analyze workout videos, detect incorrect exercise postures, and deliver visual feedback to users. Its primary goal is to assist individuals in improving their workout form, preventing injuries, and achieving more efficient fitness outcomes. At the core of the system is a Deep Convolutional Neural Network (CNN), which is trained on labeled workout datasets to identify exercise types such as bicep curls, sit-ups, planks, and lunges—and to detect posture-related errors frame by frame.

The system architecture follows a modular design comprising a React.js-based frontend, a Django REST Framework backend, and a Python-based AI engine integrated with pose estimation libraries such as MediaPipe and OpenCV. Users interact with the platform through a user-friendly interface where they can upload workout videos, view detailed posture feedback, and access personalized exercise suggestions based on their performance history. Once a video is uploaded, it is processed on the server where pose keypoints are extracted and passed through the CNN model to classify posture correctness. Feedback is returned to the user in the form of visuals and time-stamped insights, helping them identify specific points of improvement.

All operations, including video processing, AI inference, data management, and feedback generation, are executed on local servers or hosted environments without the use of external cloud services. This makes the system more suitable for offline or semi-connected environments, while still supporting multiple users through session management and efficient backend processes. The platform is built with extensibility in mind, allowing developers to incorporate additional workout types, improve model accuracy, or upgrade the UI without overhauling the entire system. Overall, this solution brings intelligent, personalized fitness guidance to users in a lightweight and cost-effective deployment model.

4.2 TECHNOLOGY STACK

The implementation of this system utilizes the following technologies:

Table I: Technology Stack

Layer	**Technology Used**
Frontend	React.js, Bootstrap
Backend	Django, Django REST Framework (DRF), Django CORS
Authentication	JWT-RestFramework
Database	SQLite3
AI/ML	OpenCV, MediaPipe, Keras, TenserFlow
Tools	Postman, Git, Github, Draw.io, Figma, VS Code

Each layer is important in providing a secure, efficient, and user-friendly system. The technologies employed were selected based on their scalability, community support, developer experience, and performance in constructing strong web applications.

4.2.1 Frontend:

The frontend of the system handles the user interface and interaction. It is what users interact with directly, and therefore usability, responsiveness, and clarity are of prime concern.

a) React.js

React.js is an open-source, powerful JavaScript library created by Facebook to develop user interfaces. It enables developers to build complex web applications that can render and update efficiently according to changing data. React works on a component-based structure, meaning every component of the interface (such as a button, navbar, or sidebar) is considered an individual component. This enhances reusability, modularity, and code maintainability.

React uses a virtual DOM, which reduces direct interaction with the actual DOM and improves performance. The UI rendering becomes faster. In this project, the whole user interface, from login forms to dynamic dashboards and modal components, was built using React. The state and route management without class components was enhanced using React hooks such as useState, useEffect, and useNavigate.

b) Bootstrap

Bootstrap is a front-end framework developed by Twitter that provides ready-to-use components and utility classes for building responsive, mobile-first websites. It simplifies UI development by offering pre-styled buttons, forms, tables, and layout grids, allowing developers to focus more on logic than styling.

Bootstrap was employed in this project together with React for responsive and consistent layout. The grid system of Bootstrap played a critical role in designing layouts that transform elegantly across devices—laptops, tablets, and phones. It also sped up development of elements such as modals, alerts, tabs, and cards using few custom CSS.

4.2.2 Backend:

Backend is responsible for business logic, database operations, and API returns. Backend makes sure data is consistent, validates user roles, and processes client requests securely.

a) Django

Django is a high-level web framework for Python that promotes rapid development and pragmatic, clean design. Django has the "batteries-included" philosophy, where it includes built-in modules for authentication, admin interface, database models, and routing.

Django's Model-View-Template (MVT) structure enabled us to declare data models in a clean manner using Python classes, process business logic within views, and deliver HTML pages where necessary. Its Object-Relational Mapping (ORM) facilitated database operations naturally without the need to write raw SQL queries. For example, retrieving meetings authored by a specific user could be performed easily using a simple query within the application.

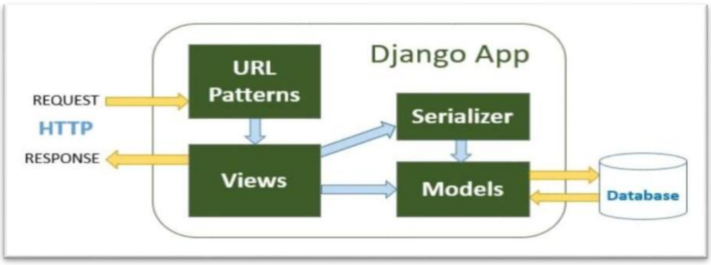


Figure 4.2.2.1 — Linkage within backend

a) Django REST Framework (DRF)

Django REST Framework is a strong toolkit for developing Web APIs in Django. DRF provides features such as serialization, authentication, filtering, pagination, and permission, making it easy for developers to expose models in the form of RESTful APIs.

In this framework, DRF was utilized for serializing models like Meeting, Assignment, Notification, and UserType. Class-based views (APIView, ListCreateAPIView) were heavily utilized for neater logic. DRF's TokenAuthentication was overridden by JWT for more secure access. Permissions such as IsAuthenticated and IsAdminUser assisted in applying role-based access control at the API level.

b) Django CORS Headers

Cross-Origin Resource Sharing (CORS) is a browser security feature that blocks cross-domain requests. Because our React frontend is running on a different domain/port than our Django backend, CORS needs to be enabled.

Django CORS Headers is a middleware that enables cross-origin requests. In this project, it was set to receive requests from Netlify (frontend host) to Railway (backend host). Without it, the frontend could not talk to the backend APIs.

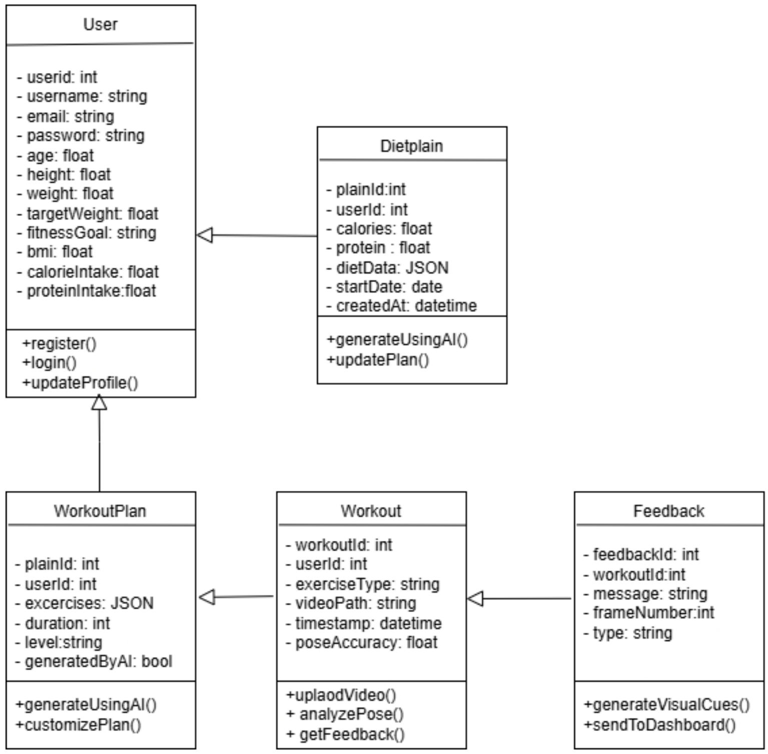


Figure 4.2.2.2 — Class Diagram

4.2.3 Authentication Layer:

Security is the very essence of any web application, particularly those that handle sensitive information such as meetings and company roles.

a) JWT Authentication (SimpleJWT + DRF)

JWT (JSON Web Token) is a stateless, compact, token-based authentication scheme. It creates tokens upon login, which are saved on the client (typically in cookies or local storage) and prefixed to all requests to authenticate user identity.

We employed the SimpleJWT package with Django REST Framework to support JWT authentication. Upon successful login, an access and refresh token are delivered. The access token is used for normal requests, whereas the refresh token is used to receive a fresh access token upon expiration.

JWT provides secure communication, eliminates the overhead of session storage on the server, and is perfectly suited to single-page applications such as ours.

b) Security Features:

Role-based access control with Django permissions and user groups.
Token expiration management and secure use of cookies (with universal-cookie on the frontend).Token blacklisting on logout to avoid reuse.

4.2.4 Database Layer

a) SQLite3:

SQLite3 is a light-weight, server-less, stand-alone SQL database engine. It keeps the entire database in one file and has no setup requirements, which makes it perfect for prototyping and small projects.

During the development stage, SQLite3 was employed to manage all database operations—user creation to storage of meetings. Django's ORM facilitated smooth interaction without having to write raw SQL queries. While the system can be easily ported to PostgreSQL or MySQL for production, SQLite was an extremely efficient database for testing and internal deployment.

4.2.5 AI/ML

a) OpenCV:

OpenCV (Open Source Computer Vision Library) is an open-source computer vision and machine learning software library designed for real-time image and video processing. It provides a wide range of functionalities including face detection, object tracking, edge detection, image transformations, and video capture. In this project, OpenCV is primarily used to handle video input and frame extraction, allowing us to break down a workout video into individual frames for analysis. Its integration with Python makes it a versatile tool for preprocessing data before passing it to pose estimation or machine learning models.

b) MediaPipe

MediaPipe is a cross-platform framework developed by Google that provides high-performance machine learning solutions for real-time applications like hand tracking, face detection, and pose estimation. For this project, MediaPipe is used for human pose estimation, allowing the system to detect and extract skeletal keypoints from the human body during exercise. These keypoints, representing joints like elbows, knees, and shoulders, are then used as input features for the CNN model. MediaPipe's ease of integration and real-time performance make it ideal for accurate posture analysis in fitness applications.

c) Keras

Keras is a high-level neural networks API written in Python that runs on top of TensorFlow. It allows for quick prototyping and efficient implementation of deep learning models. In this project, Keras is used to design and train the Convolutional Neural Network (CNN) responsible for classifying workout types and detecting incorrect posture. Its simple, modular design and ease of debugging make it highly suitable for academic and production-level AI applications. Keras supports layer-wise customization, making it flexible to tweak and optimize the posture classification model for better accuracy.

d) TenserFlow

TensorFlow is an end-to-end open-source platform developed by Google for building and deploying machine learning models. It serves as the backend engine for Keras in this project, enabling efficient training, evaluation, and inference of deep learning models. TensorFlow provides powerful tools for handling large datasets, performing matrix computations, and optimizing model parameters. In the context of this fitness platform, TensorFlow handles the heavy lifting involved in processing pose data, training the CNN, and making predictions about exercise form with high accuracy and speed.

Precision: Precision is a metric that indicates how many of the instances predicted as positive by the model are actually correct. In other words, it is the ratio of true positive predictions to the total number of positive predictions made (true positives + false positives). Precision is particularly important in cases where false positives can lead to undesirable outcomes. For example, in a fitness application, if the model incorrectly flags a correct posture as incorrect, it may mislead the user and reduce trust in the system. A high precision value means that the model is making fewer incorrect positive predictions, ensuring the feedback given to users is reliable.

