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AI Powered Yoga Trainer

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Abstract: The Yoga is an ancient practice that enhances physical health, mental stability, and overall well-being through a series of structured poses and breathing techniques. However, without proper supervision, many practitioners struggle to maintain correct posture and body alignment, which can lead to reduced effectiveness or even physical strain. This project aims to address this limitation by developing an AI-powered Yoga Trainer that assists users in performing yoga poses accurately and safely through real-time posture correction and performance tracking. The system uses a webcam to capture live user movements and employs MediaPipe Pose estimation to detect thirty-three key body landmarks. Using these landmark coordinates, the system calculates major joint angles such as shoulders, elbows, hips, and knees, and compares them with predefined reference values representing the correct yoga poses. To ensure smooth and stable detection, an Exponential Moving Average (EMA) technique is applied to eliminate small fluctuations caused by camera jitter or minor body tremors. Based on the comparison, the system provides instant visual feedback by highlighting correct and incorrect joint positions, enabling users to adjust their postures immediately. In addition, the application tracks the duration for which each pose is held and evaluates overall accuracy, allowing users to monitor their progress over time. Developed as a web-based platform using Python, OpenCV, and MediaPipe, the system offers an interactive and user- friendly interface suitable for beginners as well as advanced practitioners. By combining artificial intelligence with fitness training, this project bridges the gap between traditional instructor-led sessions and digital learning, offering a safe, personalized, and efficient yoga practice experience that promotes continuous improvement, motivation, and overall wellness.

Keywords: Yoga Trainer, Pose Estimation, Media Pipe, Artificial Intelligence, Computer Vision, Real-Time Feedback, OpenCV.

I. INTRODUCTION

Yoga, an ancient discipline originating from India, has long been recognized as a holistic practice that harmonizes the mind, body, and spirit. It promotes physical strength, flexibility, concentration, and inner balance through a structured combination of asanas (postures), pranayama (breathing control), and dhyana (meditation). In recent years, the integration of yoga into modern fitness routines has surged globally, driven by its proven benefits in stress reduction, musculoskeletal health, and mental well-being. However, the effectiveness of yoga practice heavily depends on correct posture alignment and precise execution of poses. Without expert supervision, practitioners especially beginners often struggle to maintain proper form, resulting in inefficiency, muscle strain, or potential injury. In today's digital era, the fusion of Artificial Intelligence (AI) and Computer Vision (CV) has revolutionized health and wellness technologies. AI-driven posture recognition systems have made it possible to analyze human movements, identify errors, and offer corrective feedback autonomously. Leveraging these advancements, this paper proposes an AI- Powered Yoga Trainer, an intelligent system that assists practitioners in performing yoga poses accurately and safely through real-time analysis and personalized guidance.

$$\theta = \left| \tan^{-1}\frac{c_y - b_y}{c_x - b_x} - \tan^{-1}\frac{a_y - b_y}{a_x - b_x} \right|$$

The system utilizes a webcam interface to capture user movements and employs MediaPipe Pose estimation to extract 33 key body landmarks representing major joints such as shoulders, elbows, hips, and knees.

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From these coordinates, the system computes joint angles using trigonometric relations based on the arctangent function: These computed angles are compared with predefined reference values of ideal postures stored in a dataset. The difference between the live and reference angles determines pose accuracy. To mitigate minor fluctuations caused by camera jitter or user tremors, an Exponential Moving Average (EMA) smoothing function is applied, ensuring stable and realistic feedback. The AI system provides instant visual cues by marking correctly aligned joints in green and mis aligned ones in white, enabling immediate posture correction. Additionally, it monitors pose-holding duration, computes accuracy scores, and visualizes user progress through an interactive dashboard. The entire framework is implemented using Python, OpenCV, and MediaPipe for backend processing, with a responsive web interface developed using HTML, CSS, and JavaScript to ensure accessibility across devices. By integrating AI-based motion analysis with the ancient discipline of yoga, this project bridges the gap between traditional instructor-led sessions and modern digital learning environments. The proposed AI-Powered Yoga Trainer aims not only to enhance user safety and precision but also to democratize access to guided yoga practice empowering individuals to improve health, mindfulness, and overall wellness through intelligent, technology-driven assistance.

A. Problem Statement

Yoga is a scientifically proven discipline that enhances physical strength, flexibility, and mental well-being. However, the effectiveness of yoga practice fundamentally depends on the accuracy of posture alignment and correct execution of asanas (poses). Even slight deviations in joint angles or body orientation can reduce therapeutic benefits and, in severe cases, cause muscle strain, joint stress, or injury. Beginners and self-learners face particular challenges in maintaining proper posture due to the absence of real-time supervision and personalized guidance. Traditional training resources such as pre-recorded videos, mobile applications, and textual instructions fail to offer interactive feedback or dynamic error correction. These methods merely demonstrate ideal poses but do not analyze the practitioner's real-time performance or provide corrective assistance. As a result, learners often replicate postures incorrectly, leading to ineffective practice and slow progress. Existing AI-based motion detection systems are primarily designed for general human activity recognition and lack the precision required for yoga postures, where minute angular deviations (5°–10°) are significant. Additionally, current applications offer limited personalization, do not account for differences in body proportions or flexibility, and often fail under non-ideal conditions such as varying illumination or camera angles. Therefore, there exists a crucial need for an AI-driven, real-time yoga training system capable of detecting subtle misalignments, analyzing body geometry with high precision, and providing instant corrective feedback. The proposed AI-Powered Yoga Trainer aims to bridge this gap by combining computer vision, pose estimation, and machine learning techniques to deliver an interactive, adaptive, and safe yoga practice environment that replicates the expertise of a human instructor through intelligent automation.

B. Objective

The primary objective of this research is to design and develop an AI-Powered Yoga Trainer that assists practitioners in performing yoga poses with accuracy, safety, and real-time feedback. The system leverages Computer Vision and Artificial Intelligence techniques to detect human body landmarks, evaluate joint alignments, and guide users toward correct postural execution without the need for physical supervision.

This study specifically aims to:

1. Implement a real-time posture detection model using Media Pipe Pose estimation and OpenCV, capable of identifying 33 human body landmarks with high precision.
2. Provide instant visual feedback through an intuitive interface that highlights correct and incorrect joints, enabling users to make on-the-spot corrections.
3. Track user performance metrics such as pose accuracy, duration, and progress over multiple sessions, facilitating continuous self-improvement.
4. Developascalableandaccessibleweb-basedplatformthatsupportsmultipledifficultylevels—Beginner, Intermediate, and Advanced ensuring inclusivity for all users. By fulfilling these objectives, the proposed system seeks to bridge the gap between traditional instructor-led yoga and autonomous digital learning, promoting safe, personalized, and data-driven wellness practices through the power of Artificial Intelligence.

