A Mini Project Report on

Fitness Exercise App Using AIML

T.E. - I.T Engineering

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CERTIFICATE

This to certify that the Mini Project report on Fitness Exercise app has been submitted by **Sahil Shetty** (20104122), **Pranil Patil**(20104121), **Akash Patil** (20104075) who are a Bonafede students of **A. P. Shah Institute of Technology**, Thane, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2022-23** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ABSTRACT

A fitness app is a tech solution – that assists users in improving their overall health & being. Therefore, it addresses aspects related to food habits, activity, general well-being, and mental health. As users became more conscious over time, fitness apps have come to manage a greater number of features.

Fitness apps are promising digital tools to support self-tracking and physical activity. Specific app functions such as normalized step targets represent controlling conditions that can affect controlled vs. autonomous motivation and thus motivated physical activity.

The Fitness Exercise project utilized AIML technology to create a comprehensive and user-friendly solution for individuals looking to improve their fitness levels. This project featured various functionalities such as workout videos, an API to suggest similar exercises, equipment recommendations, progress tracking, and reps counting. By leveraging AI and ML algorithms, the project offered a personalized experience for users to achieve their fitness goals. The project demonstrated the potential of technology in transforming the fitness industry and improving the overall health and well-being of individuals. Additional features such as meal planning and nutrition tracking could further enhance the project's capabilities, offering a more holistic approach to health and wellness.

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CHAPTER 1

INTRODUCTION

The fitness industry has been continuing to grow year after year with more individuals becoming health conscious. Today's apps currently don't have a simple all in one application in helping users progress in the gym. As a result, a website has been developed, to help users their gym life and the user will be able to track workouts for a particular day with the ability to add exercises. In addition to tracking workouts, the website can also provide personalized workout plans tailored to the user's goals and fitness level. The plans can be based on different factors such as the user's fitness goals, available equipment, and time constraints. To make the user experience even better, the website can integrate with wearable fitness trackers to automatically log the user's workouts and monitor their progress over time. It can also provide social features, such as the ability to connect with friends and workout partners for accountability and motivation. Furthermore, the website can offer educational resources such as articles and videos on fitness and health-related topics to help users stay informed and make informed decisions about their workout routines.

- **Problem Identified:**
- Users need a Program where they can check their accuracy of desired exercise.
- Users need a website to track their workout and create a routine that can maximize their workout.
- **Solution Proposed :**

- By using Fitness Accuracy System user will get and proper idea about his/her exercise Total reptation and accuracy.
- By utilizing the Fitness Accuracy System, users can gain a clear understanding of the total number of repetitions.

1.1 Purpose :

By providing personalized workout plans, the website can help users achieve their desired fitness outcomes more efficiently. The integration with wearable fitness trackers allows for seamless tracking of progress, while the social features provide a sense of community and motivation. Additionally, the educational resources can help users stay informed and make informed decisions about their health and fitness. Ultimately, the purpose of the website is to simplify and enhance the user's gym life experience by providing a comprehensive platform for all their fitness needs.

1.2 Problem Statement :

Existing fitness apps are not providing a simple all-in-one solution to help users progress in their gym life, leading to frustration and lack of progress towards fitness goals. Users must use multiple apps, and many apps do not offer tailored plans based on the user's fitness level, goals, and available equipment. There is a need for a comprehensive platform that can simplify the user's gym life experience and provide all the necessary tools in one place.

1.3 Objectives:

- To empower people to create healthy training habits
- To make sure user’s posture is accurate while exercising.
- To check the reptation while performing exercises.
- To check the accuracy of exercise performed.

1.4 Scope

- Can be used to track workouts.
- Can be used to count the reps of the exercise through rep counter.
- Can be used to understand accurate exercise movement.
- Can be used to make the user aware of the correct posture.
- Can be used to avoid injuries.