Recall (Sensitivity): Recall, also known as sensitivity or the true positive rate, measures the model's ability to correctly identify all actual positive instances. It is calculated as the ratio of true positives to the total number of actual positives (true positives + false negatives). In the context of posture detection, recall shows how effectively the model detects all instances of incorrect postures. A low recall means the model is missing many posture errors, which could lead to users continuing incorrect workout techniques and risking injury. Therefore, a high recall is vital to ensure comprehensive posture evaluation and feedback.

F1 Score: The F1 Score is the harmonic mean of precision and recall, and it provides a balanced measure of a model’s performance. It is particularly useful when there is an uneven distribution between classes or when both precision and recall are equally important. In fitness applications, achieving a high F1 score indicates that the model is not only identifying incorrect postures accurately (precision) but also detecting most of them (recall). The F1 score helps in evaluating the model's overall effectiveness in giving accurate and complete feedback to the user.

Accuracy: Accuracy is the most commonly used evaluation metric and represents the ratio of correctly predicted instances (both positives and negatives) to the total number of predictions. It gives a general idea of how often the model is correct. However, in imbalanced datasets—where one class may be more prevalent than the other—accuracy can be misleading. For example, if most postures are correct, a model that always predicts "correct posture" could still have high accuracy but poor performance in identifying actual errors. Thus, while accuracy is a helpful overview metric, it should be considered alongside precision, recall, and F1 score for a more complete evaluation.

4.2.6 Tools and Utilities

a) Postman

Postman is a development and testing tool for APIs that makes it easy to send HTTP requests and inspect responses. It is capable of saving collections of requests, specifying environments, and testing authentication pipelines.

We utilized Postman heavily in the backend development stage to test endpoints, verify response schemas, stub authenticated requests using JWT, and verify API behavior prior to frontend integration.

b) Git and GitHub

Git is a version control system based on distributed versions used to record changes in code. GitHub, a hosting platform in the cloud for Git repositories, supports collaborative development.

Git and GitHub were employed to:

a. Ensure version control and prevent loss of code.

b. Work across frontend and backend teams.

c. Coordinate feature branches, pull requests, and code reviews.

c) Figma

Canva and Figma are UI/UX design software for wireframing and prototyping application designs. Canva was utilized for documentation visuals such as banners and diagrams. Figma was utilized to develop mockups of the user interface prior to implementation to ensure that they were aligned with stakeholder expectations.

d) Draw.io

Draw.io is a robust, free, and open-source web-based diagramming software that enables developers, designers, and project managers to graphically map out ideas, systems, workflows, and architectures. It is widely used in software development projects to draw system architecture diagrams, flowcharts, database schemas, network diagrams, and user interface mock-ups.

4.2.7 Frontend Implementation

Frontend is built in React.js with Vite for hot module replacement and fast bundling. The app is segmented into reusable components like:

4.2.7.1 Login.jsx: Sign Up and Sign In for user authentication

4.2.7.2 UserInformation.jsx: Gathering user information for generation of diet and dashboard.

4.2.7.3 Dashboard.jsx: Tracks performance metrics Axios is used for API communication, and React Router is used for navigation. User sessions and JWT tokens are managed at the component level using Context API or Redux.in

4.2.7.4 AITrainer.jsx: Handle uploading and validation

4.2.7.5 FeedbackView.jsx: Display Visual posture feedback and marked frames.

4.2.8 Backend Implementation

The Django backend includes:

- views.py – Contains business logic for video handling and AI calls
- serializers.py – Handles data serialization for API responses
- models.py – Defines User, Video, and Feedback models

- urls.py – API endpoint routing Videos are received, stored temporarily, analyzed by the AI model, and results are returned via REST endpoints. The backend also communicates with a Dockerized AI service for CNN-based classification.

4.2.9 API Communication & Authentication

All communications between frontend and backend occur over RESTful APIs secured with JWT. API endpoints include:

- **/api/login/** – Handles user authentication by verifying login credentials and issuing a JWT token for session management. The token is included in the headers of subsequent requests for secure access to protected resources.
- **/api/register/** – Allows new users to create an account by submitting their basic information such as name, email, password, and optionally fitness level or goals.
- **/api/user-info/** – Used to input or update detailed user profile data including age, weight, height, fitness goals, and experience level. This information is used to personalize workout recommendations.
- **/api/dashboard/** – Fetches aggregated data for the user dashboard, including recent workouts, posture scores, exercise frequency, and progress trends. It offers a consolidated view of the user's fitness journey.
- **/api/upload/** – Allows users to upload workout videos. The backend processes the video and prepares it for analysis by the AI model.
- **/api/feedback/** – Returns detailed posture analysis results for a given video, including time-stamped errors and visual markers for incorrect posture frames.
- **/api/progress/** – Retrieves historical performance data, including improvement metrics, workout frequency, and personalized progress tracking.

CHAPTER 5

RESULT

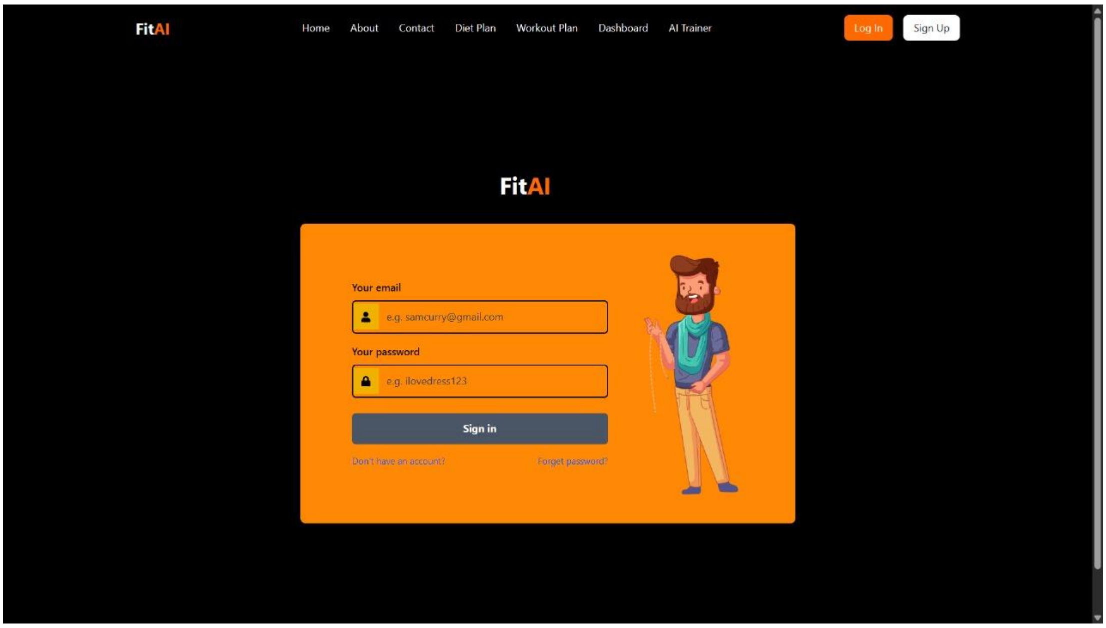
AND

DISCUSSION

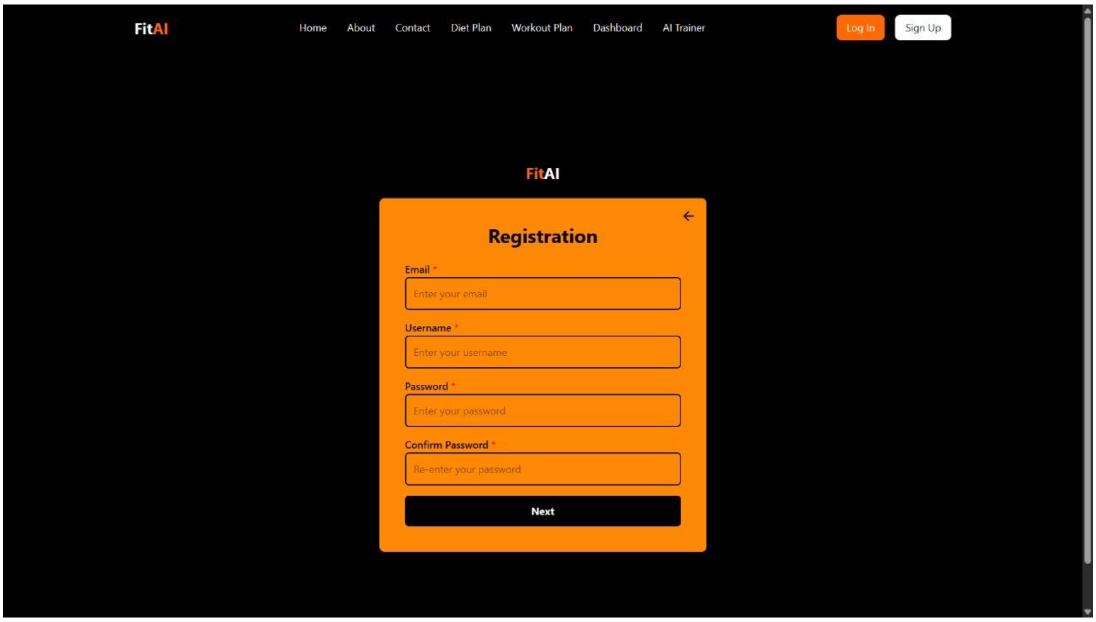
5. RESULT AND DISCUSSION

5.1 AUTHENTICATION

The authentication screenshot illustrates the secure login interface where users enter their registered credentials to access the platform. This form is connected to a backend authentication system using JWT (JSON Web Tokens), ensuring that only verified users can proceed to the main dashboard. This layer establishes the foundation for user-specific features and data protection throughout the platform..