II. PROPOSED SYSTEM

The proposed AI-Powered Yoga Trainer is designed as an intelligent web-based system that provides users with an interactive, accurate, and safe yoga training experience. It combines pose recognition, real-time feedback, and performance tracking using advanced computer vision and machine learning techniques. The system employs MediaPipe Pose estimation to detect 33 key human body landmarks and applies trigonometric and geometric computations to evaluate posture alignment with high precision.

To ensure stability and reduce jitter caused by minor camera vibrations or user movement, the Exponential Moving Average (EMA) is applied to smooth the calculated joint angles. The mathematical representation of the EMA:

$$EMA_t = \alpha \times \theta_t + (1-\alpha) \times EMA_{t-1}$$

Where θ_t represents the current joint angle ,and α is the smoothing factor controlling responsiveness. During operation, the user performs yoga poses in front of a webcam. The system captures real-time video frames, extracts land mark coordinates, and computes corresponding joint angles. These live angles are then compared with pre-stored reference pose data(storedinpose_angles.csv).

If the computed angles fall within a defined tolerance limit, the joint is classified as correct (green); otherwise, it is marked

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in correct(white).The system also features a pose timer to track the duration of correct pose holding and automatically transitions to the next pose upon successful completion. The overall architecture of the AI Yoga Trainer is divided into four key layers:

1. Pose Detection Layer: Uses Media Pipe Pose to extract 33 body land marks from the webcam input.
2. Angle Computation Layer: Applies trigonometric relations to calculate major joint angles (shoulders, elbows, hips, and knees).
3. Evaluation Layer: Compares live joint angles with reference data using pose-specific tolerance thresholds (±40°–45°).
4. Feedback Layer: Displays real-time feedback through color-coded joint markers, progress bars, and performance metrics.

A web-based front end interface built with HTML,CSS, and Java Script enables users to register, select levels (Beginner ,Intermediate, Advanced),and visualize their performance using graphical dash boards. The backend, implemented in Python with OpenCV and MediaPipe, handles land mark extraction, angle calculation, and evaluation. Integration between frontend and backend is achieved using RESTful APIs, ensuring smooth, low-latency communication. This intelligent system enhances user engagement, motivation, and accuracy by providing instant correction cues, performance summaries, and visual feedback animations. It enables individuals to practice yoga independently and safely,replicating the role of a real instructor through artificial intelligence.

A. System Architecture

The system architecture defines the structural framework of the AI-Powered Yoga Trainer, illustrating how various components interact to perform pose detection, angle computation, evaluation, and real-time feedback generation. As shown in Fig. 1, the architecture demonstrates the sequential flow of data beginning from the webcam input and ending with visual feedback and performance tracking. Each layer of the system is designed to handle a specific task, ensuring modularity, scalability, and real-time responsiveness. The architecture is organized into six core layers: User Interface (UI), Input Processing Layer, Pose Detection Layer, Pose Angle Computation Layer, Pose Evaluation Layer, and Feedback & Storage Layer. These layers communicate through structured data exchange to provide smooth user interaction and consistent performance across sessions.

1) User Interface (UI)

The User Interface acts as the primary point of interaction where users perform yoga poses using their browser camera. The UI displays a live video feed, overlays the detected body landmarks, and provides real-time pose accuracy and completion status. Developed using HTML, CSS, and JavaScript, it ensures smooth visualization and responsive performance across devices. This layer captures live video frames from the browser camera and forwards them to the backend for computational analysis. It manages the real-time input stream, synchronizes frame rates, and ensures seamless data transfer between frontend and backend systems using Web APIs and asynchronous processing.

3) Pose Detection Layer

The Pose Detection Layer utilizes Media Pipe Pose to identify 33 body land marks, including shoulders, elbow ships, knees, and ankles, from each video frame. Each land mark's spatial coordinates (x, y, z) are extracted to represent the user's skeletal structure. This data forms the foundation for subsequent angle computations and pose evaluation.

Pose Angle Computation Layer: This layer computes eight key joint angles (elbows, shoulders, hips, and knees) using trigonometric relations based on three land mark points. The joint angle θ is calculated as: These computed angles are stored in the reference CSV dataset (pose_angles.csv) and are also used during live pose evaluation for comparison and accuracy assessment.

4) Pose Evaluation Layer

In this stage, the system compares the user's live joint angles with stored reference values to determine pose correctness. A tolerance threshold (±40°–45°) is applied to account for individual flexibility. The Exponential Moving Average (EMA) smoothing function is used to eliminate jitter and produce stable angle tracking. Based on these evaluations, the system marks each joint as Correct (green) or Incorrect (white) in real time.

5) Feedback & Storage Layer

The final layer provides instant visual feedback, highlighting joints and displaying pose accuracy percentages, holding duration, and completion messages once the pose is performed correctly. The system also stores performance metrics such as pose name, accuracy, and duration within local browser storage for progress visualization. Agraphical dashboard presents user improvement trends and motivates consistent practice.

B. Use-Case Diagram

The Use-Case Diagram for the AI-Powered Yoga Trainer, as shown in Fig. 2, represents the interaction between the User and the System, describing how different functionalities work together to deliver a real-time yoga training experience. The diagram visually maps each activity performed by the user and the corresponding system responses that ensure accurate posture correction and personalized feedback. At the center of the system is the User, who interacts with the Web Application to initiate and control all activities. The process begins when the user logs in or signs up through a secure authentication interface. Once the user successfully logs in, they can select a yoga level (Beginner, Intermediate, or Advanced) and choose a specific yoga pose to practice. After the session begins, the Web Interface activates the webcam and starts capturing the live video stream.

The system then sends this input to the Pose Detection Module, which uses MediaPipe Pose estimation to detect 33 human body landmarks in real time.