CHAPTER 2

Literature Review

Sr. no	Title	Author(s)	Year	Algorithms	Limitations	Result
1	Bicep Curl Tracker	1]Ms. S. Harishma 2]Dr. R. K.Kavitha	2023	K- nearest neighbour Algorithm	Only tracks webcam workout	The fitness systems and the potential of AI image processing techniques for stance identification and pose tracking. The traditional techniques for tracking poses are limited in speed.
2	Real-time Workout Posture Correction	1]Yejin Kwon 2]Dongho Kim	2022	Generative adversarial networks	Only detects the posture but not the reps i.e tracking is not feasible.	The program estimates the user's body landmarks through real-time image analysis and calculates the necessary numerical values to determine posture correctness.
3	Workout Analysis	1]Swapnil Dawange 2]Akash Chavan 3]Abhijit Dusane 4]H.P.Bhabad	2021	Open Pose	The system is limited for workout purposes with single-person compatibility at a time.	Blaze-pose estimation module developed by MediaPipe to capture user movements accurately. The proposed application offers pre-trained workout sets and real-time monitoring of user movements to provide accuracy and avoid injuries.

CHAPTER 3

PROPOSED SYSTEM

The Fitness Exercise application is designed to assist people with limited knowledge about physical fitness and working out. The system will provide exercise categories for specific body parts to enhance. The proposed system will benefit users by offering workout exercise assistance and exercises for those who want to shape their body.

3.1 Features and Functionality

- **Workout videos:**

  User can refer to various workout plans to help them understand the exercises.

- **Similar exercise:**

  User can see similar exercise to their current plan with the help of API

- **Equipment:**

  User can view the exercises related to the equipment they own and add to their plan.

- **Graph:**

  User can have a observe on his/her progress through the graph constantly.