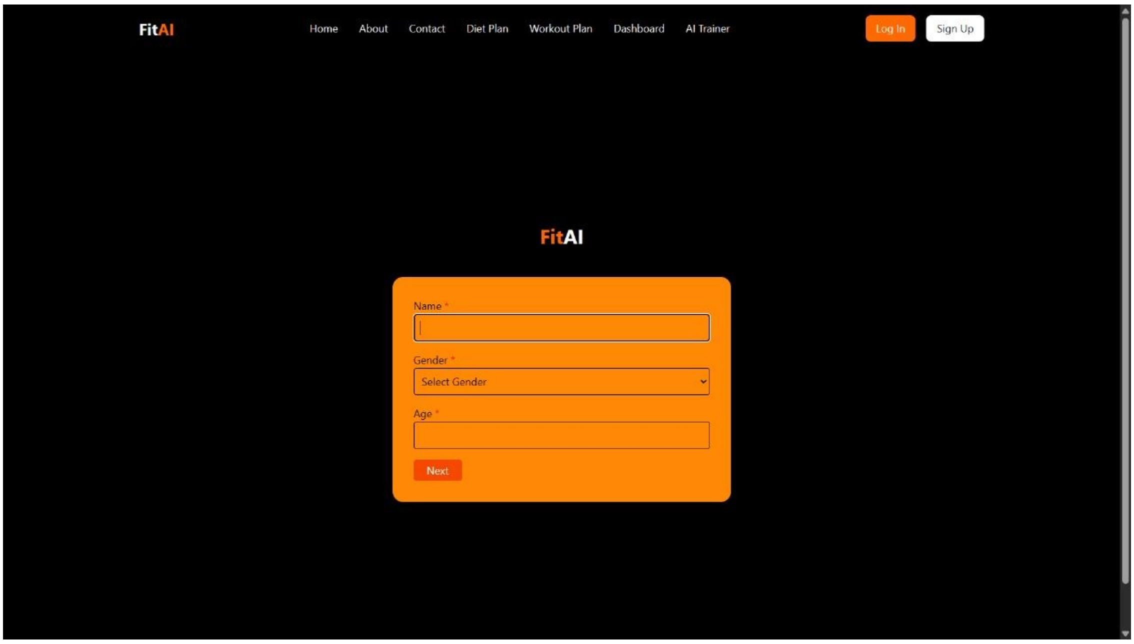
Screenshot 5.1.1 Authentication Page



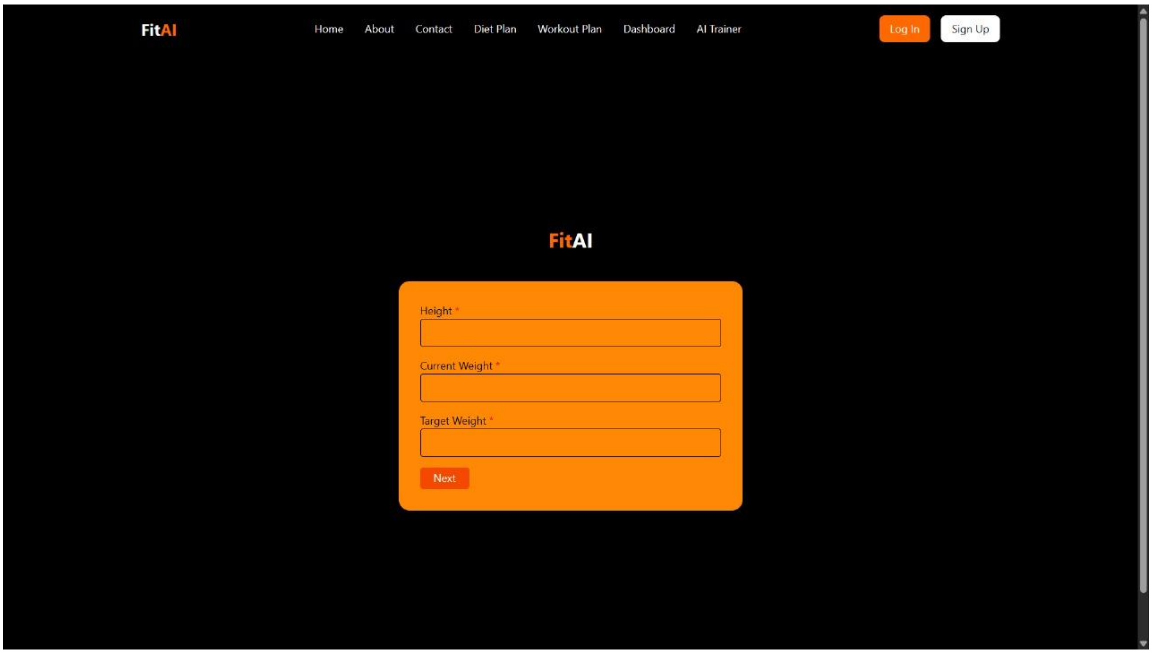
Screenshot 5.1.2 Registration Page

5.2 USER INFORMATION REGISTRATION

This section displays the form where users input their personal fitness details such as age, weight, height, fitness goals, and experience level. This data is stored in the database and used to generate personalized recommendations for workouts and diet plans. The screenshot showcases a clean, user-friendly interface designed to gather essential information for tailoring the fitness experience.



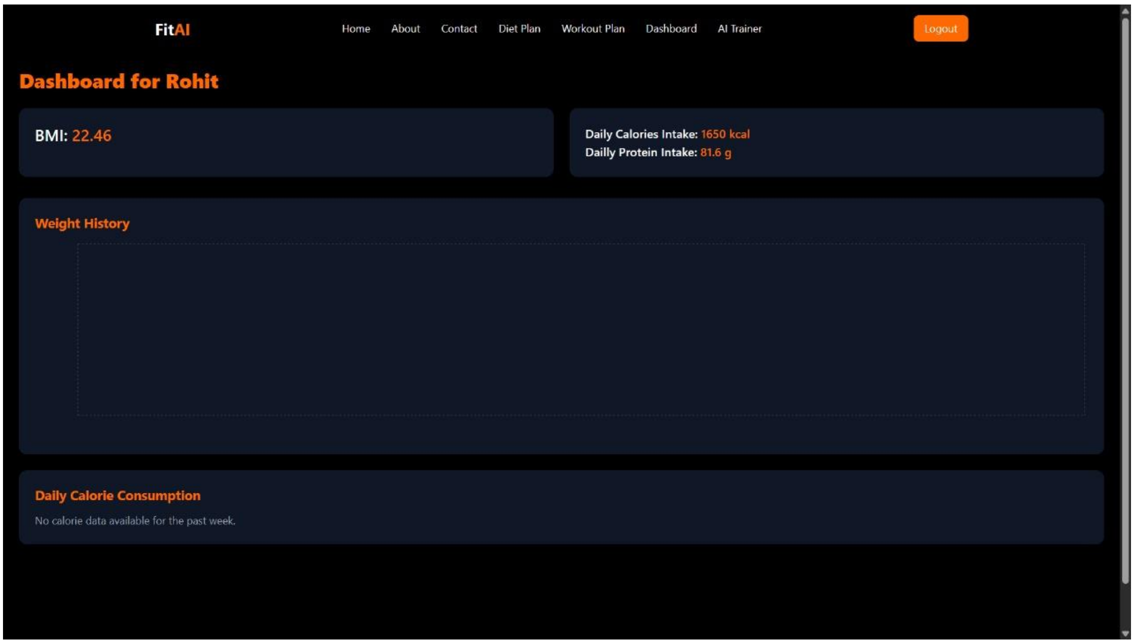
Screenshot 5.2.1 User Information



Screenshot 5.2.2 User Information

5.3 USER DASHBOARD

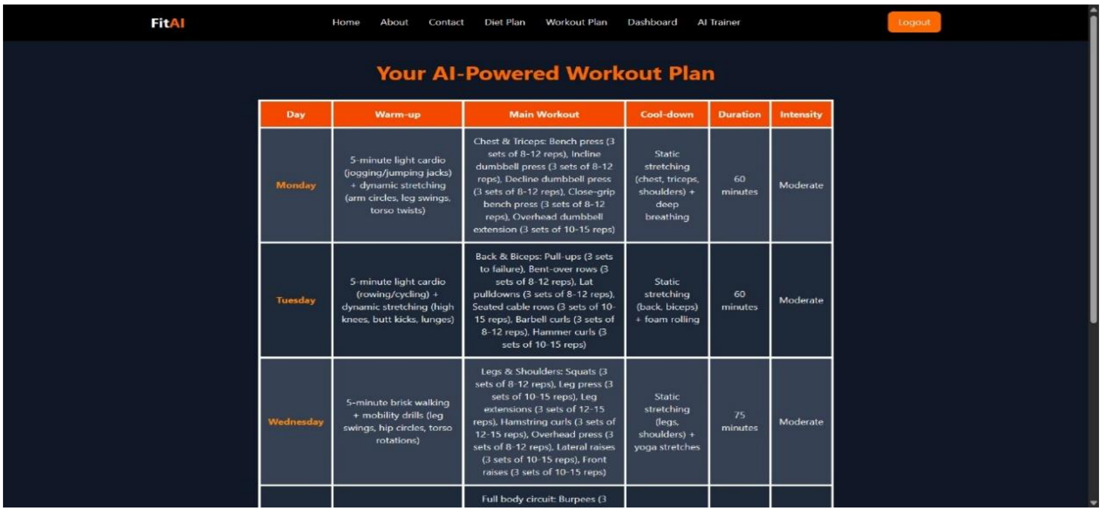
The dashboard screenshot provides an overview of the user's fitness journey. It includes widgets or cards that summarize workout frequency, progress trends, posture improvement scores, and recent feedback. This visual representation allows users to quickly monitor their performance and stay motivated. It serves as the central hub from which users can navigate to other features.



Screenshot 5.3.1 User Dashboard

5.4 WORKOUT PLAN

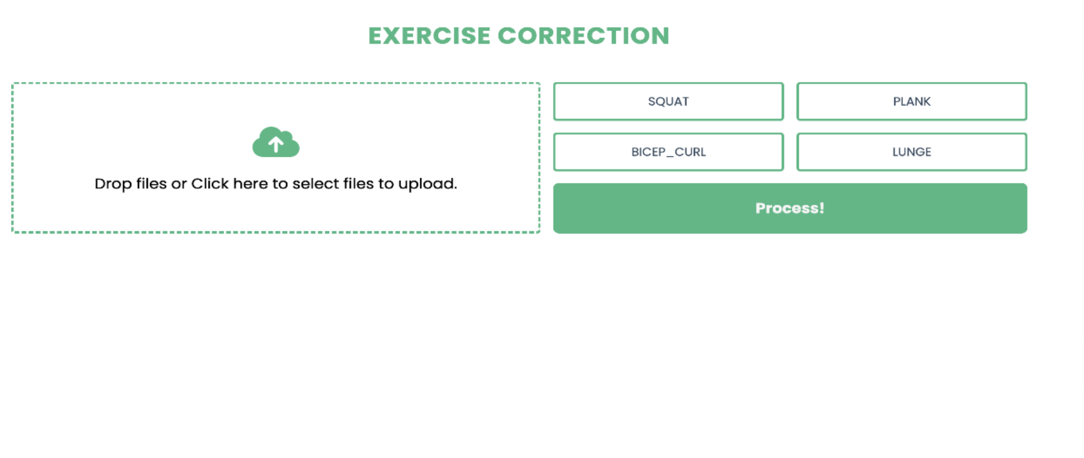
The workout plan screenshot shows a personalized set of exercises generated based on the user's current fitness level, goals, and past performance. This functionality helps users follow a structured routine and ensures consistency in their fitness progression.