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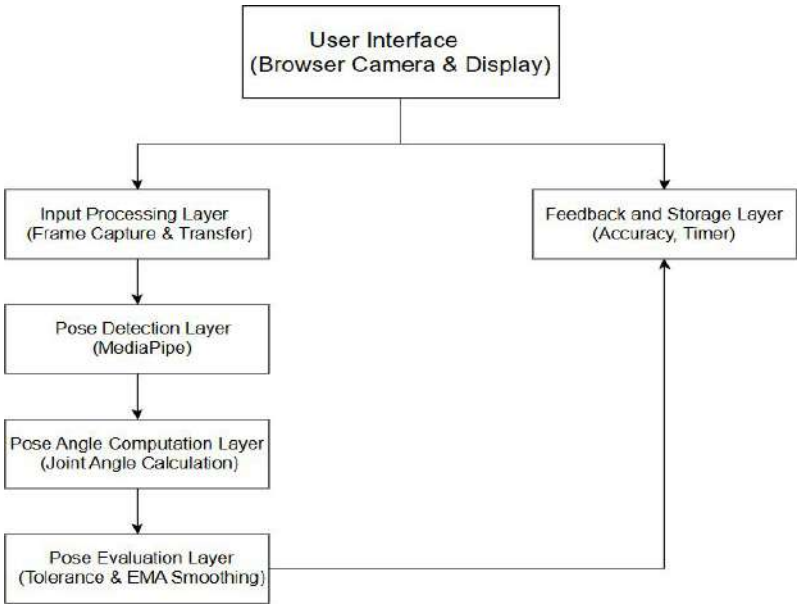

Fig.1 System Architecture of AI-Powered Yoga Trainer

These landmarks are essential for computing joint angles and analyzing body alignment. The Pose Evaluation Module compares the user's detected angles with reference data stored in the database. Using trigonometric relationships and tolerance thresholds, it determines whether each joint is correctly aligned. The results are processed and sent back to the web interface, which provides instant visual feedback correctly aligned joints are highlighted in green, while misaligned joints remain white. Performance metrics. These details are then stored in local storage or a browser-based database for later review. The user can view their progress reports, including accuracy percentages, duration history, and pose completion status, at any time through the dashboard. The Web Application serves as the communication bridge between the User, Pose Detection Module, and Database. It ensures proper synchronization between real-time feedback and historical performance records. This design provides a seamless and adaptive yoga learning experience that combines AI-driven analysis, computer vision techniques, and intuitive visualization to enhance user engagement and posture accuracy.

C. Sequence Diagram

The Sequence Diagram for the AI-Powered Yoga Trainer, as shown in Fig. 3, illustrates the dynamic flow of interactions between different components of the system—User, Web Interface, Pose Detection Module, Evaluation Module, and Local Storage. It defines the step-by-step communication sequence that occurs during a yoga session, ensuring real-time data exchange and feedback delivery. The process begins when the User logs in or initiates a session through the Web

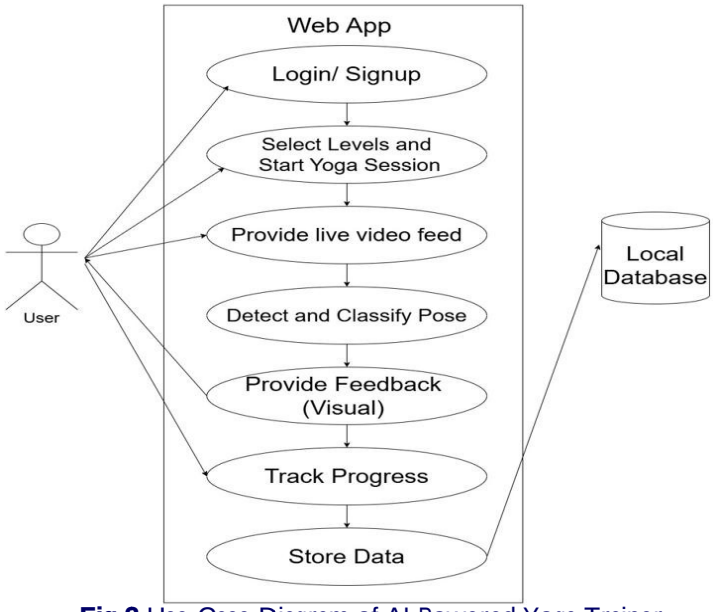

Fig.2 Use-Case Diagram of AI-Powered Yoga Trainer

Interface. This interaction is represented by the *Login/Start* action. After successful authentication, the user can begin a yoga session by starting the webcam. The Web Interface activates the camera and prepares it to capture live video input

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for pose detection, as indicated by the *Start Cam* interaction. Next, the Video Feed process begins. The webcam continuously transmits video frames containing skeletal movement data to the Web Interface, where they are preprocessed and forwarded to the Pose Detection Module. This module uses MediaPipe Pose to identify and extract 33 key body landmarks representing the user's posture in three-dimensional space. These coordinates are then sent to the Evaluation Module (Send Landmarks). The Evaluation Module calculates relevant joint angles using trigonometric formulas, compares them with the reference dataset, and applies Exponential Moving Average (EMA) smoothing to reduce noise. The resulting evaluation, containing feedback on correct/incorrect joints and pose accuracy, is sent back to the Web Interface (Evaluation Result). The Web Interface immediately presents Real-Time Feedback to the user through color-coded visualization green markers indicate correctly aligned joints, while white markers represent misalignment. The Evaluation Module simultaneously performs the *Save Data* step, recording session details such as pose name, duration, and accuracy into Local Storage. Once data storage is complete, Local Storage sends a Confirmation message to the Web Interface, ensuring that the session results have been securely saved. The user can then execute the final step, View Progress, to analyze performance summaries, accuracy graphs, and improvement charts displayed on the dashboard. This sequential flow ensures smooth coordination between all modules, maintaining real-time feedback and reliable performance tracking for an interactive, intelligent, and user-friendly yoga training experience.

