Project Proposal

Project title: fItneSS us

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# Introduction

The fItneSS us platform is an innovative fitness app designed to provide personalized gym and workout site recommendations based on users’ location, available time, and fitness goals. It offers tailored workout plans, real-time exercise suggestions, and live form correction during workouts using computer vision technology. Additionally, fItneSS us incorporates social media features, enabling users to share their fitness progress, engage with friends, participate in challenges, and discover new workout inspirations from the community. This fosters a supportive environment where users can connect and stay motivated through social interactions.

This project seeks to combine location-based services, AI-powered fitness recommendations, real-time feedback, and social media integration to revolutionize the way individuals approach their fitness routines.

# Background

## Abstract

In today’s fast-paced world, people often struggle to find time to work out and maintain a balanced fitness routine. Furthermore, accessing nearby workout facilities, creating effective workout plans, and ensuring proper form during exercise can be overwhelming.

Many existing platforms either focus on location-based services or provide generic workout plans without addressing individual needs. *fItneSS us* aims to fill this gap by integrating location-based services with AI-powered workout recommendations and live movement supervision to offer a truly personalized fitness experience.

## Market analysis

The global fitness industry is projected to grow to over $96 billion by 2024. With the rise of digital fitness solutions due to the COVID-19 pandemic, users are increasingly seeking out home-based fitness platforms with a personalized touch. However, existing platforms like Peloton, Mirror, and MyFitnessPal lack the combination of location-based gym recommendations, dynamic workout planning, and real-time form feedback. fItneSS us addresses this need by integrating multiple functionalities into one seamless app, tapping into both the gym-goer and home-fitness markets.

### Key Market Drivers

* Increased health awareness post-pandemic.
* Growth of the at-home fitness industry.
* Demand for personalized fitness experiences.

### PEST Analysis

#### Political

##### WHO policy

Global Action Plan on Physical Activity 2018-2030:

* Create Active Societies: Promote and create opportunities for physical activity through community programs and policies.
* Create Active Environments: Develop urban and rural environments that support physical activity, such as parks and recreational facilities.
* Create Active Workplaces: Encourage workplaces to offer opportunities for physical activity and promote a culture of health and well-being.
* Create Active People: Support individuals in becoming more active by providing information, resources, and support.

(https://iris.who.int/bitstream/handle/10665/272722/9789241514187-eng.pdf)

##### Policies in different countries

###### USA

* Department of Health and Human Services (HHS): The HHS publishes the Physical Activity Guidelines for Americans, which recommend that adults should engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity each week, along with muscle-strengthening activities. For children and adolescents, the guidelines recommend at least 60 minutes of physical activity per day.
* Healthy People 2030: This initiative sets data-driven national objectives to improve health and well-being over the next decade. It includes specific goals related to physical activity, such as increasing the proportion of adults who meet the recommended levels of physical activity and enhancing community environments that support active living.
* Community and School Programs

###### China

* National Fitness Plan (2016-2020): This plan is a comprehensive strategy aimed at increasing physical activity levels among the Chinese population. It emphasizes the development of sports infrastructure, community sports programs, and integration of physical activity into daily life. The plan promotes the construction of fitness centres, sports parks, and public exercise facilities.
* China’s Sports Law: This law includes provisions to encourage public participation in sports and fitness activities. It supports the development of sports programs at the community level and aims to make playing sports more accessible to all citizens.
* Healthy China 2030: This initiative outlines goals to improve the overall health of the Chinese population, including increasing physical activity levels. It includes measures to integrate physical activity into daily routines, promote exercise among youth, and develop sports and fitness facilities.

##### Policy in Singapore

Singapore’s political environment plays a significant role in shaping the fitness and healthcare sectors.

###### Government Health Initiatives

* Health Promotion Board (HPB): The HPB is a government agency under the Ministry of Health (MOH) responsible for promoting healthy living. It runs various campaigns and programs to encourage physical activity, healthy eating, and preventive care. For instance, the HPB’s “Healthier SG” initiative focuses on improving the overall health of Singaporeans by encouraging regular health checks, healthy lifestyles, and preventive measures.
* ActiveSG: Launched by Sport Singapore, ActiveSG aims to promote sports and fitness activities across all age groups. The initiative provides affordable access to sports facilities, offers community sports programs, and supports fitness events. ActiveSG also offers a fitness membership program that provides discounts and benefits for various sports and fitness activities.

