SMART INDIA HACKATHON 2024

Problem Statement ID – SIH1599

Problem Statement Title- *"FITLIFE" exercise guidance with integration of computer vision using custom build ML model.*

Theme- Fitness & Sports

PS Category- Software

Team ID- 974

Team Name- ENIGMA!

FITLIFE

A step Towards a Better and Optimised living.

ENIGMA!

IDEA TITLE

SMART INDIA HACKATHON 2024

• Proposed Solution

The Exercise Tracking **Web-App** with **Pose Detection** using real-time pose analysis to guide users in correct exercise form, count repetitions, and provide personalised workouts for an enhanced fitness experience.

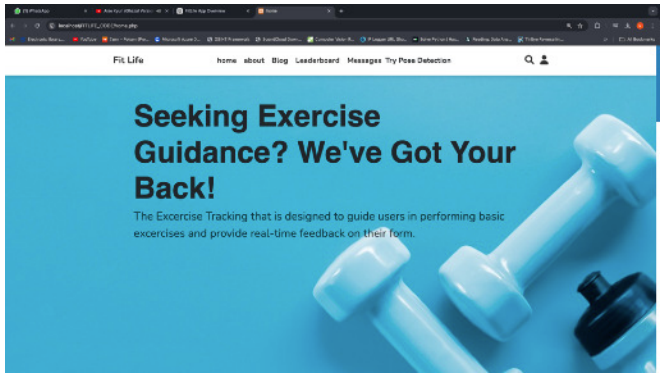


Figure 1.1: Some insights of Fit life web app displaying home part of home page. (App Under Development - Final Version Will Be Enhanced) (please zoom in to have a better look)

• Address the Problem

FitLife addresses key fitness challenges by offering personalised **workout plans**, real-time **form correction,** and **gamification** to keep users engaged. It's affordable, accessible, and designed to fit any schedule. In the healthcare sector, FitLife can be used at a **basic level for physiotherapy**, providing remote sessions with **real-time guidance**, **progress tracking**, and improved patient engagement in their recovery

- Time Constraints
- High Costs
- Lack of Personalised Guidance
- Limited Access to Equipment
- Limited Access to Physiotherapy
- Engagement for Children
- Inconsistent Motivation
- Difficulty in Tracking Progress
- Patient Engagement in Recovery
- Progress Tracking in Recovery

• Innovation and Uniqueness

Real-Time Pose Detection and tracking

Tracks user movements with high precision, offering instant feedback and form correction during exercises.

Personalised Fitness Guidance

Customises workout plans based on each user's fitness goals, current fitness level, and available equipment, ensuring a personalised fitness experience.

Exercise Selection:

Users can browse and select exercises from an extensive library, tailored to their goals and equipment availability.

Gamification Elements

FitLife uses gamification with leaderboards, levels, and challenges to make exercise fun and competitive, effectively engaging children by turning fitness into a game.

All-in-One Platform

Combines real-time tracking, personalised plans, and gamification, setting FitLife apart from generic fitness apps.

Sport-Specific Training

FitLife recommends exercises specific to a chosen sport, like football, to improve relevant skills and muscle groups.

The ML model can also be trained to be integrated with **Yoga** (we are working on it) **