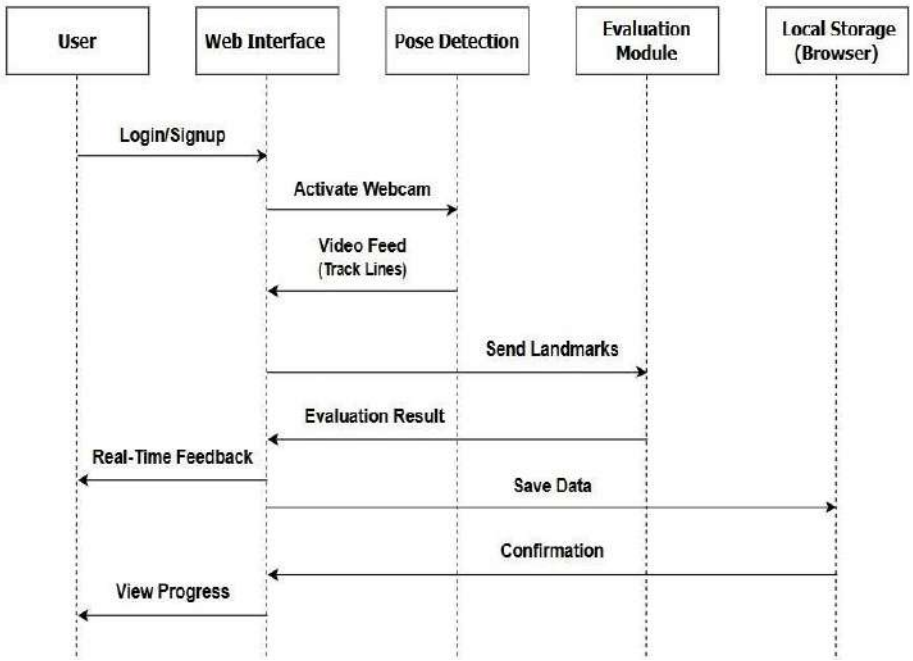

Fig.3 Sequence Diagram of AI-Powered Yoga Trainer

III. METHODOLOGY

The proposed AI-Powered Yoga Trainer follows a structured five-stage development methodology: Data Collection, Preprocessing, Model Design, Real-Time Evaluation, and Feedback Delivery. In the first stage, yoga pose images are sourced from publicly available datasets such as Kaggle and categorized based on pose type and difficulty level. Each image is processed using Media Pipe Pose, which extracts33 body land marks corresponding to major joints. From these landmark coordinates, eight key joint angles (shoulders, elbows, hips, and knees) are calculated using trigonometric relationships. The reference values derived from these calculations are stored in a dataset named pose_angles.csv, which forms the foundation for live evaluation. During real-time operation, frames captured from the webcam undergo the same landmark extraction and angle computation. The live pose angles are compared with reference values using a tolerance-based classification approach. If the angular deviation lies within the acceptable threshold, the joint is marked as correct; otherwise, it is highlighted for correction. To ensure temporal stability, an Exponential Moving Average (EMA) filter smooths the results and minimizes noise. The pose accuracy is computed as:

$$Accuracy = \frac{\text{Number of Correct Angles}}{\text{Total Angles}} \times 100$$

This accuracy score, combined with the pose-holding duration, is displayed in real time through the system interface. The frontend, implemented using JavaScript, synchronizes seamlessly with backend processes written in Python utilizing OpenCV and MediaPipe, enabling low-latency visual feedback.

A. Pose Detection Module

The Pose Detection Module serves as the foundation of the AI-Powered Yoga Trainer.

It is responsible for capturing real-time video input from the user's webcam and detecting the human body's skeletal structure. This module uses MediaPipe Pose, an advanced computer vision model developed by Google, which identifies33 key body landmarks such as the shoulders, elbows, wrists, hips, knees, and ankles. Each landmark is defined by

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a 3D coordinate system (x, y, z) — where x and y represent the pixel position in the image frame, and z indicates the depth value (distance from the camera). The webcam feed is processed frame by frame, and the model estimates the coordinates of each key point with high precision, even under different lighting or camera angles. After detection, these landmark coordinates are normalized to maintain scale and position invariance, ensuring consistency across users of varying heights and distances from the camera. The extracted data is stored temporarily forangle computation in the next module. Thus, this module acts as the data acquisition layer of the system. It converts a live video stream into structured numerical pose data, enabling further geometric and trigonometric calculations. Without this module, the system cannot perform pose analysis or provide feedback. In essence, the Pose Detection Module lays the groundwork for accurate, real- time yoga posture evaluation.

B. Pose Evaluation Module

The Pose Evaluation Module performs the analytical processing of the detected landmarks. It takes the coordinates generated by the Pose Detection Module and computes the joint angles of major body parts to assess the user's posture accuracy. These angles are calculated using the trigonometric formula:

$$\theta = |\tan^{-1}\frac{c_y - b_y}{c_x - b_x} - \tan^{-1}\frac{a_y - b_y}{a_x - b_x}|$$

Here, a, b, and c representthreeconsecutivejointsforminganangleatpoint.Thesystemcompareseachcalculated angle (θ) with its ideal reference angle stored in the dataset (pose_angles.csv). If the deviation lies within a tolerance range of ±40°–45°, the posture at that joint is considered correct; otherwise, it is classified as incorrect. To eliminate flickering or noise caused by minor user movements or camera vibrations, the Exponential Moving Average (EMA) technique is applied. This smooths the live angle data, producing stable results. The evaluated angles are then labeled as either correct (green) or incorrect (white) and passed to the Feedback & Progress Module. This evaluation step represents the core analytical intelligence of the system, converting raw geometric data into meaningful posture insights. Through this module, the system achieves precise and real-time pose validation, replicating the judgment of a human instructor.

C. Feedback & Progress Module

The Feedback & Progress Module represents the user-interaction and visualization layer of the AI-Powered Yoga Trainer. Once the Pose Evaluation Module determines which joints are correctly aligned, this module provides instant, user-friendly feedback through a visually rich interface. Each joint is color-coded green for correct posture and white for incorrect posture enabling the user to make real-time corrections. The system also calculates the pose-holding duration and overall session accuracy using the formula:

$$Accuracy = \frac{\text{Number of Correct Angles}}{\text{Total Angles}} \times 100$$

This accuracy value and pose duration are displayed in real time through dynamic dashboards and progress bars. The module additionally incorporates motivational visual cues such as confetti animations and success sounds when apose is performed correctly, making the experience engaging and encouraging. The user's performance data, including accuracy scores, time held, and pose history, is stored for long-term progress tracking across difficulty levels Beginner, Intermediate, and Advanced. This enables users to monitor improvements over time and set personalized goals.

IV. RESULTS AND DISCUSSION

The AI Yoga Trainer demonstrated reliable performance in guiding users through correct yoga postures, offering accurate real-time feedback during practice sessions. By utilizing MediaPipe Pose for landmark detection and angle-based analysis, the system effectively identified correct and incorrect poses with high precision. Accuracy levels were notably consistent in well-lit environments with clear body visibility, while minor deviations were observed in low-light or partially obstructed conditions. The application proved efficient and lightweight, operating smoothly on standard systems without requiring high-end hardware or external sensors. The integrated web interface was positively received during testing, as it provided clear visual guidance and easy navigation for users. The feedback system's responsiveness and the ability to monitor user progress contributed significantly to improving posture accuracy and overall engagement during training sessions.

A. Home Page (Landing Page)

The homepage as shown in Fig. 4, serves as the introduction to the AI Yoga Trainer system. It provides a welcoming interface that highlights the project's purpose offering a personal AI-powered yoga trainer accessible anytime and anywhere. The page features a visually appealing layout with the project title, tagline, and a"Start" button that directs users to the main yoga session module. This page is designed to create a positive first impression while guiding users smoothly into the application.