###### Government strategic plans

* Singapore’s Healthier Singapore Strategy: This strategy focuses on improving the nation’s health by promoting healthy lifestyles and preventive care. It includes initiatives to enhance physical activity, reduce chronic diseases, and improve mental well-being. The strategy aligns with the broader goals of Singapore’s 2030 Healthcare Masterplan, which aims to provide affordable and quality healthcare services while promoting a healthier nation. (https://www.healthiersg.gov.sg/about/what-is-healthier-sg/)
* National Physical Activity Guidelines: These guidelines provide recommendations for physical activity levels across different age groups and populations. They are used to inform public health campaigns and community programs designed to increase physical activity and reduce sedentary behavior. (<https://ch-api.healthhub.sg/api/public/content/a0254274ebdd40ab95c7c630a59acc31?v=dab36f97>)

###### Conscription System (Increased Fitness Demand)

* Physical Requirements: Due to the physical training demands during National Service, Singaporean males need to maintain good physical condition. Many individuals begin physical conditioning before enlistment to improve their fitness levels and meet the service requirements.
* Continued Fitness Habits: Even after completing National Service, many individuals continue to engage in regular exercise. They become accustomed to physical activity and recognize its importance for maintaining health.

###### Political Stability

Singapore’s political stability contributes to a favorable environment for implementing health and fitness policies. The government’s long-term commitment to improving public health and supporting the fitness industry ensures consistent policy support and funding.

#### Economic

Economic factors like rising disposable income and increased spending on health and fitness products make this a favorable time for the launch of fItneSS us. Many people are willing to spend money on gym memberships, fitness apps, and wellness programs, especially after the pandemic raised awareness of the importance of personal health.

##### Economic Downturns

During the COVID-19 pandemic, many people turned to free or low-cost fitness apps as gyms closed. According to a report by App Annie, global downloads of fitness apps increased by 50% in early 2020 compared to the previous year.

In cases of economic downturn, consumers may reduce spending on non-essential services, which could include fitness apps. However, if fItneSS us is competitively priced or offers value by eliminating the need for expensive personal trainers or gym memberships, it can retain a solid user base even during challenging economic periods.

For example, MyFitnessPal, a popular fitness app, saw increased user engagement during the pandemic as people sought cost-effective fitness solutions.

##### Partnerships with Gyms and Fitness Centers

Economic factors could influence partnerships with gyms and fitness centers, particularly in regions where the gym industry has suffered post-pandemic.

A survey by the International Health, Racquet & Sportsclub Association (IHRSA) reported that 27% of gyms worldwide closed permanently or temporarily during the pandemic.

Gyms might see partnering with fItneSS us as a way to bring customers back, increasing their own revenue while contributing to the platform’s growth.

#### Social

##### Health and Fitness Awareness

Social awareness of health, fitness, and wellness has grown significantly, particularly after the COVID-19 pandemic. According to a survey by McKinsey & Company, 79% of consumers in the U.S. have adopted healthier behaviours since the pandemic began. There is a strong societal trend toward adopting healthier lifestyles, exercising regularly, and focusing on mental well-being, making the timing for fItneSS us ideal. Consumers are looking for tools that provide personalized, accessible, and affordable solutions for maintaining fitness.

##### Personalization and Convenience

Modern consumers are accustomed to personalized digital experiences, whether in e-commerce, entertainment, or fitness. fItneSS us can leverage this expectation by offering tailored workout routines, gym recommendations, and real-time feedback based on individual preferences and body status. Convenience will also be a key selling point, as users increasingly prefer platforms that fit seamlessly into their daily routines.

##### Community and Gamification

Fitness platforms that include social or gamified elements have proven to be more engaging. Social factors like group motivation, leaderboards, challenges, and sharing progress with friends can drive user engagement. By integrating community features and challenges, fItneSS us can foster a sense of belonging and increase retention rates.

##### Remote Work and Fitness Trends

The rise of remote work has changed fitness habits, with people now looking for flexible workout options that fit into their home or hybrid work life. A survey by the American College of Sports Medicine (ACSM) revealed that 43% of fitness consumers have increased their home workouts since the pandemic began. This has led to increased demand for apps that provide flexibility and allow users to work out at home, at the gym, or while traveling.

#### Technological

##### Advancements in AI, ML and DL

AI and machine learning technologies are essential to the success of fItneSS us, as they enable personalized recommendations and real-time feedback. The platform will rely on machine learning to analyze user data, track progress, and suggest exercises, while computer vision will ensure correct workout form. With ongoing improvements in these fields, the platform has the potential to offer even more sophisticated features over time.