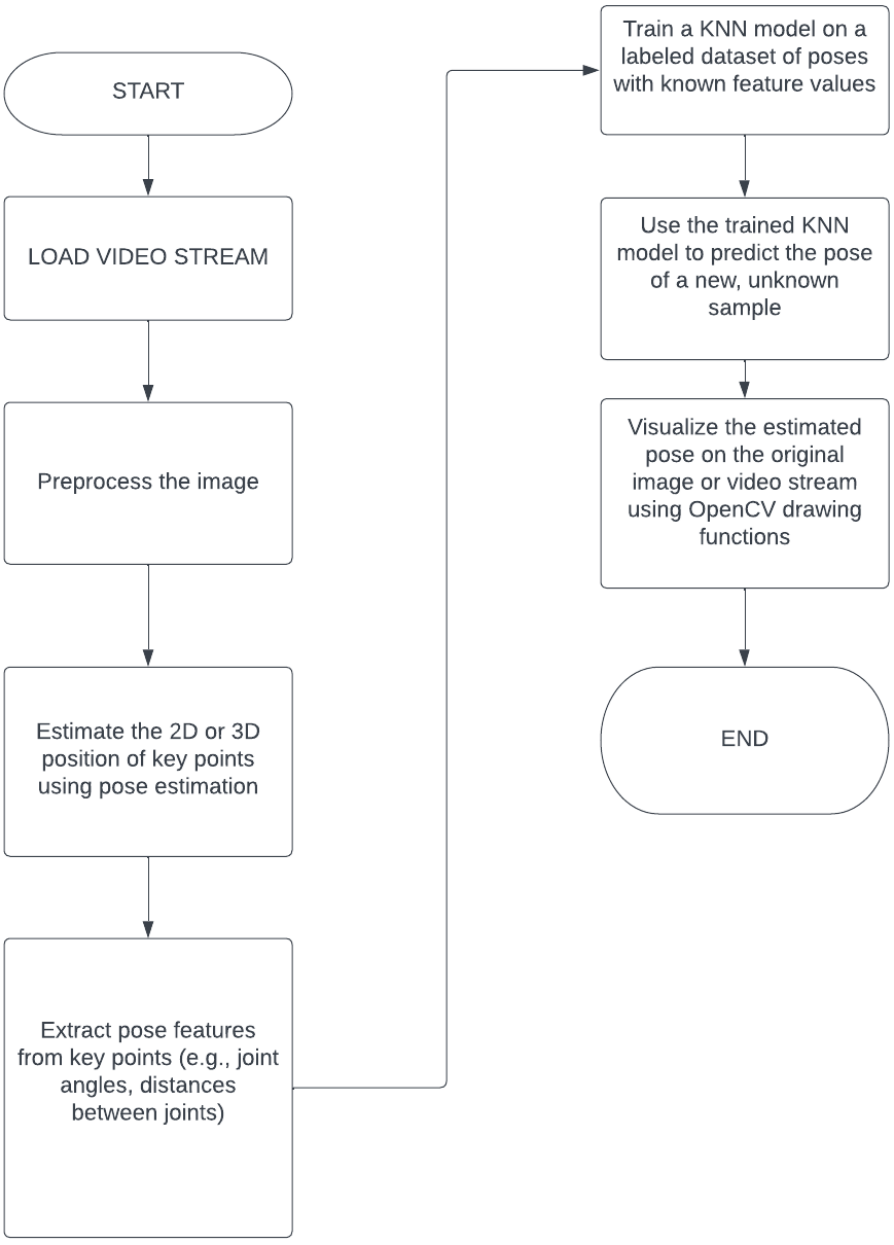
- **Track Workout:**

  User can track their daily routine by inserting their daily exercise and repetition count.

- **Reps Counter:**

  User can perform the exercise by enabling the webcam and can see counting of reps on the screen.

3.2 Algorithm Working with flowchart



3.3 Algorithm

K-nearest neighbor (KNN) is a machine learning algorithm that can be used in OpenCV pose estimation to identify the most similar poses in a dataset. KNN works by comparing the distances between the pose features of an unknown pose and those of labeled poses in a dataset.

To use KNN in pose estimation, we first need to extract features from the poses. These features can be things like joint angles, distances between joints, or other relevant measures of the pose. Then, we can train a KNN model on a labeled dataset of poses with known feature values.

Once the model is trained, we can use it to predict the pose of a new, unknown sample by finding the k-nearest labeled poses in the dataset based on the feature distances, and then taking the most common pose among those k neighbors as the predicted pose.