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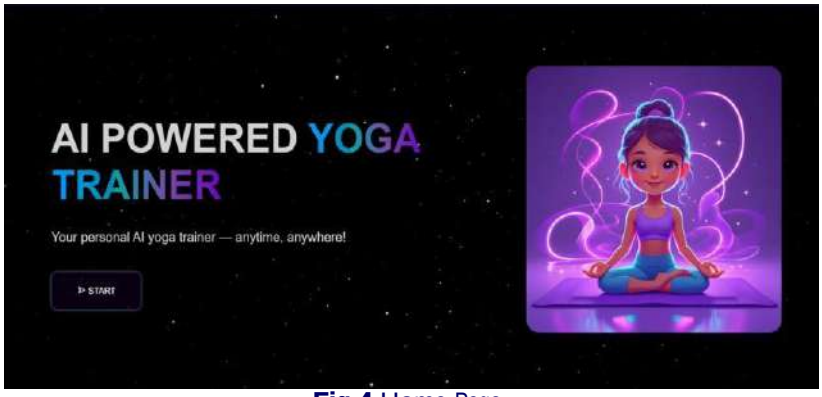

Fig.4 Home Page

The login and sign-up as shown in Fig. 5 and Fig. 6, modules handle user authentication and session management. The sign-up page collects essential user details with proper validation, while the login page allows returning users to access their saved progress. Both pages feature a clean, responsive interface with real-time feedback for input errors. Session data is stored locally, enabling users to resume their yoga sessions without repeated logins.

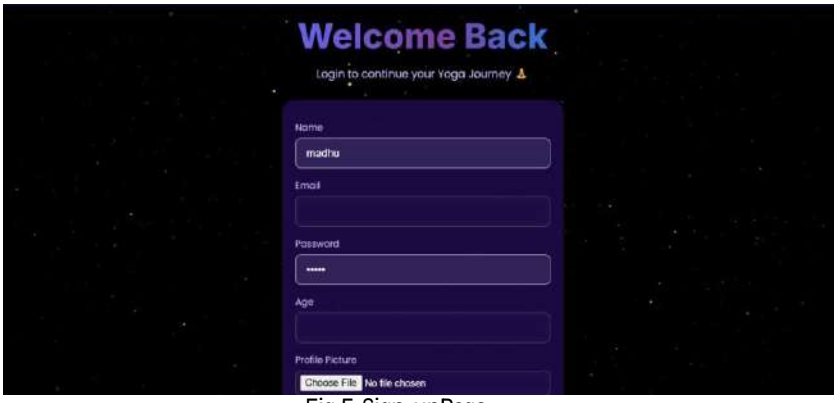

Fig.5 Sign-upPage

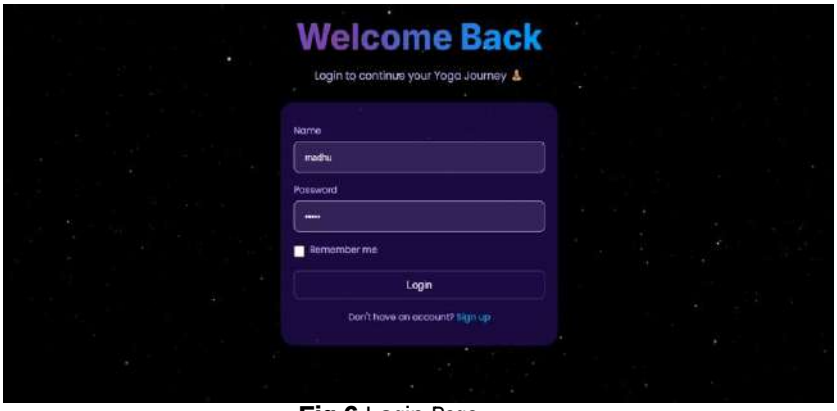

Fig.6 Login Page

C. Level Selection

This page serves as a personalized entry point for users as shown in Fig. 7, to select their desired yoga training level according to their skill, comfort, and prior experience. It offers three progressive stages Harmony, Strength, and Enlightenment each designed with a specific purpose and difficulty level. The Harmony stage is tailored for beginners, focusing on building a foundation in flexibility, posture alignment, and basic breathing control. The Strength stage caters to intermediate users, emphasizing endurance, stability, and balance through slightly advanced poses that enhance physical strength and coordination. The Enlightenment stage is crafted for advanced practitioners, promoting mindfulness, precision, and concentration with challenging postures that refine both mental and physical discipline. Each level includes short descriptions highlighting the core goals, benefits, and areas of focus, allowing users to understand what to expect before beginning. This structured progression helps users train at their own pace, ensuring a guided, safe, and effective yoga journey that aligns with their personal growth and fitness aspirations. The beginner level interface as shown in Fig. 8, is designed to provide a smooth and friendly experience for new users starting their yoga journey. It features a clean and simple layout that allows easy navigation without confusion. Users can choose basic yoga poses such as Tree, Chair, and Cobra from a dropdown menu, each selected to help improve flexibility, balance, and posture awareness. After selecting a pose, they can set a hold time in seconds, giving them the freedom to practice comfortably at their own pace.

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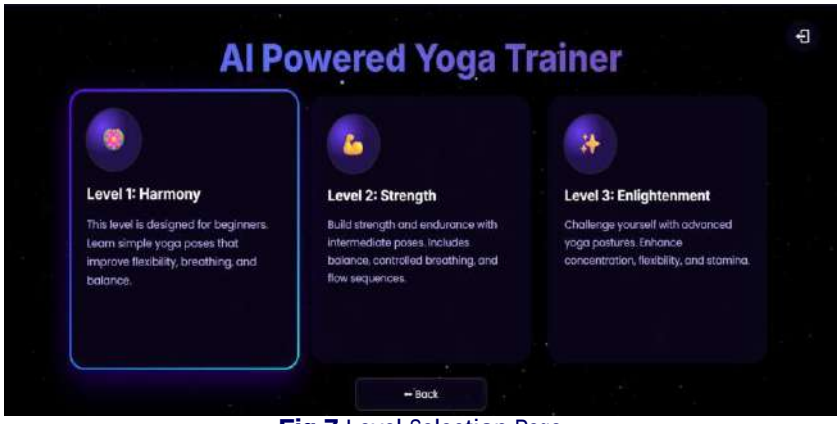

Fig.7 Level Selection Page

To make the session more motivating, the interface includes encouraging prompts like*"Get ready to push your limits!"* and "Let's power up!" These messages create a positive and energetic atmosphere, helping users stay focused throughout their practice. Overall, the beginner interface ensures that first-time learners feel confident and supported, turning yoga sessions into an enjoyable and structured experience.