##### Wearable Technology Integration

The fitness market has seen a surge in the adoption of wearable devices like Fitbit, Apple Watch, and Garmin, which track health metrics such as heart rate, calories burned, and sleep quality. Integrating with these devices will enhance fItneSS us’s ability to provide data-driven recommendations and create a holistic fitness ecosystem. Keeping up with advancements in wearables and ensuring seamless integration will be crucial.

##### Mobile and Cloud Technologies

As fItneSS us is primarily a mobile application, it will benefit from the continuing advancements in smartphone capabilities (e.g., high-resolution cameras for form correction) and cloud computing technologies. Cloud-based platforms will allow the app to scale, provide real-time feedback, and store vast amounts of user data securely.

##### Augmented Reality (AR) and Virtual Reality (VR)

Emerging technologies like AR and VR offer future potential for fItneSS us to provide immersive workout experiences. Users could engage in virtual fitness classes or even receive real-time AR-based form corrections during exercises. While not immediately necessary, this could be an area of growth and innovation.

### STP Analysis

#### Segmentation

##### Age

* Young Adults (18-30 years): Interested in fitness for lifestyle and social reasons. They might be tech-savvy and open to using apps for fitness.
* Adults (31-50 years): Focused on maintaining health and managing work-life balance. They might be looking for flexible solutions.
* Older Adults (50+ years): May require specialized fitness solutions that consider age-related physical limitations.

##### Income Level

* High-Income: Likely to invest in premium features or personalized services.
* Middle-Income: May prefer affordable or free features with high value.
* Low-Income: Interested in budget-friendly solutions or free options.

##### Geographic

* Urban: Higher demand for modern fitness solutions due to greater access to technology and fitness awareness.
* Rural: Might have limited access to gyms; therefore, remote, and home-based fitness solutions are more appealing.

##### Behavioral

* Fitness Enthusiasts: Regularly exercise and seek advanced fitness features.
* Casual Exercisers: Engage in occasional exercise and look for simple, easy-to-use solutions.
* Newcomers to Fitness: Interested in starting a fitness routine and need guided, beginner-friendly options.

##### Psychographic

* Health-Conscious Individuals: Focused on overall wellness, including physical fitness, mental health, and nutrition.
* Lifestyle-Oriented Individuals: Seek fitness solutions that integrate with their social and leisure activities.
* Goal-Oriented Individuals: Focused on specific fitness goals, such as weight loss, muscle gain, or improved endurance.

#### Targeting

* Urban Health Enthusiasts: Young and middle-aged adults living in cities who are tech-savvy and prioritize health and fitness. They are likely to use a fitness app that offers convenience and personalization.
* Busy Professionals: Adults with demanding jobs who need flexible workout options that fit into their busy schedules. They will appreciate features like on-demand workouts and time-efficient exercises.
* Fitness Newcomers: Individuals who are new to fitness and need guidance, motivation, and easy-to-follow routines. They are likely to be drawn to beginner-friendly features and educational content.

#### Positioning

Our market position is dynamic and evolving.

We primarily aim at personalization and convenience.

* Personalization: Offer tailored workout plans and fitness recommendations based on individual preferences and goals.
* Convenience: Provide flexible workout options that can be done at home, at the gym, or while traveling, integrating seamlessly into users’ daily routines.

For the beginning period of the project, we provide our customers with:

* For Urban Health Enthusiasts: “fItneSS us offers cutting-edge, personalized fitness solutions that fit seamlessly into your busy urban lifestyle, helping you stay fit and motivated no matter where you are.”
* For Busy Professionals: “Maximize your fitness with our flexible, on-demand workouts designed to fit into your hectic schedule. Achieve your health goals without compromising your professional commitments.”
* For Fitness Newcomers: “Start your fitness journey with fItneSS us. Our easy-to-follow routines and motivational support are designed to guide you every step of the way, making fitness approachable and enjoyable. “As our project matures, we will target our services at high-net-worth clients. We will also provide specialized and customized high-end services.

Finally, we will incorporate most market segments, including which rural or elderly market. We will also have specialized algorithms to help them achieve good health.

### Porter’s 5 forces

#### Threat of new entrants

The fitness app market has low barriers to entry, with many developers able to create and launch new apps. This increases competition and the threat of new entrants.