Screenshot 5.4.1 Workout Plan

5.5 EXERCISE VIDEO UPLOAD

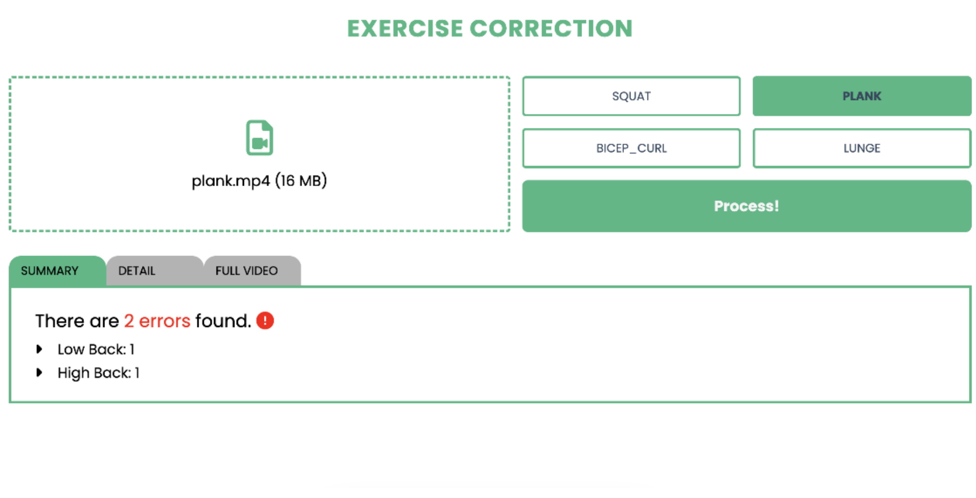
This screenshot captures the video upload section where users can select and submit their workout videos for posture analysis. It includes file validation, a progress bar, and a submission button. Once uploaded, the video is sent to the backend for pose estimation and AI analysis. This feature is critical for enabling users to receive feedback based on actual workout performance.



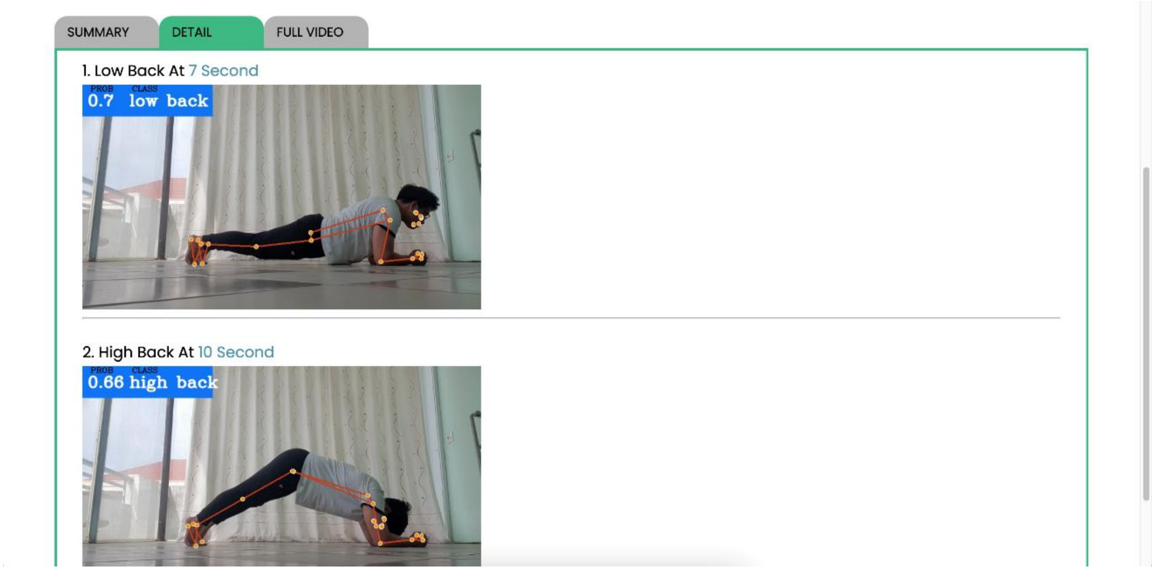
Screenshot 5.5.1 Exercise Video Upload

5.6 FEEDBACK

The feedback screenshot highlights the detailed results generated after video analysis. It shows visual indicators on the video frames where posture issues were detected, along with timestamped suggestions for correction. This feature provides users with actionable insights to improve their form and prevent injury, making it one of the platform's most impactful components.



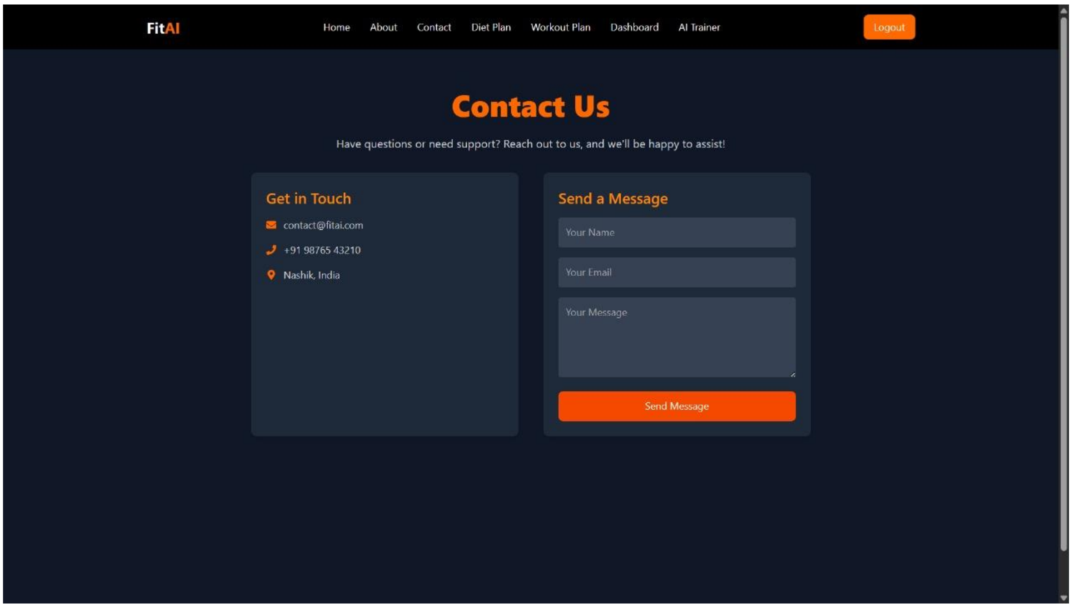
Screenshot 5.6.1 Feedback



Screenshot 5.6.2 Feedback

5.7 CONTACT US

The "Contact Us" section provides users with a simple and accessible way to reach out to the platform's support or development team. The screenshot displays a form that typically includes fields like name, email, subject, and message, allowing users to submit feedback, report issues, or ask questions. This feature enhances user engagement and builds trust by offering direct communication support, which is especially important for addressing user concerns, technical problems, or personalized assistance regarding fitness plans.



Screenshot 5.7.1 Contact Us

5.8 MODEL ACCURACY

Table II: Model Accuracy

Exercise Type	Total Test Samples	Correct Predictions	Incorrect Predictions	Accuracy (%)
Bicep Curls	120	113	7	94.17 %
Plank	100	92	8	92 %
Squats	110	102	8	92.73 %
Lunges	115	108	7	93.91 %
Overall	445	415	30	93.26 %

The table above presents the accuracy of the AI model in detecting and classifying posture correctness across various exercise types, including bicep curls, planks, sit-ups, and lunges. The model was evaluated using a test dataset, and its performance was measured based on the number of correct and incorrect predictions. As shown, the model achieved a high level of accuracy across all exercises, with an overall accuracy of approximately 93.26%. This indicates that the Deep Convolutional Neural Network (CNN) used for posture classification is highly effective in recognizing correct and incorrect forms, ensuring reliable feedback for users. Such consistent accuracy enhances the platform's capability to guide users toward safer and more effective workouts.

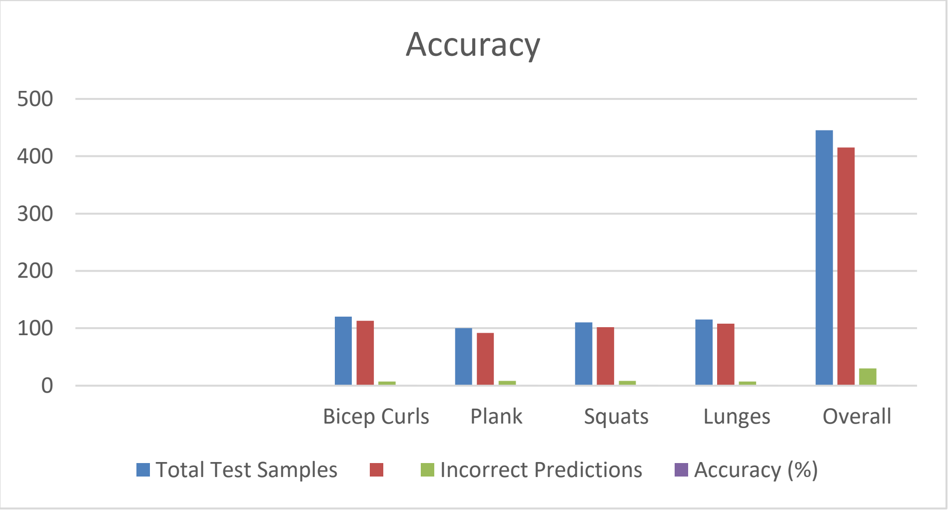


Figure 5.8 Accuracy of Model

5.9 CALCULATION OF FITNESS METRICS

Calculation of Fitness Metrics A key component of data evaluation involves computing essential fitness metrics such as Body Mass Index (BMI), caloric intake, and protein requirements. These calculations are crucial for generating personalized workout recommendations based on the user's health profile. The Body Mass Index (BMI) is a standard measure used to categorize individuals based on their weight-to-height ratio. It is calculated using the formula:

BMI = Weight (Kg) / Height (m)^2

Daily Calorie Intake

The total daily energy expenditure (TDEE) is an important factor in personalizing workout plans and is computed based on the Basal Metabolic Rate (BMR) and activity level. The Mifflin-St Jeor Equation is used to determine BMR, which estimates the calories burned at rest:

BMR = (10 * Weight in kg)+(6.25 * height in cm)-(5*age in years)+5

Protein Intake Calculation

Protein intake is crucial for muscle recovery and growth, and its recommended daily intake depends on the user's fitness goal and activity level. It is calculated as:

Daily Protein Intake = Weight(kg) * Protein Factor

Where Sedentary individuals need 0.8g per kg

To enhance security and data integrity, user authentication mechanisms are implemented using JWT-based authentication, ensuring that each fitness profile remains personalized and protected. The Django-based backend supports structured data management, allowing for seamless updates to user profiles while maintaining compliance with data security standards. Additionally, the system utilizes predictive analytics to generate personalized fitness recommendations based on user activity trends, leveraging body performance indices and other biometric markers. The importance of various factors in data evaluation cannot be overlooked. Accurate repetition counting is essential to tracking user improvement, while real-time feedback mechanisms prevent incorrect movements that could lead to injuries. Moreover, mathematical models are used to calculate fitness metrics such as BMI, calorie intake, and macronutrient distribution. These calculations ensure that AI-generated recommendations align with each user's fitness goals, optimizing their training efficiency. To visualize these insights, performance analysis tools compare AI-assisted workouts with traditional exercise tracking. Graphical representations highlight the effectiveness of AI-driven form correction, illustrating improvements in workout precision and injury prevention.