KNN can be used in conjunction with other pose estimation methods, such as OpenPose, to improve accuracy and robustness of the overall pose estimation system.

CHAPTER 4

REQUIREMENT ANALYSIS

Performance Requirements

The load time for the user interface screen should take no longer than 5 seconds.Workout videos for reference should be there .Track of daily progress made by user should be seen through graph or daily tracking information.

- **Design Constraints**

  The application should be able to run on any Pc or Laptop.

- **Availability**

  The application should be available at all times whenever user wants to use.

Hardware requirements

- **RAM**

  The application requires a device with a minimum of 512MB RAM while running.

- **Processor speed**

  The application requires a device with a minimum processor speed of 1GHz while running.

Software requirements

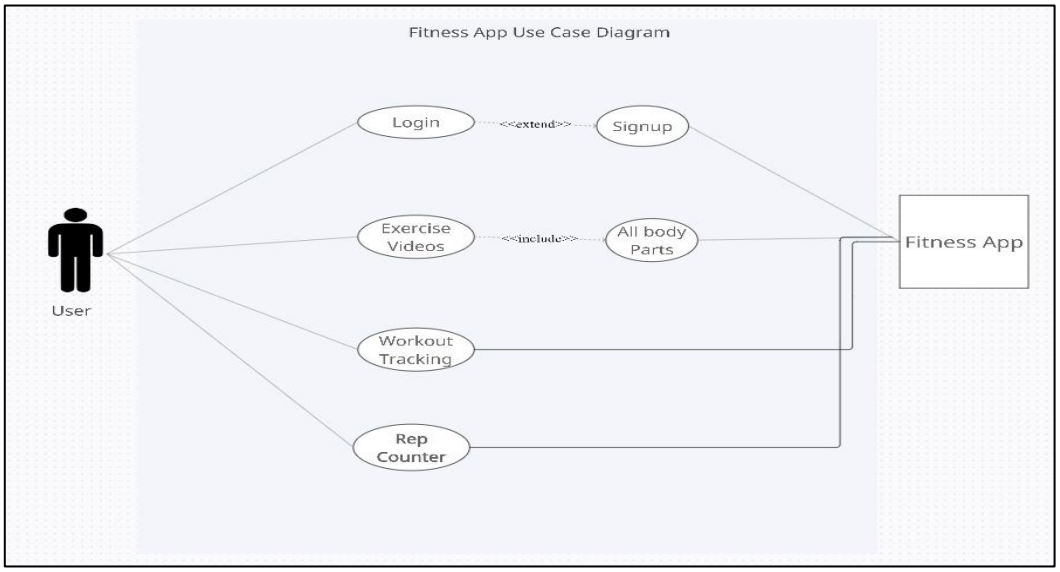
- **Operating system**

  The application must run on any Operation System.