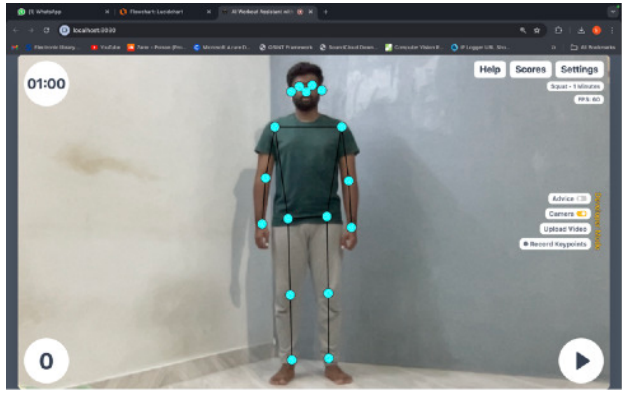
TECHNICAL APPROACH

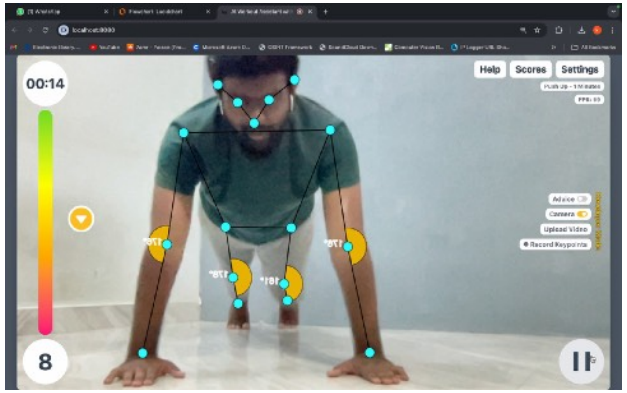
• Technologies to be Used

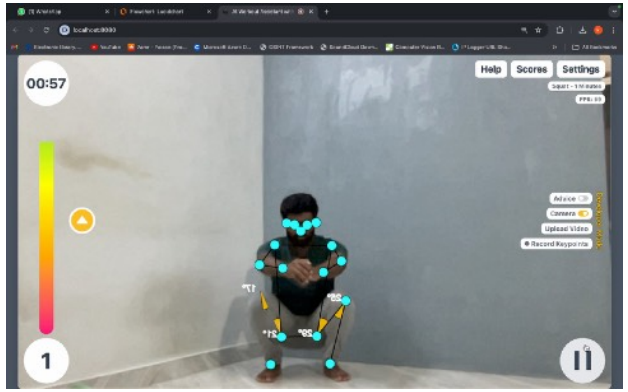
- **Programming Languages**: Python, JS , HTML , CSS
- **Frameworks**: MediaPipe, React js ,Node.js
- **Tools**: VS Code
- **Hardware**: Laptop with a camera for pose detection

Note - Detailed technology overview is explained in idea description and supporting documentation documentation link —— https://fitlifedoc.s3.amazonaws.com/index.html

• Working Prototype.







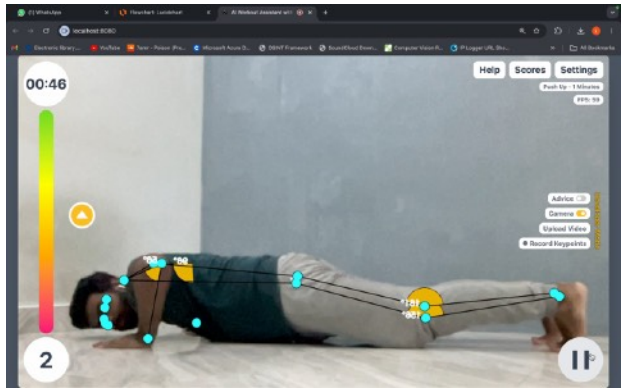


Figure 1.2: practical demonstration of pose tracking and rep counting while doing Squats

Figure 1.3: practical demonstration of pose tracking and rep counting while doing Push up's