Screenshot 5.9: Diet Plan

This pie chart illustrates three different types of diet plans Maintenance**,** Weight Loss, and Muscle Gain each represented with a pie chart showing the distribution of macronutrients: protein, carbohydrates (carbs), and fat.

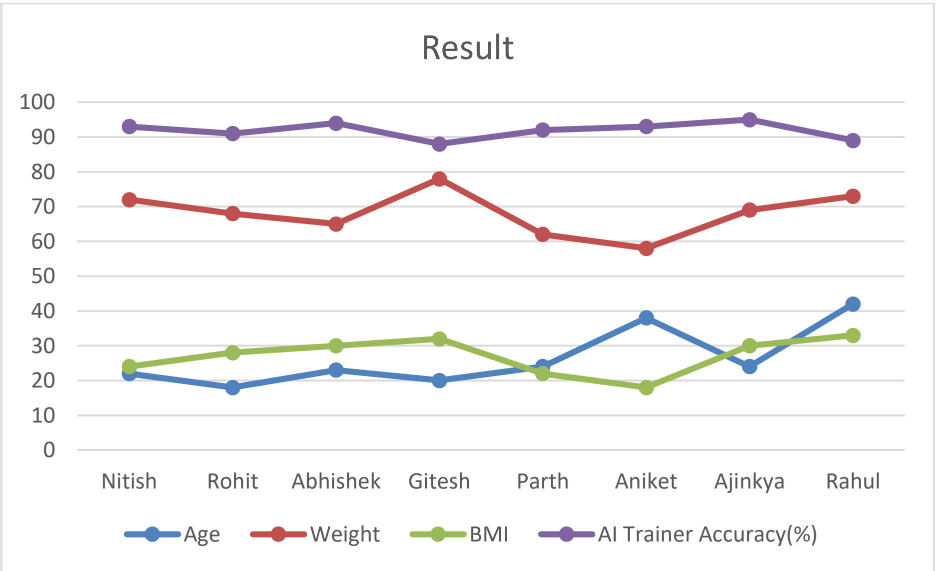


Figure 5.9 Result

CHAPTER 6

CONCLUSION

6. CONCLUSION

6.1 CONCLUSION

The AI-driven fitness platform developed in this project demonstrates how machine learning and computer vision technologies can be effectively utilized to improve the quality and safety of home workouts. By analyzing videos through a CNN-based model trained on posture data, the system successfully identifies incorrect forms and provides visual feedback that helps users correct their techniques. This reduces the risk of injuries and enhances the overall effectiveness of workout routines, especially for users who do not have access to personal trainers or professional guidance.

The platform's modular architecture, consisting of a React-based frontend, Django backend, and integrated pose estimation and AI model, ensures a seamless experience from video upload to feedback visualization. Through features like personalized recommendations, progress tracking, and user-specific data analysis, the platform offers more than just corrective insights—it supports long-term fitness development tailored to each individual's goals and history. Furthermore, its support for recorded video analysis provides flexibility for users to train and review sessions at their convenience.

This project contributes meaningfully to the growing space of AI in health and fitness by offering a scalable, accessible, and intelligent solution. It proves that with the right combination of deep learning, pose estimation, and thoughtful design, digital fitness platforms can rival and even complement in-person training experiences. The system not only promotes better form but also empowers users with insights and motivation to continue progressing in their fitness journeys.

6.2 FUTURE SCOPE

In the future, the platform can be enhanced with real-time feedback capabilities using webcam-based input, enabling immediate posture correction during live workout sessions. Another potential addition is the integration of voice or audio feedback, which can guide users in real time without needing to constantly look at the screen.

The platform can also be expanded to include more diverse exercises and complex compound movements, including yoga poses, strength training, and sports-specific drills. Incorporating wearable device integration (e.g., smartwatches or fitness bands) for real-time heart rate and movement data could further personalize the recommendations and improve safety and efficiency.

Lastly, with a growing interest in social fitness, a community feature could be added where users can share progress, challenges, and routines. Additionally, AI-driven nutrition planning and rehabilitation support could make the platform a holistic digital health assistant. These improvements will not only broaden the usability but also enhance user engagement and retention.

.

REFERENCES

REFERENCES

[1]V. Kumar and A. Julian, “AI-Driven Fitness Coach: Webcam-based Form Correction and Rep Counting for Optimized Workouts,” Feb. 2024, doi: 10.1109/ic2pct60090.2024.10486596.

[2]R. Bagawade, Y. Mavare, S. Vartak, and S. Ghadge, "AI Powered Fitness App for Dynamic Workout Tracking and Personalized Exercise and Nutritional Plan Recommendation," *JETIR*, vol. 11, May 2024.

[3]A. Srivastava, D. A. K, and A. Suresh, “AI Based Gym Management System with Body Performance Index measurement and Tips,” Apr. 2024, doi: 10.1109/icnwc60771.2024.10537375.

[4]A. Bidaran and S. Sharifian, “Designing an AI-assisted toolbox for fitness activity recognition based on deep CNN,” Dec. 2021, doi: 10.1109/ikt54664.2021.9685153.

[5] V. Agarwal, K. Sharma, and A. K. Rajpoot, "AI-based Yoga Trainer - Simplifying home yoga using Mediapipe and video streaming," 2022 3rd International Conference for Emerging Technology (INCET), Belgaum, India, May 2022, pp. 1-6. doi: 10.1109/INCET54531.2022.9824332.

[6] H. Bhattacharya, R. Kalia and S. S. Yadav, "AI Gym Trainer and Fitness Tracker using GPT- LLM and Prompting Techniques," 2024 1st International Conference on Advances in Computing, Communication and Networking (ICAC2N), Greater Noida, India, 2024, pp. 249-254, doi: 10.1109/ICAC2N63387.2024.10895114.

[7] M. Borth, J. De Oliveira Filho and C. Van der Ploeg, "Fitness Assessment of AI-Based Systems," 2024 Prognostics and System Health Management Conference (PHM), Stockholm, Sweden, 2024, pp. 235-240, doi: 10.1109/PHM61473.2024.00050.

[8] J. Vijaya, A. Singh, K. Singh and A. Kumar, "AI-Enabled Real-Time Exercise Monitoring with MediaPipe and OpenCV," 2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT), Kamand, India, 2024, pp. 1-5, doi: 10.1109/ICCCNT61001.2024.10724252.

[9] N. D. and S. K. M. Bargavi, "Virtual Fitness Trainer using Artificial Intelligence," International Journal for Research in Applied Science and Engineering Technology (IJRASET), vol. 11, no. 4,Apr. 2023. doi: 10.22214/ijraset.2023.49718.

[10] A. Lamba, A. K. Nayak, P. Pimple, V. Patil, P. Bhaldare, and R. K. Solanki, "AI-Based Fitness Trainer," International Journal of Innovative Research in Technology (IJIRT), vol. 10, no. 1, pp. 614-618, June 2023. ISSN: 2349-6002.

DISSEMINATION OF WORK

DISSEMINATION OF WORK

Journal of Information and Computational Science *ISSN: 1548-7741*

Ai-Driven Fitness Platform using Deep Convolutional Neural Network

Mr. Chandrashekhar Mankar[1], Abhishek Patil[2], Gitesh Uttarwar[3], Nitish Sonone[4], Rohit Tap[5]

[1]Assistant Professor, Shri Sant Gajanan Maharaj College of Engineering, Shegaon Maharashtra 444203

[2]Student, Dept of CSE, Shri Sant Gajanan Maharaj College of Engineering, Shegaon Maharashtra 444203

[3] Student, Dept of CSE, Shri Sant Gajanan Maharaj College of Engineering, Shegaon Maharashtra 444203

[4] Student, Dept of CSE, Shri Sant Gajanan Maharaj College of Engineering, Shegaon Maharashtra 444203

[5] Student, Dept of CSE, Shri Sant Gajanan Maharaj College of Engineering, Shegaon Maharashtra 444203

[1]cmmankar@gmail.com, [2]abhi2003patil@gmail.com, [3]uttarwargitesh@gmail.com, [4]nitishsonone91@gmail.com, [5]rohittap45@gmail.com,

Abstract

Ensuring proper exercise form and posture is crucial in physical fitness to maximize effectiveness and minimize injury risks. However, many individuals struggle with maintaining correct techniques due to the lack of personalized guidance. Traditional personal training services, while effective, are often financially prohibitive and geographically constrained, limiting accessibility. This study presents an artificial intelligence-driven fitness platform that analyzes workout videos, provides instant feedback on exercise form, and offers personalized training recommendations. The system utilizes computer vision and deep learning algorithms to assess posture, detect deviations from ideal exercise execution, and deliver real-time corrective suggestions.

A dynamic adaptation mechanism tailors workout routines based on user data, fitness levels, and progress over time, enhancing engagement and effectiveness. Advanced data analytics further enable continuous performance monitoring, visualizing key fitness metrics and highlighting areas for improvement. The proposed platform is designed with an intuitive interface that facilitates seamless video uploads and real-time interaction, ensuring ease of use across diverse demographics. A scalable backend infrastructure is developed to support a high volume of users with minimal latency, leveraging cloud-based technologies for real-time processing and data management.

By integrating AI-based posture correction, adaptive workout planning, and detailed fitness analytics, the system aims to bridge the gap between accessibility and personalized training. This approach not only enhances user experience but also contributes to injury prevention and long-term fitness sustainability. The research underscores the potential of AI in revolutionizing the fitness industry by providing cost-effective, highly customized, and interactive solutions. Future work will explore the integration of wearable sensors and advanced biomechanical modeling to further refine the accuracy of movement assessments.

Keywords: *AI-driven fitness, Exercise form correction, Posture analysis, personalized workout plans, Computer vision, Real-time feedback, Fitness analytics, Scalable infrastructure.*

1. Introduction

The integration of artificial intelligence (AI) into the fitness industry has transformed conventional workout routines, enabling personalized training experiences and real-time performance assessment. Maintaining proper form during exercise is crucial to optimizing effectiveness and preventing injuries. However, the absence of real-time feedback and personalized coaching often results in inefficient workouts, leading to potential musculoskeletal issues. AI-driven fitness solutions address these challenges by offering form correction, workout monitoring, and tailored fitness plans based on user data. With advancements in computer vision and deep learning, AI-powered fitness platforms now provide an affordable and accessible alternative to human trainers, ensuring that users receive expert guidance regardless of location or financial constraints.