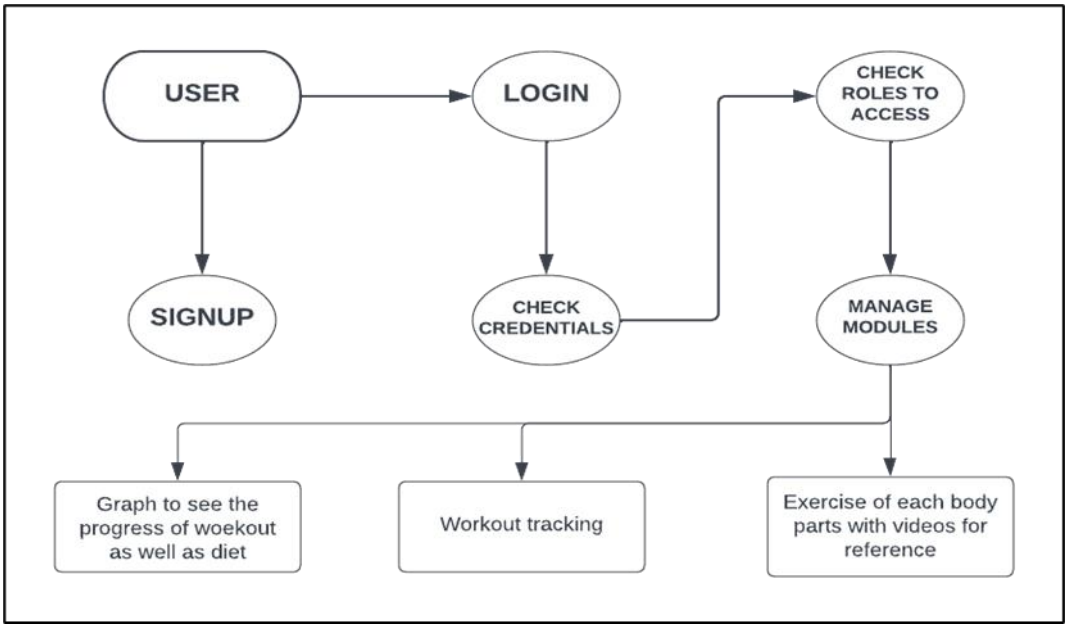
CHAPTER 5

PROJECT DESIGN

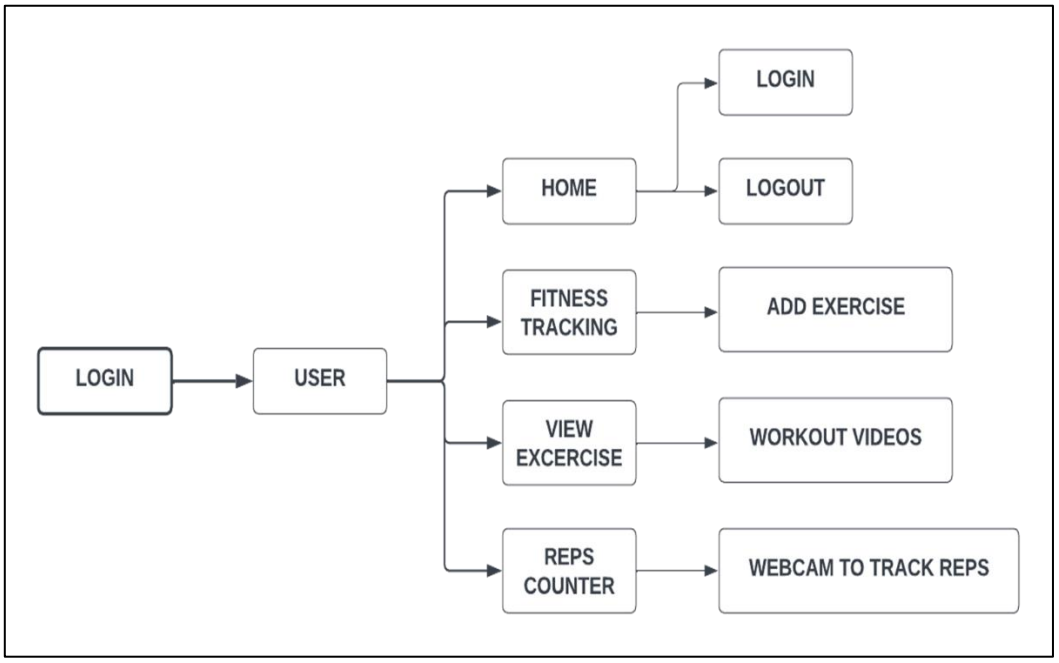
5.1 Use Case Diagram



5.2 DFD



5.3 System Architecture



CHAPTER 6

TECHNICAL SPECIFICATION

Development: VS Code

VS Code also known as Visual Studio Code is a source code editor made by Microsoft for Windows, Linux, MacOS. It has various features such as Debugging, Syntax highlighting, extension, intelligent code completion.

Frontend: Html, CSS, JavaScript

As a web developer, the three main languages we use to build websites are HTML, CSS, and JavaScript. JavaScript is the programming language, we use HTML to structure the site, andwe use CSS to design and layout the web page.

OS : Windows

Windows is a graphical operating system developed by Microsoft. It allows users to view and store files, run the software, play games, watch videos, and provides a way to connect to the internet. It was released for both home computing and professional works.

Backend: Php, MySQL, Python-OpenCV

With PHP, you can connect to and manipulate databases. MySQL is the most popular database system used with PHP. PHP combined with MySQL are cross-platform (you can develop in Windows and serve on a Unix platform) . OpenCV is an open-source computer vision and machine learning library that is used for various image and video processing tasks. It provides a wide range of functions for tasks such as image filtering, feature detection, and object detection. OpenCV has a Python API that allows for easy integration with Python-based applications.