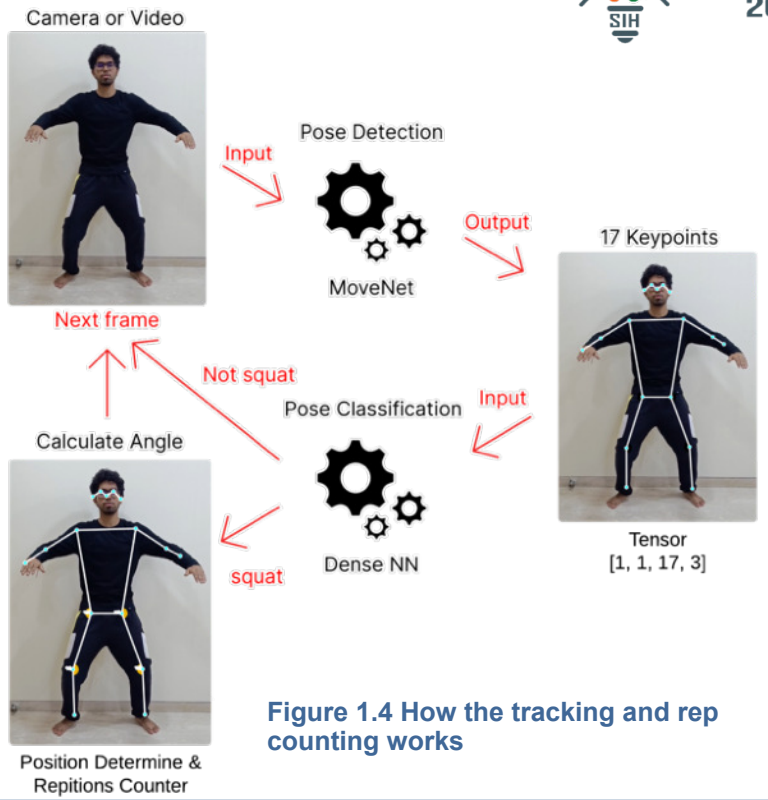


Figure 1.4 How the tracking and rep counting works

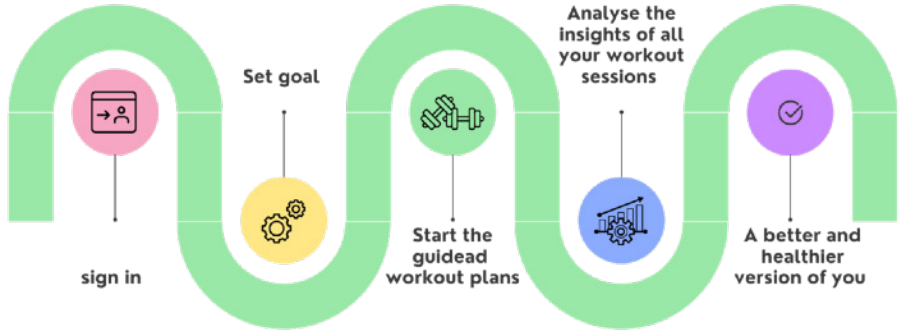


Figure 1.5 User flow

FEASIBILITY AND VIABILITY

Feasibility of the FitLife Project

Technical Feasibility: Leverages **well-established technologies** like Python and MediaPipe, and **custom ML model** ensuring manageable development and strong support.

Pose Detection: Utilises advanced pose detection techniques, which are reliable and accurate, making them **ideal for fitness and basic physiotherapy applications.**

Gamification Features: Simple to implement yet highly effective in enhancing **user engagement,** requiring **minimal additional infrastructure**.

Scalability: Designed to grow with user needs, supporting more exercises, features, and **potential integrations with healthcare systems.**

Credibility: We are closely working with medical professionals(**Nutritionist**, **physiotherapist**, **Gym Trainers**) to get the accurate data.

A Genius Business model

- **Individuals:** Customised fitness plans for personal goals.
- **Gyms:** Enhanced member experience and retention.
- **Sports Authorities:** Data-driven athlete training.
- **Corporate Wellness:** Employee health and productivity.
- **Healthcare Providers:** Chronic disease management.
- **Fitness Pros:** Enhanced client services.

A step Towards a better and optimised living.

Save time and financial resources.

Potential Challenges and Risks

- **Pose Detection Accuracy:** Ensuring that the pose detection works accurately across different body types and environments.
- **User Engagement**: Maintaining user interest over time, especially for younger audiences.
- **Data Privacy**: Protecting user data, particularly sensitive health information.

Strategies for Overcoming Challenges:

- **Pose Detection**: Continuous testing and improvements , **larger training datasets** , **Hight quality video cameras**
- **User Engagement**: Regular updates and introduction of new **challenges** and **rewards**, **Gamification strategies** such as **badges, leaderboards**, and virtual fitness goals
- **Data Privacy**: Implementing robust encryption and data handling practices. Implementing **GDPR-compliant data handling** practices and Encryption protocols such as **AES** (Advanced Encryption Standard)

IMPACT AND BENEFITS

• Potential impact on the target audience

Individuals: Receive **personalised fitness plans** and **progress tracking,** leading to more effective workouts and better health outcomes.

Gyms: **Enhance member experience** with customised fitness plans and data insights, improving member satisfaction and retention.

Sports Authorities: **Optimise athlete training** and performance with data-driven insights and analytics.