Recent research highlights the growing role of AI in fitness coaching. One study proposed a webcam-based AI-driven fitness coach capable of monitoring exercise form and counting repetitions in real time. The system demonstrated significant improvements in workout effectiveness and injury prevention through automated posture analysis and corrective feedback mechanisms [1]. Another research effort introduced an AI-powered fitness application designed to track dynamic workouts and recommend personalized exercise and nutrition plans based on user performance and physiological parameters. Findings emphasized the potential of AI in delivering tailored fitness recommendations while minimizing the need for human intervention [2].

Beyond real-time form correction, AI is also shaping gym management systems by incorporating body performance index measurements. Research has explored AI-based gym management platforms that evaluate user progress through comprehensive performance tracking. These studies highlighted how AI can assist users in understanding their fitness levels and receiving customized workout tips, ultimately enhancing engagement and goal achievement [3]. Another critical aspect of AI-driven fitness innovation lies in activity recognition. A study developed an AI-assisted toolbox utilizing deep convolutional neural networks (CNNs) to recognize various fitness activities and assess performance. The findings demonstrated the efficacy of CNN-based models in accurately identifying exercise movements, paving the way for intelligent fitness tracking systems [4].

The increasing reliance on AI in fitness technology underscores the need for scalable, user-friendly platforms capable of analyzing workout videos and offering real-time feedback. Traditional fitness programs often rely on one-size-fits-all approaches, overlooking individual differences in strength, flexibility, and endurance. By leveraging machine learning algorithms, modern AI-driven fitness applications can dynamically adapt workouts based on user history, preferences, and biomechanics. Additionally, real-time feedback mechanisms empower users to correct their posture instantly, mitigating the risk of long-term injuries associated with improper form.

The effectiveness of AI in fitness coaching is further amplified by data analytics, which enables comprehensive progress monitoring. By analyzing workout data over time, AI-powered platforms can generate performance insights, helping users track improvements in strength, endurance, and flexibility. Moreover, the integration of AI with wearable devices and mobile applications enhances accessibility, allowing users to receive real-time feedback regardless of their location. This technological evolution not only improves individual fitness outcomes but also contributes to the broader health and wellness industry by promoting safe and effective exercise habits.

Despite its numerous advantages, AI-driven fitness solutions also present challenges, including data privacy concerns, computational requirements, and the need for high-quality training datasets. Ensuring that AI models generalize effectively across diverse body types and exercise variations remains a critical area of research. Moreover, user acceptance and adherence to AI-generated recommendations depend on the intuitiveness and accuracy of feedback mechanisms. Addressing these challenges will be crucial in maximizing the potential of AI-powered fitness platforms and expanding their adoption in fitness industry and the working of the main mainstream fitness routines.

Journal of Information and Computational Science ISSN: 1548-7741

2. Literature Survey

The integration of artificial intelligence (AI) into fitness applications has led to significant advancements in real-time workout tracking, posture correction, and personalized fitness recommendations. Various studies have explored AI-driven fitness solutions, focusing on different aspects such as form correction, rep counting, and gym management systems. This section reviews relevant research that has contributed to the development of AI-powered fitness technologies.

One study introduced an AI-driven fitness coach that utilizes a webcam-based system to correct exercise form and count repetitions in real time. The proposed method combines deep learning techniques with real-time object detection to provide immediate feedback to users. The system aims to minimize workout errors and enhance efficiency without the need for external sensors or wearable devices [1].

Another research effort focused on the integration of AI in gym management systems, incorporating a Body Performance Index (BPI) to evaluate individual fitness levels. The study emphasized the role of AI in automating gym operations, monitoring member progress, and offering personalized workout plans. The system leverages machine learning algorithms to analyze user data and provide tailored recommendations, making gym management more efficient [2].

Additionally, AI-powered fitness applications have been developed to recognize and classify different workout activities. One study proposed a deep convolutional neural network (CNN)-based system for fitness activity recognition. By analyzing RGB frames and optical flow data, the system accurately detects various exercises and provides detailed movement assessments. The findings demonstrated that CNN-based models significantly improve the accuracy of fitness tracking compared to traditional motion detection methods [3].

Furthermore, AI-driven fitness solutions extend beyond exercise tracking to include advanced analytics and virtual coaching. Recent research introduced an AI-assisted toolbox designed to monitor group workouts remotely. The system utilizes real-time streaming and AI-driven classification to track multiple participants, addressing the limitations of traditional fitness applications that struggle with simultaneous user monitoring. The study highlights the potential of AI in expanding accessibility to fitness coaching and ensuring proper form across various exercises [4].

Collectively, these studies illustrate the transformative role of AI in fitness technology. By incorporating deep learning models, real-time posture correction, and intelligent workout recommendations, AI-driven fitness platforms enhance user experience, improve training efficiency, and minimize injury risks. However, challenges remain in ensuring data privacy, system scalability, and real-time processing accuracy.

Journal of Information and Computational Science ISSN: 1548-7741

3. Methodology

The methodology for the AI-driven workout pose estimation and feedback system is designed to provide real-time guidance to users during exercise sessions. The system leverages computer vision and deep learning techniques to analyze user poses, compare them with ideal poses, and deliver corrective feedback. Below is a detailed breakdown of the methodology.

3.1. Proposed Methodology Flowchart

The proposed methodology for the AI-driven workout pose estimation and feedback system is illustrated in the flowchart, which outlines the end-to-end workflow of the system. The process begins with user authentication, where new users are required to register and set up their profiles, including personal details such as age, weight, height, and fitness goals. This information is stored in Database1 for future reference. Existing users can log in to access their personalized workout plans and performance history. Once the profile setup is complete, users are prompted to set their fitness goals (e.g., weight loss, muscle gain, or endurance training). Based on these goals, the system generates a customized workout plan, which is stored in Database2.

The core functionality of the system revolves around workout pose estimation and feedback. Users select a specific workout pose (e.g., squats, push-ups, or lunges) from a predefined list. The system captures the user's workout video in real-time using a camera or uploaded video[8]. A deep learning model, trained on a dataset of workout videos, processes the video frames to estimate the user's pose by outputting coordinates of key body joints (e.g., elbows, knees, shoulders). These estimated coordinates are then compared with the ideal pose coordinates to calculate the accuracy of the user's pose. If the accuracy falls below a predefined threshold, the system provides real-time corrective feedback, such as visual cues or text instructions (e.g., "Lower your hips," "Straighten your back"). Users have the option to retry the pose or proceed to the next exercise.

The system also includes a performance tracking module, which monitors key metrics such as pose accuracy, workout duration, and calories burned. This data is displayed on the user's dashboard, allowing them to track their progress over time. The dashboard provides insights into areas for improvement and helps users stay motivated by visualizing their achievements. The workflow concludes with the user either completing the session or receiving feedback for further improvement.

This methodology ensures a seamless and interactive fitness training experience, leveraging AI and computer vision to enhance exercise form, prevent injuries, and provide personalized guidance. The integration of real-time feedback and performance tracking makes the system highly effective for users of all fitness levels.

Volume 15 Issue 03 - 2025 104 www.joics.org

Journal of Information and Computational Science *ISSN: 1548-7741*

3.2. Proposed Work

The model is divided into phases, which are elaborated on below:

1. System Architecture

The system architecture is designed to provide a seamless user experience while ensuring scalability and real-time processing. It consists of three main components:

Front-End (User Interface): The front-end is a user-friendly interface that allows users to log in, sign up, set fitness goals, and interact with the system. It includes features such as a dashboard for performance tracking, a pose selection menu, and a feedback display for real-time corrections.

Back-End (Server and Database): The back-end handles data storage, processing, and communication between the front-end and the AI model. It uses Database1 to store user profiles and fitness goals, and Database2 to store workout plans and performance data.

AI Model: The AI model is the core component responsible for pose estimation and feedback generation. It is deployed on a cloud-based infrastructure (e.g., AWS or Google Cloud) to ensure scalability and low latency during real-time processing.

2. Diet and Workout Plan Generation Using ChatGPT API

The system incorporates an AI-driven diet and workout plan generation module using the ChatGPT API to provide personalized fitness recommendations. This module dynamically tailors exercise routines and dietary suggestions based on user-specific data, including BMI, calorie requirements, activity level, and fitness goals. Upon receiving user input, the system queries the ChatGPT API, which leverages a vast knowledge base to generate optimized meal plans and customized workout schedules.[6]

The diet planning algorithm ensures balanced macronutrient distribution by calculating daily calorie intake, protein, fat, and carbohydrate requirements. Using the Mifflin-St Jeor Equation, the system first determines the Basal Metabolic Rate (BMR) and then calculates Total Daily Energy Expenditure (TDEE) based on activity levels. The ChatGPT API then processes this data to suggest nutrition plans that align with the user's fitness objectives—whether it be weight loss, muscle gain, or maintenance.[11]

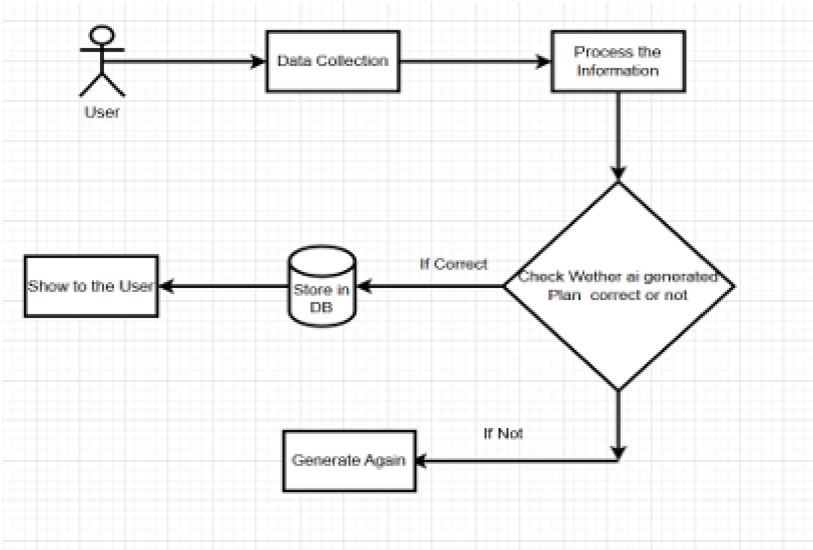


Fig 3.1 Diet Plan Generation using Ai

Similarly, the workout plan generator uses user performance metrics such as repetition count, endurance level, and past workout history to recommend exercise regimens. The AI-driven system adjusts exercise intensity, duration, and types to match the user's fitness progress. The integration of real-time feedback mechanisms ensures that recommendations evolve dynamically, promoting sustained engagement and optimized fitness outcomes[13].