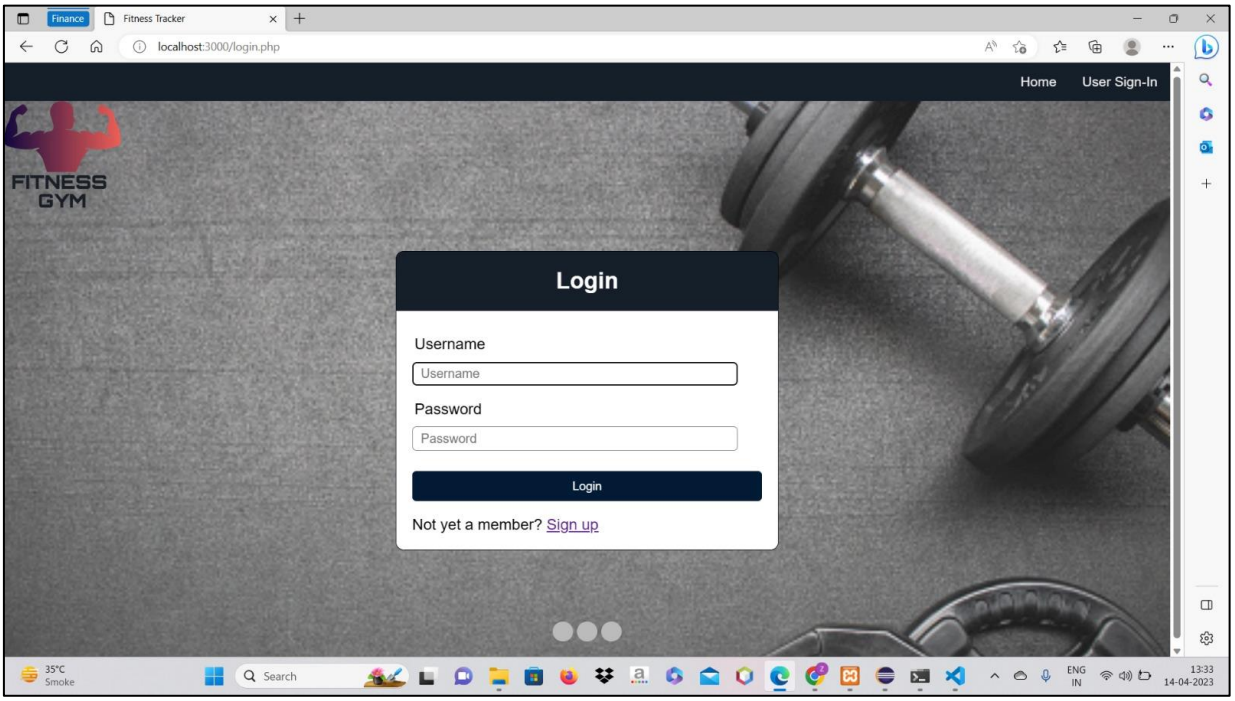
CHAPTER 7

PROJECT SCHEDULING

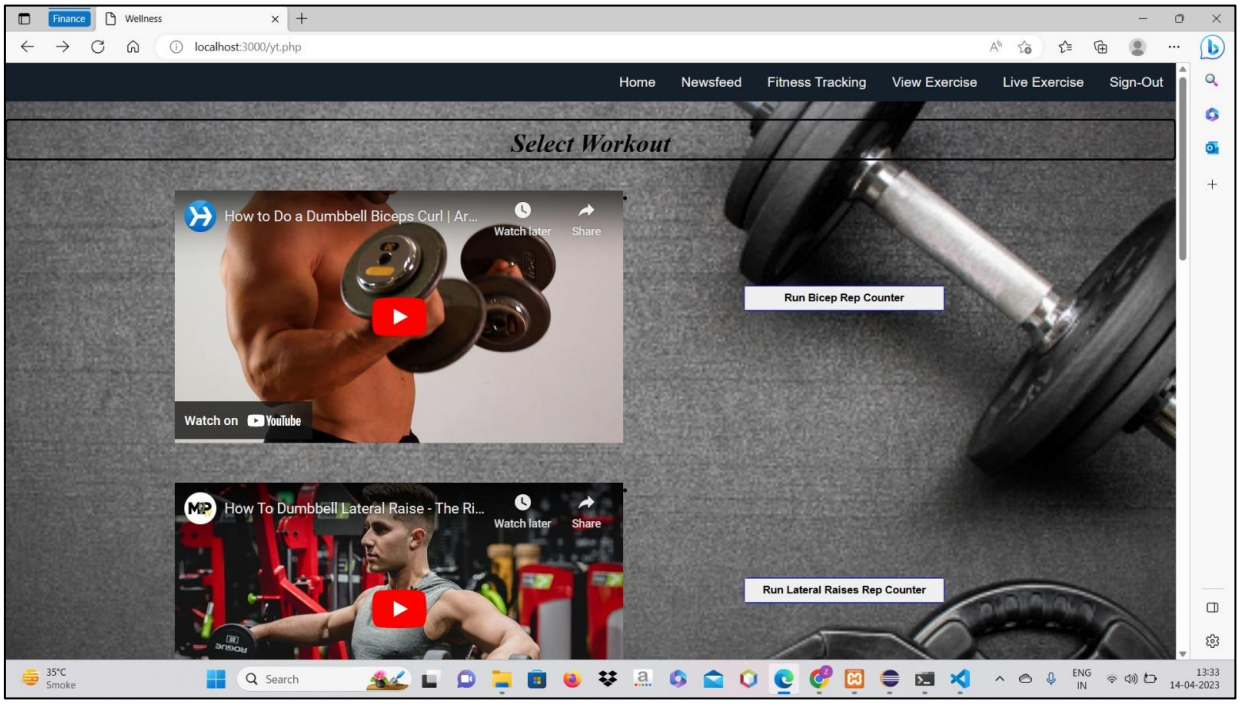
Sr. No	Group Member	Time duration	Work to be done
1	Pranil Patil	1st week of January	Implementing the workout tracker along with the backend.
		2nd week of January	Testing the workout tracker
2	Akash Patil Sahil Shetty	3rd week of January	Implementing exercise library and the newsfeed section
3	Akash Patil Sahil Shetty Pranil Patil	By the end of February month	Implementing live exercise tracker using OpenCV and mediapipe.