Beginner Level Yoga Pose Detection

At the beginner level, the system guided users through foundation al yoga postures such asTree Pose as showninFig.9, Chair Pose as shown in Fig. 10, and Cobra Pose as shown in Fig. 11. Using the Mediapipe Pose model, the application

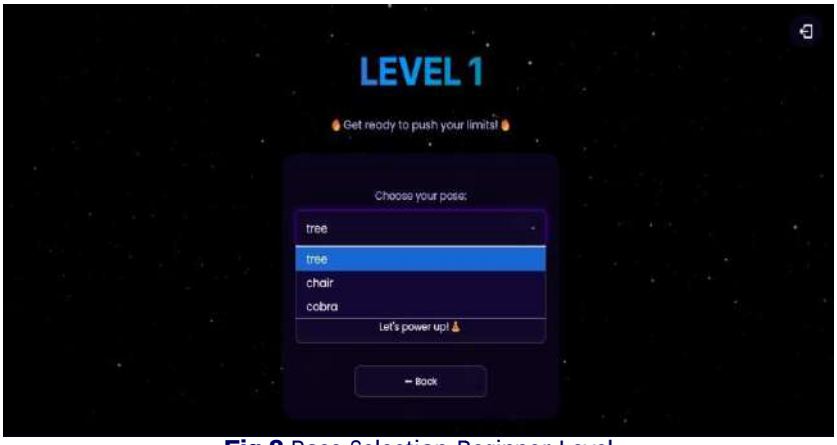

Fig.8 Pose Selection-Beginner Level

accurately detected 33 key body landmarks and tracked posture alignment in real time. Each pose was displayed alongside an animated reference, enabling users to visually compare their alignment with the ideal posture. This helped beginners to easily adjust their movements and understand the correct form for each yoga position. The real-time detection process relied on the camera feed, which was continuously analyzed by the pose estimation algorithm. For every frame, the system calculated joint angles, including the shoulders, elbows, hips, and knees, using trigonometric relations. If the deviation exceeded the tolerance range, the system immediately highlighted incorrect joints in white while displaying correct joints in green, creating an intuitive feedback loop for the practitioner. During experimentation, the system achieved high stability in tracking user movements, even when users changed positions or experienced minor camera shifts. The application also displayed a pose holding timer and accuracy percentage, motivating users to maintain correct posture for longer durations

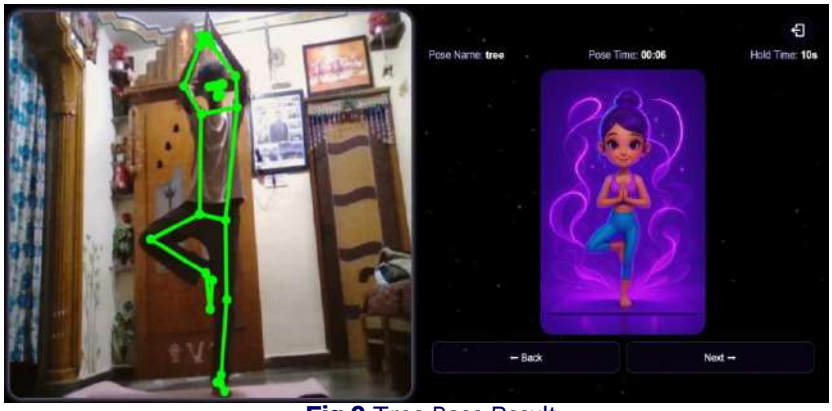

Fig.9 Tree Pose Result

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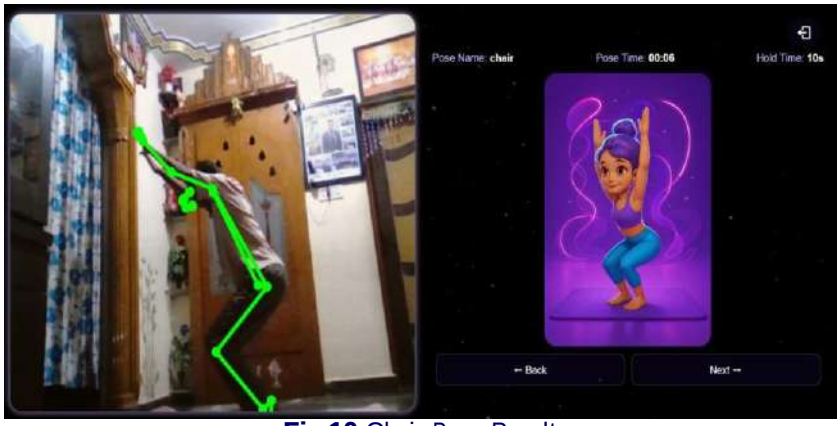

Fig.10 Chair Pose Result

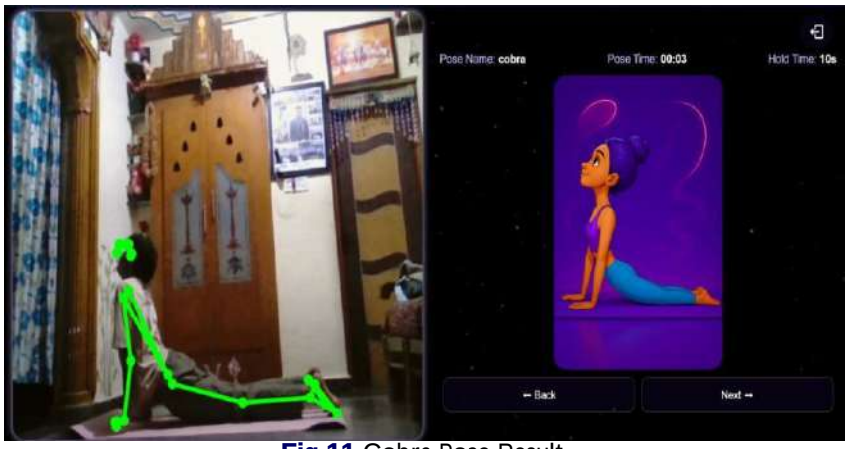

Fig.11 Cobra Pose Result

This combination of quantitative and visual guidance helped beginners improve gradually without the need for an external instructor. Overall, the beginner-level testing demonstrated the efficiency of the AI-Powered Yoga Trainer in improving posture awareness, accuracy, and body coordination. By combining artificial intelligence, computer vision, and biomechanical analysis, the system provided a smooth and interactive learning experience.

2. Intermediate Level–Pose Selection Interface

The intermediate level interface as shown in Fig. 12, is designed to help users progress beyond the basic by improving their strength, stability, and endurance. It features a clean and organized layout that allows users to smoothly select their preferred poses from a dropdown menu, including options like Warrior I, Warrior II, and Plank. These poses are specifically chosen to enhance body control, coordination, and muscular engagement, supporting users as they transition from beginner to more challenging movements. Once a pose is chosen, users can set a hold limit in seconds, helping them gradually increase their stamina and consistency in practice. To keep the experience engaging, the interface displays motivating prompts such as “Get ready to push your limits!” and “Let’s power up!” that encourage users to stay focused and confident during their sessions. The overall design maintains a perfect balance between functionality and motivation, ensuring that users feel both guided and inspired as they strengthen their yoga foundation and move closer to mastery.