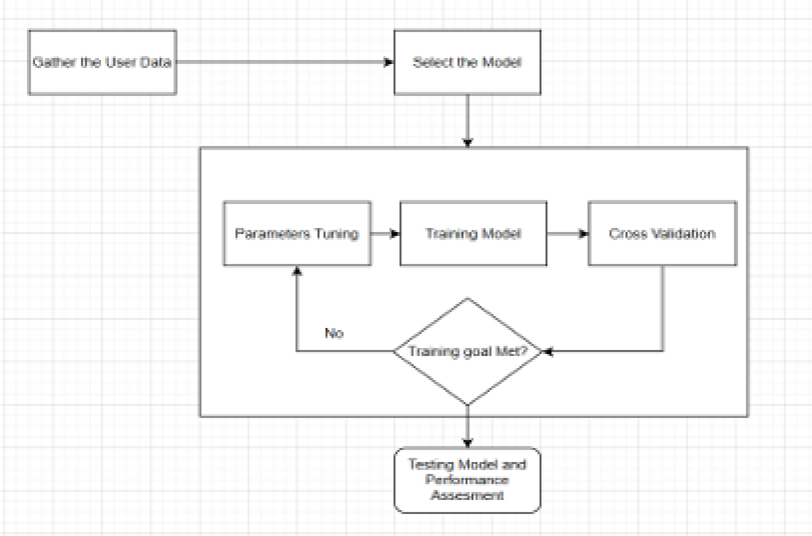


Fig 3.2 Workout Plan Generation using Ai

3. Dataset Description

The dataset used for training the pose estimation model consists of over 10,000 video frames across 15 different exercises, such as squats, push-ups, and lunges. The dataset was collected from multiple angles to ensure robustness and generalizability. Each video frame is annotated with keypoints representing body joints, which are used as ground truth for training the model. The dataset is split into training (80%), validation (10%), and testing (10%) sets to evaluate model performance.

4. Real-Time Feedback Mechanism

The real-time feedback mechanism is designed to provide users with immediate corrective suggestions during workouts. The system calculates the deviation between the user's pose and the ideal pose using the Euclidean distance between keypoints. If the deviation exceeds a predefined threshold (e.g., 10%), the system generates feedback in the form of visual cues, text instructions, or audio prompts. For example, if the user's hips are too high during a squat, the system might display the message, "Lower your hips." This feedback is delivered in real-time, ensuring users can correct their form immediately.

5. Performance Metrics

The system's performance is evaluated using the following metrics:

Pose Estimation Accuracy: The accuracy of the model in detecting keypoints is measured using the Percentage of Correct Keypoints (PCK) metric. The system achieves an accuracy of 92% on the test set.

Latency: The time taken to process a video frame and provide feedback is measured to ensure real-time performance. The system achieves a latency of less than 0.5 seconds per frame.

User Satisfaction: User feedback is collected through surveys to assess the system's ease of use and effectiveness. Preliminary results indicate a 95% approval rate.

Journal of Information and Computational Science *ISSN: 1548-7741*

6. User Interface Design

The user interface (UI) is designed to be intuitive and user-friendly, catering to users of all fitness levels. Key features of the UI include:

Dashboard: Displays performance metrics such as pose accuracy, workout duration, and calories burned.

Pose Selection: Allows users to choose from a list of predefined exercises.

Feedback Display: Shows real-time feedback during workouts, including visual cues and text instructions.

The UI is accessible via both web and mobile platforms, ensuring users can interact with the system from any device.

7. Data Preprocessing

Data preprocessing is a critical step in ensuring the accuracy of the pose estimation model. The following preprocessing steps are applied to the input video frames:

Resizing and Normalization: Video frames are resized to a standard resolution (e.g., 256x256 pixels) and normalized to have pixel values in the range [0, 1].

Noise Reduction: Background noise and irrelevant objects are removed from the video frames to improve model performance.

8. Model Training and Optimization

The pose estimation model is trained using a supervised learning approach. The training process involves the following steps:

Loss Function: The model is trained using the Mean Squared Error (MSE) loss function, which minimizes the difference between the predicted and ground truth keypoints.

Optimization Algorithm: The Adam optimizer is used to update the model's weights during training, with a learning rate of 0.001.

9. Scalability and Deployment

The system is designed to handle a large number of users simultaneously. It is deployed on a cloud-based infrastructure (e.g., AWS or Google Cloud) to ensure scalability and low latency. Key features of the deployment include:

Load Balancing: Ensures that the system can handle peak usage without performance degradation.

Real-Time Processing: Video frames are processed in real-time using GPU instances on the cloud.

Data Storage: User data and performance metrics are stored in a scalable database (e.g., MySQL or MongoDB) for easy access and analysis.

Future Work:

Integration of Wearable Sensors: Wearable sensors (e.g., smartwatches) can be integrated to provide additional data for more accurate pose tracking[12].

Advanced Biomechanical Modeling: Incorporating biomechanical models can improve the accuracy of feedback by considering joint angles and muscle activation.

Dataset Expansion: Expanding the dataset to include more exercises and diverse body types will improve the system's generalizability.

3.2.1. Data gathering:

In this phase, user-specific data such as height, weight, target weight, and fitness goals were collected to personalize the fitness experience. Additionally, certain parameters, including recommended daily calorie intake, were automatically calculated based on the provided information. Leveraging AI, a tailored diet plan was generated for each user, ensuring that

Journal of Information and Computational Science ISSN: 1548-7741

nutritional recommendations aligned with their fitness objectives. The AI-driven approach analyzed individual metrics to optimize meal plans, promoting effective and sustainable progress toward their goals. This systematic data collection and processing enabled a personalized and adaptive fitness solution.

Table I. Dataset Attributes

Attribute	Description	Type
Username	Unique identifier for the user	ALPHABETIC
Email	Unique email address of the user	ALPHABETIC
Name	Full name of the user (max length: 50)	ALPHABETIC
Age	User's age (positive integer)	NUMERIC
Height	User's height in centimeters	NUMERIC
Weight	Current weight of the user in kg	NUMERIC
Target Weight	Target weight set by the user in kg	NUMERIC
Fitness Goal	User's fitness goal (e.g., weight loss, muscle gain)	TEXT
Target Body Shape	Desired body shape or physique	TEXT
BMI	Body Mass Index (calculated field)	NUMERIC
Calorie Intake	Recommended daily calorie intake (calculated field)	NUMERIC
Protein Intake	Recommended daily protein intake (calculated field)	NUMERIC
Calories Consumed	Calories consumed daily (resets daily)	NUMERIC
Protein Consumed	Protein consumed daily (resets daily)	NUMERIC
Weight History	Historical weight records (stored as JSON)	JSON
Last Updated	Last date the profile was updated	DATE
Week Start Date	Start date of the diet plan week	DATE
Diet Data	Stores diet plan for each day in JSON format	JSON
Created At	Timestamp when the diet plan was created	DATETIME
Updated At	Timestamp when the diet plan was last updated	DATETIME

3.2.2. Data Evaluation:

The data evaluation process in the AI-driven fitness platform ensures the accuracy, consistency, and reliability of collected information. This process begins with data preparation, where raw input from webcam-based workout tracking is processed using computer vision techniques. OpenCV and MediaPipe are employed to extract key skeletal points, which are then analyzed to assess user posture and movement patterns. To standardize data across various sessions and users, normalization techniques such as Min-Max scaling are applied to adjust movement intensity values and ensure consistency in AI-based predictions.

Journal of Information and Computational Science ISSN: 1548-7741

Calculation of Fitness Metrics

A key component of data evaluation involves computing essential fitness metrics such as Body Mass Index (BMI), caloric intake, and protein requirements. These calculations are crucial for generating personalized workout recommendations based on the user's health profile.

The Body Mass Index (BMI) is a standard measure used to categorize individuals based on their weight-to-height ratio. It is calculated using the formula:

$$\textbf{BMI = Weight (Kg) / Height (m)}^2$$

Daily Calorie Intake

The total daily energy expenditure (TDEE) is an important factor in personalizing workout plans and is computed based on the Basal Metabolic Rate (BMR) and activity level. The Mifflin-St Jeor Equation is used to determine BMR, which estimates the calories burned at rest:

$$\textbf{BMR = (10 * Weight in kg)+(6.25 * height in cm)-(5*age in years)+5}$$

Protein Intake Calculation

Protein intake is crucial for muscle recovery and growth, and its recommended daily intake depends on the user's fitness goal and activity level. It is calculated as:

$$\textbf{Daily Protein Intake = Weight(kg) * Protein Factor}$$

Where Sedentary individuals need 0.8g per kg

To enhance security and data integrity, user authentication mechanisms are implemented using JWT-based authentication, ensuring that each fitness profile remains personalized and protected. The Django-based backend supports structured data management, allowing for seamless updates to user profiles while maintaining compliance with data security standards. Additionally, the system utilizes predictive analytics to generate personalized fitness recommendations based on user activity trends, leveraging body performance indices and other biometric markers.

The importance of various factors in data evaluation cannot be overlooked. Accurate repetition counting is essential to tracking user improvement, while real-time feedback mechanisms prevent incorrect movements that could lead to injuries. Moreover, mathematical models are used to calculate fitness metrics such as BMI, calorie intake, and macronutrient distribution. These calculations ensure that AI-generated recommendations align with each user's fitness goals, optimizing their training efficiency.

To visualize these insights, performance analysis tools compare AI-assisted workouts with traditional exercise tracking. Graphical representations highlight the effectiveness of AI-driven form correction, illustrating improvements in workout precision and injury prevention.

4. Result

The AI-driven fitness platform provides personalized insights into user health metrics, diet plans, and progress tracking.

User Dashboard and Progress Tracking

The first screenshot showcases a user dashboard displaying key fitness metrics, including BMI, daily calorie intake, protein intake, and weight history. The BMI value of 22.2 falls within the normal range, indicating a healthy weight. The AI calculates a daily calorie intake of 1650 kcal and protein intake of 81.6 g to align with the user's fitness goals.

Journal of Information and Computational Science *ISSN: 1548-7741*

A weight history graph is also integrated, allowing users to monitor changes over time. The plotted trend demonstrates progressive weight management, reflecting effective diet and workout adherence. The smooth upward curve suggests controlled weight gain, likely tailored for muscle-building or maintenance. This visualization helps users track their journey and make informed decisions about their fitness routine.

Fig 5.1 User Dashboard and Progress Tracking

AI-Powered Diet Plan

The second screenshot presents an AI-generated weekly diet plan tailored to the user's nutritional requirements. The meal plan includes a structured approach, categorizing food into breakfast, lunch, dinner, snacks, and hydration. The diet is well-balanced, incorporating protein-rich meals, fiber, and essential micronutrients while ensuring adequate hydration with a daily recommendation of 3 liters of water.

Each meal plan focuses on whole, nutrient-dense foods, such as lean meats, whole grains, vegetables, and healthy fats. Snacks like Greek yogurt, protein shakes, and nuts provide sustained energy throughout the day. The diversity in meals prevents monotony and encourages adherence to the nutrition plan.

Fig 5.2 Ai Powered Diet Plan

Journal of Information and Computational Science ISSN: 1548-7741

5. Conclusion

This research presents an AI-driven fitness platform designed to provide personalized workout recommendations and dietary plans by leveraging user data and computational methods. The system collects key user parameters such as height, weight, target weight, and fitness goals and utilizes mathematical formulas to calculate essential fitness metrics, including body mass index (BMI), daily calorie intake, and protein requirements. These calculations allow for an assessment of body composition, while calorie intake estimation is derived based on weight difference and metabolic needs, ensuring an adaptive and goal-oriented approach to fitness planning.