Corporate Wellness: Improve **employee health and productivity** while potentially reducing healthcare costs through personalised wellness programs.

Healthcare Providers: Manage chronic diseases more effectively and engage patients in their h**ealth management with tailored fitness solutions.**

Fitness Professionals: Offer **enhanced services and insights to clients**, improving client satisfaction and professional skills.

• Potential impact on the target audience

Social: Promotes a **healthy lifestyle across all age** groups, including children.

Economic: Provides a cost-effective **alternative to gym memberships** and personal trainers.

Environmental: **Reduces the need for commuting to gyms**, lowering the carbon footprint.

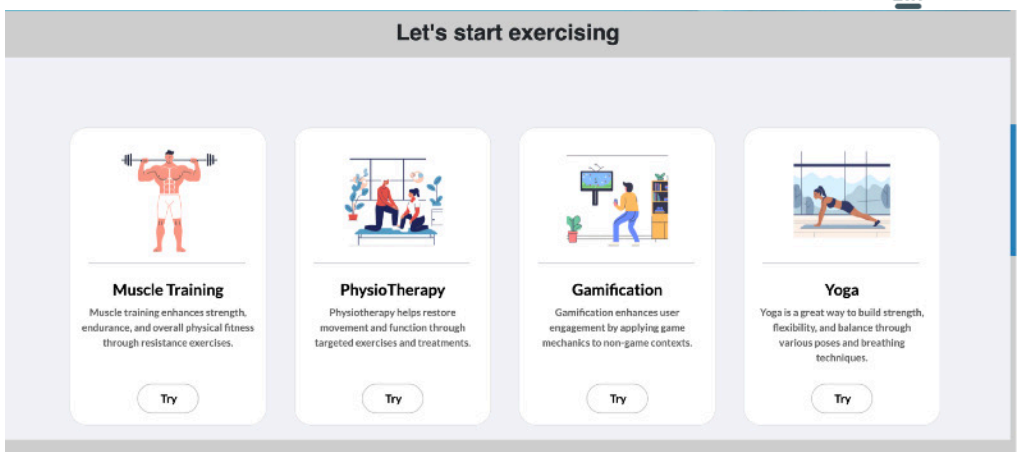


Figure 1.6: Major areas of services offered by FitLife

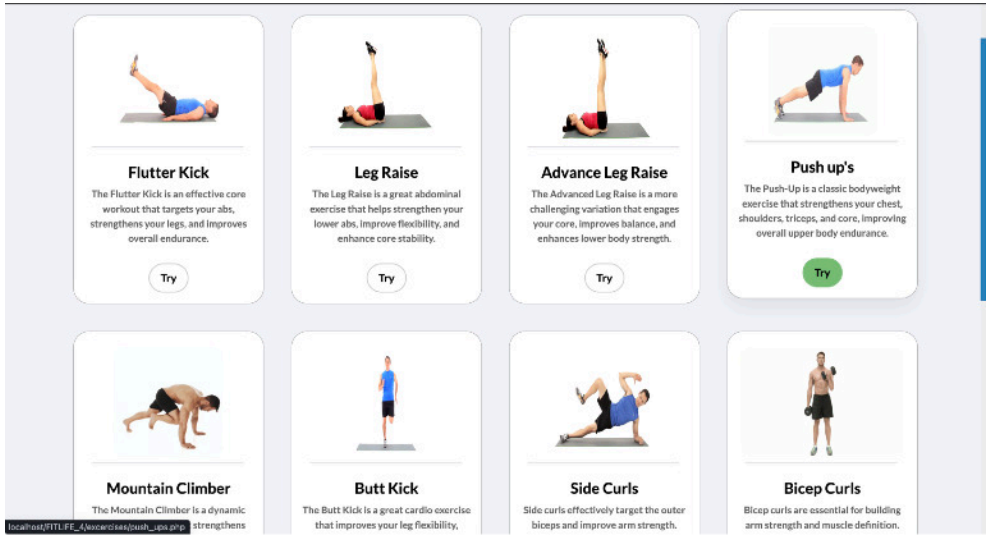


Figure 1.7: FitLife offering wide range of exercise catalog to select from.
(The image only show some of the exercises offered there is much more to explore)

RESEARCH AND REFERENCES

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