CHAPTER 9

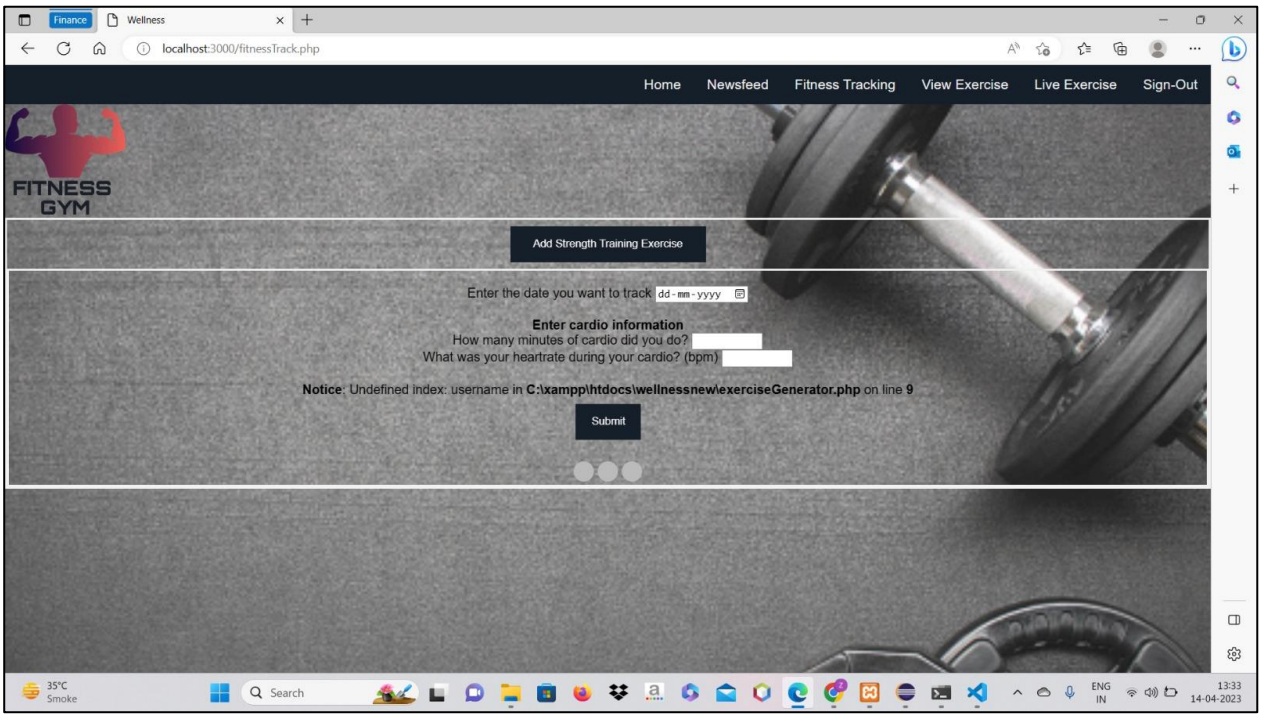
RESULT AND DISCUSSION



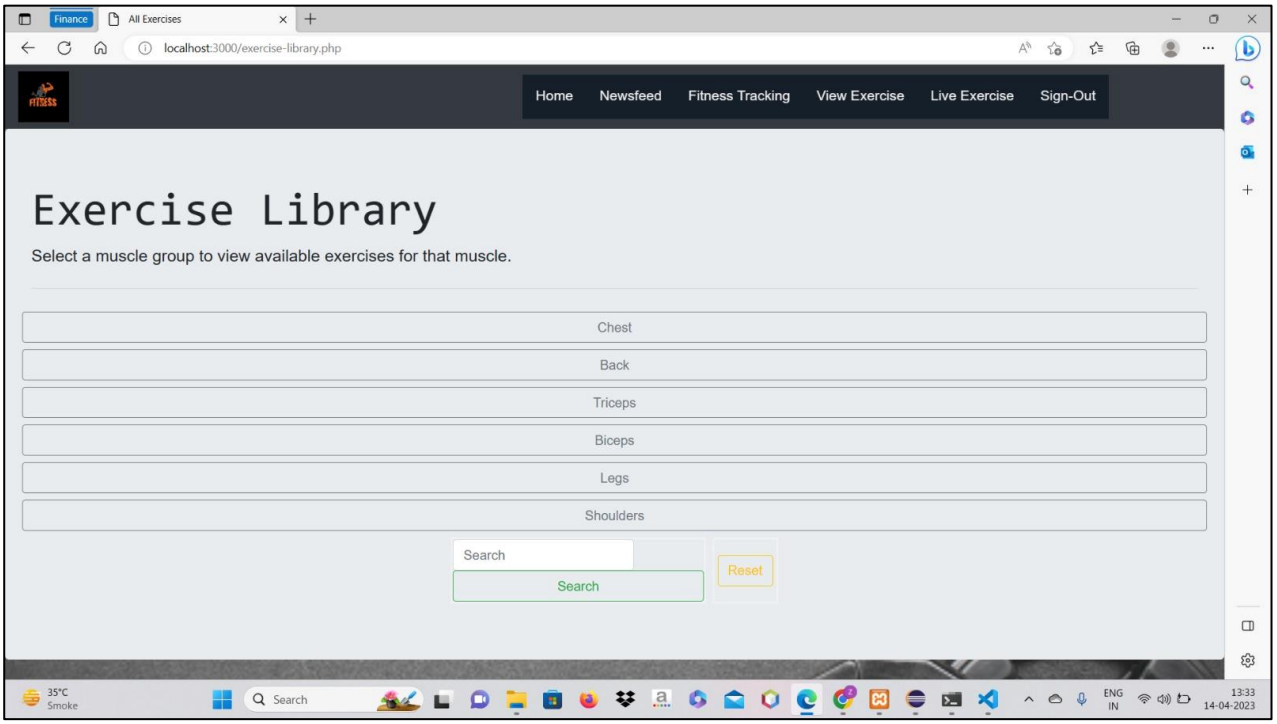
8.1. USER LOGIN



8.2. SELECTING MULTIPLE WORKOUT AND REPS COUNTER



8.3 FITNESS TRACKER FOR GRAPHICAL REPRESENTATION



8.4 REFERENCE VIDEO LIBRARY

CHAPTER 10

CONCLUSION

In the past, the Fitness Exercise project utilized AIML technology to offer a comprehensive and user-friendly solution for individuals looking to improve their fitness levels. The project featured workout videos to help users understand exercises, an API to suggest similar exercises based on their current plan, equipment recommendations based on what the user owned, progress tracking via graphs, and reps counting through the use of a webcam.

The project served as an excellent example of how technology can be used to improve our health and fitness. By incorporating AI and ML algorithms, the project offered a personalized experience for users to achieve their fitness goals. The project could have been further enhanced by incorporating additional features such as meal planning and nutrition tracking to offer a more holistic approach to health and wellness.

Overall, the Fitness Exercise project was a valuable tool for individuals looking to take control of their fitness journey. The project demonstrated the potential of AI and ML technology in transforming the fitness industry and improving the overall health and well-being of individuals.

FUTURE SCOPE

- Integration of virtual reality technology to enhance the user experience by simulating real-life workout scenarios and providing interactive feedback.
- Incorporation of wearable technology such as smartwatches and fitness trackers to sync with the Fitness Exercise app and provide additional data and insights for users to track their progress and adjust their workouts.
- Utilization of machine learning algorithms to provide more accurate recommendations and predictions based on user data, including personalized workout plans, meal plans, and nutrition recommendations.
- Expansion to include a social aspect, allowing users to connect with friends and share progress, tips, and motivation.
- Addition of gamification elements to make the workout experience more engaging and rewarding.
- Integration with other health and wellness apps to offer a more holistic approach to health.

CHAPTER 11

REFERENCE

[1] https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-015-0314-1

[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7407266/

[3] https://apps.dtic.mil/sti/citations/AD1041181

[4] https://www.learnopencv.com/deep-learning-based-human-pose-estimation-using-opencv-cpp-python/

[5] https://heartbeat.fritz.ai/human-activity-recognition-using-opencv-and-deep-learning-772ee68c9a7e

[6] https://www.frontiersin.org/articles/10.3389/fninf.2018.00061/full

[7] https://www.sciencedirect.com/science/article/pii/S136481521930116X

[8] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6601236/