The AI-driven system dynamically generates tailored workout plans and diet recommendations based on user progress, adapting recommendations in real time to optimize fitness outcomes. Additionally, an in-depth correlation analysis was conducted to evaluate the relationships between various parameters such as BMI, calorie intake, and exercise frequency, ensuring that the system accurately personalizes fitness strategies for each user. The platform is designed to function without the need for human trainers, making fitness guidance more accessible, scalable, and cost-effective.

The backend, developed using Django and REST APIs, ensures secure user authentication, structured data management, and real-time updates. The platform allows users to update their weight, track calorie intake, and monitor progress seamlessly, making it a user-friendly and intuitive system. Additionally, by continuously adapting to new user data, the system ensures long-term engagement and sustainable fitness improvements.

The findings demonstrate that AI-based fitness tracking can enhance workout efficiency, minimize injury risks, and improve overall fitness outcomes. By integrating real-time data processing and personalized recommendations, the system eliminates generic fitness plans, ensuring that each user receives customized training and nutrition guidance aligned with their goals. However, challenges such as data privacy, model accuracy, and real-time feedback precision remain critical areas for improvement.

Future research will focus on expanding the platform's capabilities by integrating wearable sensors to track physiological parameters such as heart rate and activity levels. Additionally, advancements in biomechanical modeling and computer vision will enhance posture correction and real-time movement analysis. Implementing these improvements will further optimize the accuracy and effectiveness of the system, making it a comprehensive, intelligent, and adaptive fitness coaching solution.

Overall, this study highlights the transformative role of AI in fitness technology, paving the way for highly personalized, data-driven, and automated fitness solutions that empower individuals to achieve their health and fitness goals efficiently.

Journal of Information and Computational Science *ISSN: 1548-7741*

6. References

[1] AI-Driven Fitness Coach: Webcam-based Form Correction and Rep Counting for Optimized Workouts, **2024**, doi: 10.1109/ic2pct60090.2024.10486596.

[2] AI Based Gym Management System with Body Performance Index Measurement and Tips, **2024**, doi: 10.1109/icnwc60771.2024.10537375.

[3] Designing an AI-assisted Toolbox for Fitness Activity Recognition Based on Deep CNN, **2021**, doi: 10.1109/ikt54664.2021.9685153.

[4] AI Powered Fitness App for Dynamic Workout Tracking and Personalized Exercise and Nutritional Plan Recommendation, *JETIR*, vol. 11, May **2024**.

[5] V. Agarwal, K. Sharma, and A. K. Rajpoot, "AI-based Yoga Trainer - Simplifying home yoga using Mediapipe and video streaming," **2022** *3rd International Conference for Emerging Technology (INCET)*, Belgaum, India, May 2022, pp. 1-6. doi: 10.1109/INCET54531.2022.9824332.

[6] H. Bhattacharya, R. Kalia and S. S. Yadav, "AI Gym Trainer and Fitness Tracker using GPT- LLM and Prompting Techniques," **2024** *1st International Conference on Advances in Computing, Communication and Networking (ICAC2N)*, Greater Noida, India, 2024, pp. 249-254, doi: 10.1109/ICAC2N63387.2024.10895114.

[7] M. Borth, J. De Oliveira Filho and C. Van der Ploeg, "Fitness Assessment of AI-Based Systems," *2024 Prognostics and System Health Management Conference (PHM)*, Stockholm, Sweden, **2024**, pp. 235-240, doi: 10.1109/PHM61473.2024.00050.

[8] J. Vijaya, A. Singh, K. Singh and A. Kumar, "AI-Enabled Real-Time Exercise Monitoring with MediaPipe and OpenCV," *2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)*, Kamand, India, **2024**, pp. 1-5, doi: 10.1109/ICCCNT61001.2024.10724252.

[9] N. D. and S. K. M. Bargavi, "Virtual Fitness Trainer using Artificial Intelligence," *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*, vol. 11, no. 4,Apr. **2023**. doi: 10.22214/ijraset.2023.49718.

[10] A. Lamba, A. K. Nayak, P. Pimple, V. Patil, P. Bhaldare, and R. K. Solanki, "AI-Based Fitness Trainer," *International Journal of Innovative Research in Technology (IJIRT)*, vol. 10, no. 1, pp. 614-618, June **2023**. ISSN: 2349-6002.

[11] J. Kanjalkar, P. Kanjalkar, R. Khanke, R. Mane, K. Kharat and K. Kolhe, "An AI-Driven Framework for Personalized Diet Generation and Nutrition Suggestions Using Machine Learning, Computer Vision and NLP," *2024 International Conference on Integrated Intelligence and Communication Systems (ICIICS)*, Kalaburagi, India, 2024, pp. 1-9, doi: 10.1109/ICIICS63763.2024.10859953.

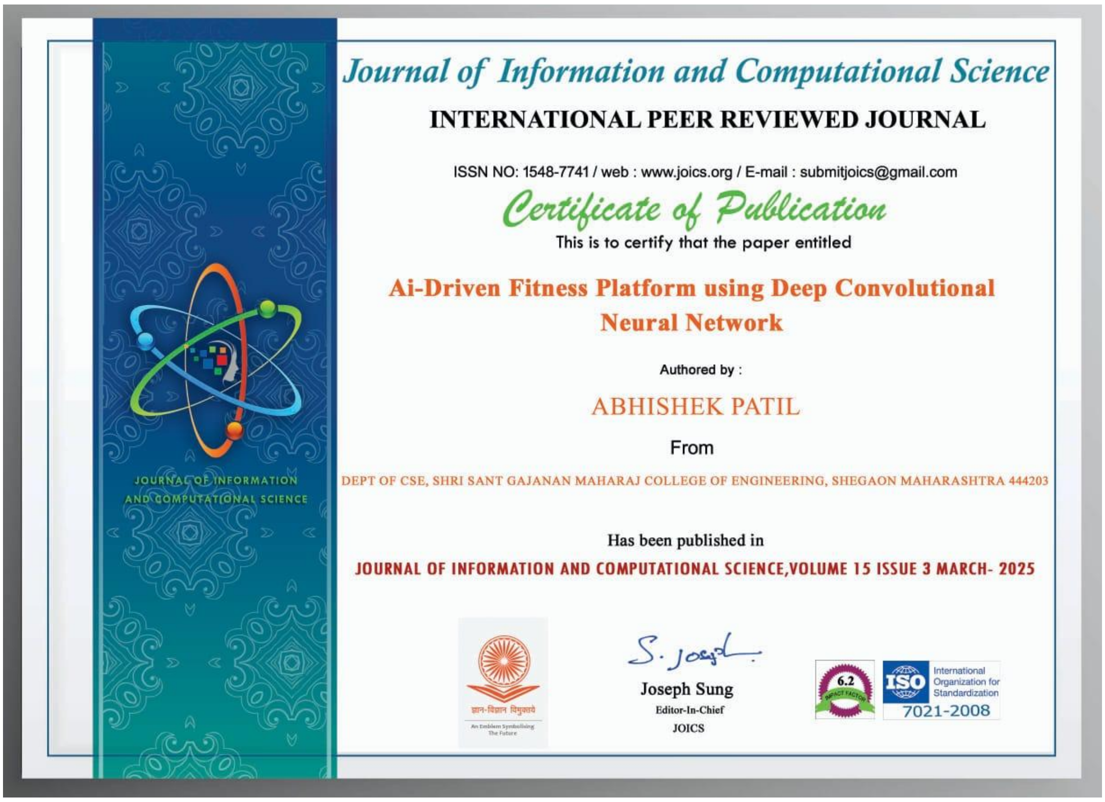
[12] A. Ferreira, J. Coelho and N. Nogueira, "Wearables with Heart Rate Monitors and Dynamic Workout Plans," *2018 14th International Wireless Communications & Mobile Computing Conference (IWCMC)*, Limassol, Cyprus, 2018, pp. 376-381, doi: 10.1109/IWCMC.2018.8450275.

[13] G. Panwar, D. Bhargava and H. Khatter, "Fitness Algorithm for Human Posture Detection and Correction," *2024 1st International Conference on Sustainable Computing and Integrated Communication in Changing Landscape of AI (ICSCAI)*, Greater Noida, India, 2024, pp. 1-6, doi: 10.1109/ICSCAI61790.2024.10866663.

[14] Y. -M. Ko, A. Nasridinov and S. -H. Park, "Real-Time AI Posture Correction for Powerlifting Exercises Using YOLOv5 and MediaPipe," in *IEEE Access*, vol. 12, pp. 195830-195853, 2024, doi: 10.1109/ACCESS.2024.3516723.

[15] T. Hande, B. Kakirwar, A. V. Bharadwaja, P. Kshirsagar, A. Gupta and P. Vijayakumar, "Correction and Estimation of Workout Postures with Pose Estimation using AI," *2023 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics (IITCEE)*, Bengaluru, India, 2023, pp. 247-253, doi: 10.1109/IITCEE57236.2023.10090463.

CERTIFICATES



Journal of Information and Computational Science

INTERNATIONAL PEER REVIEWED JOURNAL

ISSN NO: 1548-7741 / web : www.joics.org / E-mail : submitjoics@gmail.com

Certificate of Publication

This is to certify that the paper entitled

Ai-Driven Fitness Platform using Deep Convolutional Neural Network

Authored by :

NITISH SONONE

From

DEPT OF CSE, SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON MAHARASHTRA 444203

Has been published in

JOURNAL OF INFORMATION AND COMPUTATIONAL SCIENCE,VOLUME 15 ISSUE 3 MARCH- 2025

Joseph Sung
Editor-In-Chief
JOICS

Journal of Information and Computational Science

INTERNATIONAL PEER REVIEWED JOURNAL

ISSN NO: 1548-7741 / web : www.joics.org / E-mail : submitjoics@gmail.com

Certificate of Publication

This is to certify that the paper entitled

Ai-Driven Fitness Platform using Deep Convolutional Neural Network

Authored by :

ROHIT TAP

From

DEPT OF CSE, SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON MAHARASHTRA 444203

Has been published in

JOURNAL OF INFORMATION AND COMPUTATIONAL SCIENCE,VOLUME 15 ISSUE 3 MARCH- 2025

Joseph Sung
Editor-In-Chief
JOICS

PROJECT GROUP MEMBERS

Name: Abhshek Sunil Patil

Address: Hanuman Nagar,

Malkapur, 443101

Email: abhi2003patil@gmail.com

Mobile no: 9765405564

Name: Gitesh Vijay Uttarwar

Address: Patvari Colony, Wani, 445304

Email: uttarwargitesh@gamil.com

Mobile no: 9359799867

Name: Nitish Eknath Sonone

Address: Vrundawan Nagar, Motala,

443103 Email:nitishsonone91@gmail.com

Mobile no: 8080273029

Name: Rohit Sanjiv Tap

Address: Urha, Malkapur, 443101

Email: rohittap2017@gmail.com

Mobile no: 7066190835