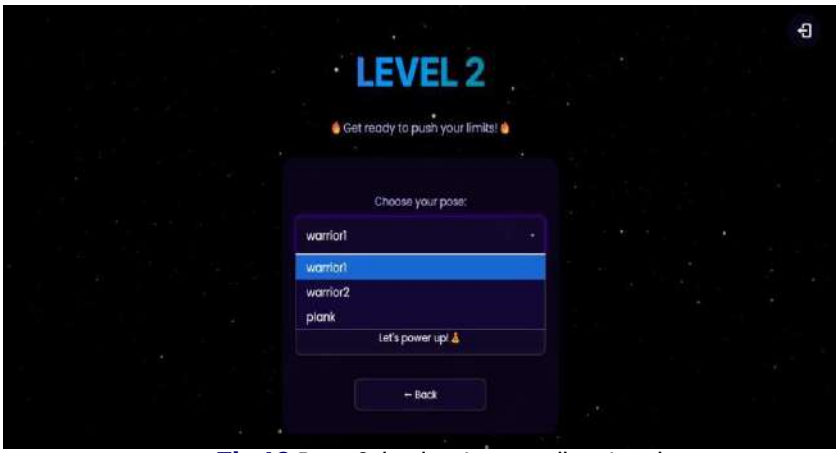

Fig.12 Pose Selection-Intermediate Level

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This interface helps users build strength and balance through poses like Warrior I as shown in Fig. 13, Warrior II as shown in Fig. 14, and Plank. It tracks posture in real time and provides motivation with prompts like "Push your limits!" guiding users as they progress from beginner to advanced levels.

Fig.13 Warrior1 Pose Result

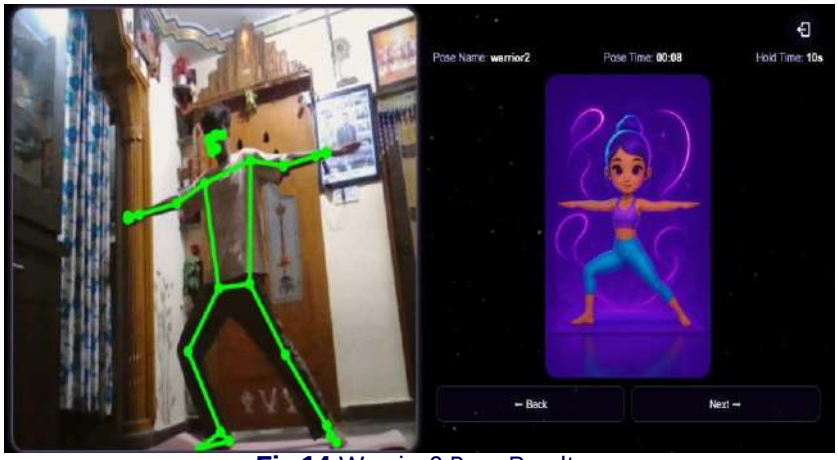

Fig.14 Warrior2 Pose Result

3. Advanced Level–Pose Selection Interface

The advanced level interface as shown in Fig. 15, is built to challenge users and enhance their flexibility, strength, and endurance. It features a simple and interactive layout where users can easily choose their desired poses from a dropdown menu, including options like Triangle, Downdog, and Extended. These poses are specifically designed to improve posture precision, muscle coordination, and full-body balance, helping users refine their movements as they progress toward mastery. Once a pose is selected, users can set a hold duration to test their stamina and control during each session. To make the experience motivating, the interface includes energetic prompts such as "Get ready to push your limits!" and "Let's power up!"—keeping users inspired throughout their practice. The overall design perfectly combines focus and motivation, guiding users to stay consistent, confident, and determined as they advance through their yoga journey.

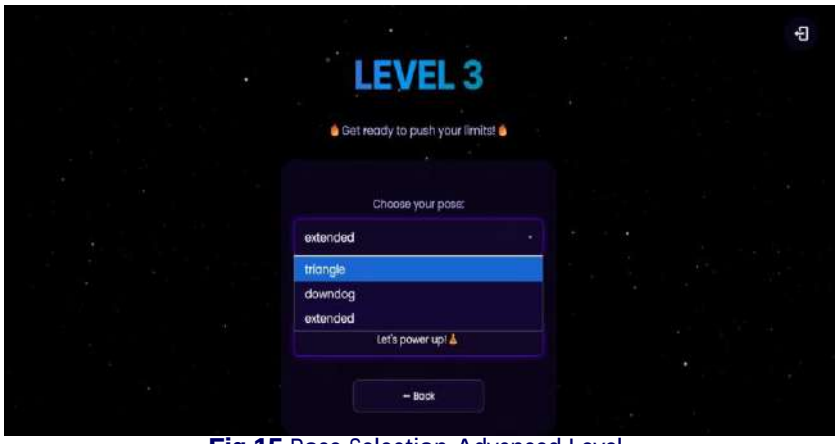

Fig.15 Pose Selection-Advanced Level

This interface helps users enhance flexibility and control through poses like Triangle as shown in Fig. 16, and Downward Dog as shown in Fig. 17. It tracks posture in real time and provides motivation with prompts like "Get ready to push your limits!"—guiding users as they refine strength and move toward mastery.

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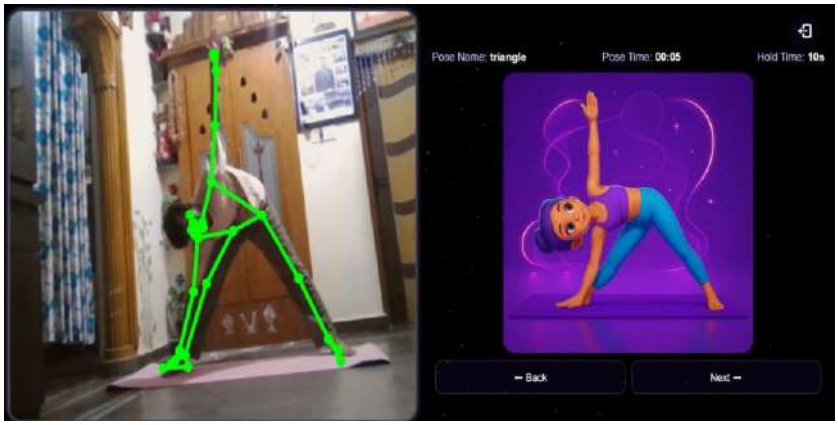

Fig.16 Triangle Pose Result

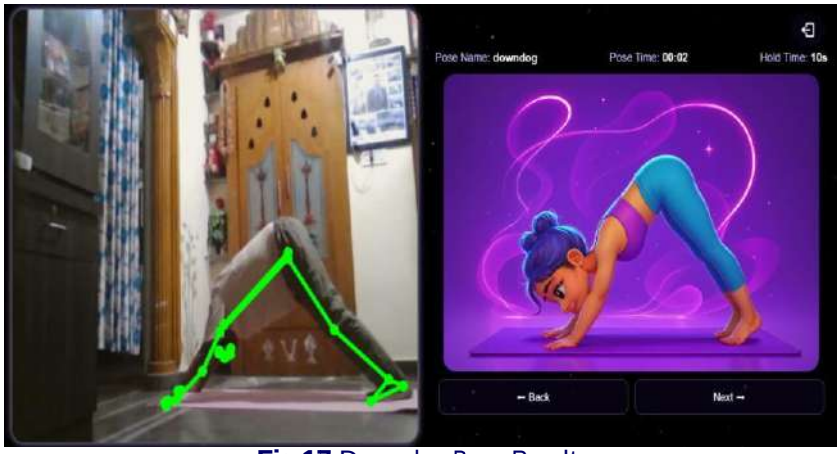

Fig.17 Downdog Pose Result

4. Completion Interface–Final Achievement Screen

The Completion Interface represents the final and most motivational stage of the AI-Powered Yoga Trainer, marking the user's overall accomplishment at the end of their training. As shown in Fig. 19, this screen activates when a user successfully completes all the yoga poses and levels Beginner, Intermediate, and Advanced. It serves as both a visual acknowledgment of achievement and a psychological reward that promotes user satisfaction and continued engagement. The Final Achievement Screen, as illustrated in Fig. 18, appears after the user has mastered every yoga level. It displays the message "You mastered every level amazing work!", which creates a sense of personal accomplishment and emotional gratification. The system highlights the user's cumulative progress, including metrics such as total accuracy, session count, and improvement percentage. These values are fetched from local storage and rendered on the interface through graphical charts, giving users a clear visualization of their journey and performance.

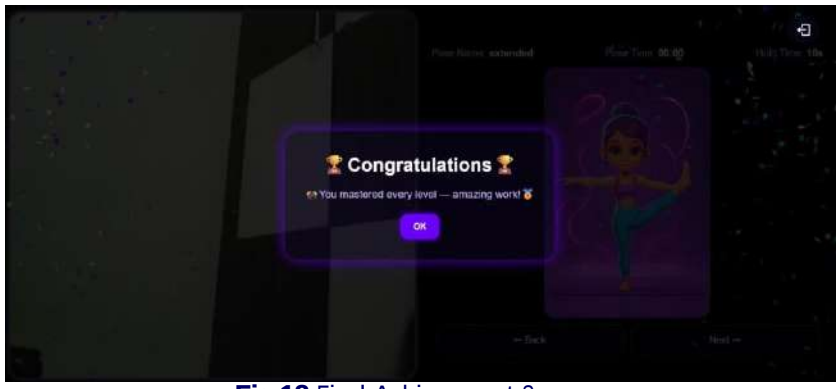

Fig.18 Final Achievement Screen

5.Dashboard Interface

The Dashboard Interface offers users a clear summary of yoga performance and progress as shown in Fig. 20, Fig. 21 and Fig 22. It highlights essential metrics such as total sessions completed, total practice time, average pose accuracy, and current streak, helping users stay consistent and motivated in their training routine. The layout is clean and visually engaging, allowing users to easily interpret their progress at a glance. The dashboard features multiple interactive visualizations that translate raw data into meaningful in sights. Charts like "Accuracy Over Time" depict the user's performance trend across sessions, while "Pose-wise Accuracy (Radar)" high lights strengths and weaknesses for each yoga posture.

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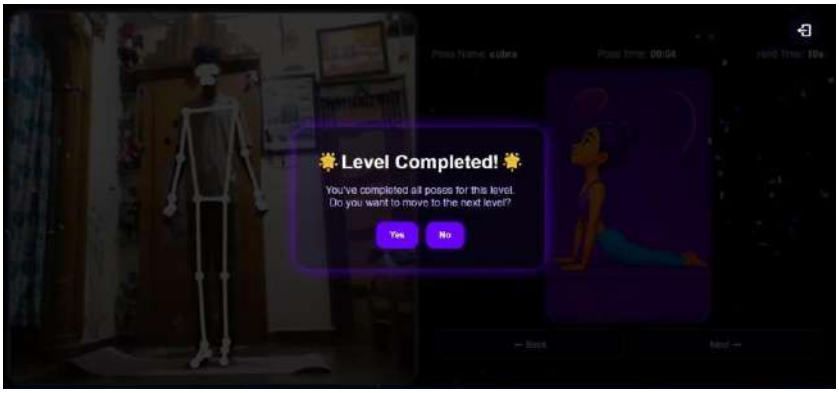

Fig.19 Level Completion Interface

Additionally, the "Hold Time Progress" chart tracks the user's endurance improvement, showing how long they successfully maintained correct poses. To gether, these visual tools present a holistic view of progress, empowering users to understand their body alignment efficiency and training patterns more deeply. Beyond visualization ,the AI-generated Insights integrated into the dash board offer personalized recommendations for continuous improvement. The system analyzes accuracy trends, pose durations, and error frequency to suggest specific poses that require additional focus, such as improving balance in Tree Pose or enhancing flexibility in Cobra Pose.

Fig.20 Dashboard Interface–User Performance Overview

Fig.21 Dashboard Interface– Pose-wise Accuracy

V. CONCLUSION AND FUTURE SCOPE

A. Conclusion

The AI-Powered Yoga Trainer successfully integrates artificial intelligence, computer vision, and fitness education into a unified platform. It enables real-time posture detection and feedback, promoting self-paced learning and proper alignment without requiring an instructor's presence. The system proved reliable, lightweight, and user-friendly during testing, functioning smoothly on standard hardware. It effectively enhances flexibility, focus, and health awareness among users. Though the accuracy slightly varies with lighting and camera quality, its overall performance demonstrates the potential of AI-based virtual fitness assistants in modern health applications.

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Fig.22 Dashboard Interface Hold Time and AI Feedback

B. Future Scope

Future improvements will focus on making the system more interactive and personalized. Planned enhancements include integrating voice feedback to provide verbal pose corrections, gamification with scores and rewards, and multi- language support for broader accessibility. The addition of age-based and skill-based yoga plans will tailor exercises to user needs. Incorporating AI-driven posture prediction and 3D pose estimation could further increase precision and adaptability. Cloud integration for progress tracking and social sharing features can also foster motivation and community participation. These advancements will make the AI Yoga Trainer a comprehensive and intelligent digital wellness companion.

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