But this industry could be data-orientated in the future, and users' fitness data and preferences are still unbelievably valuable and could be a barrier in the future in terms of algorithms.

This means we should do more on differentiation by adding unique features and get advantages by using AI. We can also build brand loyalty in our customers.

#### Bargaining power of suppliers

As mentioned before, the economic downturns could influence partnerships with gyms and fitness centers, particularly in regions where the gym industry has suffered post-pandemic. There is intense competition among the gyms which means their bargaining power is low.

#### Bargaining power of buyers

Users have numerous fitness app options to choose from, giving them significant bargaining power. They can easily switch to a competitor if they find better value or features.

Users are price-sensitive, particularly if they are comparing subscription models or free vs. paid features.

These lead to high bargaining power from buyers.

#### Threat of Substitute Products or Services

Substitutes include free fitness content on platforms like YouTube, home workout equipment, and traditional gyms. Users may choose these alternatives over fitness apps.

Innovative technologies, such as virtual reality fitness experiences or advanced wearable devices, can serve as substitutes.

#### Industry Rivalry

The fitness app market is highly competitive with established players like MyFitnessPal, Fitbit, and new entrants constantly emerging.

### Competitors

* Peloton (live and on-demand workouts).
* MyFitnessPal (calorie tracking, but no real-time feedback).
* Nike Training Club (personalized workouts but lacks gym recommendations and form supervision).

### SWOT Analysis

fItneSS us has several strengths, including innovative features, a comprehensive solution, and strong community engagement. However, it faces challenges such as high development costs, market penetration difficulties, and dependence on data privacy.

#### Strength

##### Innovative Features

* Personalization: Offers tailored workout routines and exercise recommendations based on individual preferences, body status, and goals.
* Form Supervision: Provides real-time feedback and corrections on exercise form, enhancing user experience and effectiveness.

##### Comprehensive Solution

* Integrated Platform: Combines gym recommendations, workout plans, and movement supervision in one app, offering a holistic fitness solution.
* Convenience: Allows users to work out anywhere—at home, in the gym, or while traveling—making fitness accessible and flexible.

#### Weakness

* Market Penetration: As a new entrant in a competitive market, fItneSS us may struggle with brand recognition and establishing trust compared to well-established competitors.
* Dependence on Data: Handling sensitive health data requires robust security measures and compliance with privacy regulations, which can be challenging and costly.

#### Opportunity

* Growing fitness awareness & expanding market

##### Technological advancements

* Location-based Services
* Recommendation systems
* Computer vision

#### Threat

##### Intense Competition

* Established Players: Competing with established fitness apps like MyFitnessPal, Fitbit, and new market entrants can be challenging.
* Rapid Innovation: Fast-paced technological advancements mean competitors are constantly introducing new features and improvements.

##### Economic Downturns

* Reduced Spending: Economic downturns may lead to reduced consumer spending on non-essential services, including fitness apps.
* Pricing Pressure: Pressure to offer competitive pricing or free features may impact profitability.

##### Regulatory Challenges

* Data Privacy Regulations: Compliance with stringent data privacy laws and regulations (e.g., GDPR, CCPA) can be complex and costly.
* Health and Safety Standards: Ensuring adherence to health and safety standards for fitness-related advice and supervision.

## Technical background Review

This project aims to develop a personalized fitness plan generator that assists users in creating tailored exercise routines based on their physical characteristics and goals. By inputting personal data such as height, weight, and BMI, along with specific fitness objectives like fat loss or muscle gain, and current exercise conditions (e.g., no equipment or gym access), the system will generate a customized workout plan. The plan will detail exercise frequency, targeted muscle groups, specific exercises, sets, repetitions, and recommended weights. Additionally, the project intends to provide users with information on nearby gyms to enhance their fitness journey.

To achieve these objectives, the project will leverage the following technologies:

* **Data Collection and Storage**: A robust database will be designed to securely store user information, fitness goals, and exercise data. This database will serve as the foundation for generating personalized workout plans.
* **Natural Language Processing (NLP)**: NLP techniques will be employed to interpret user inputs and preferences, allowing the system to understand and process natural language queries effectively. This will enhance user interaction and ensure accurate customization of fitness plans.
* **Artificial Intelligence and Machine Learning**: AI algorithms analyze user data and goals to generate optimal workout routines. These algorithms will consider a range of factors, such as fitness level and available equipment, to tailor exercises appropriately.
* **Geolocation Services**: Integration with geolocation APIs will enable the system to provide users with information on nearby gyms, including location, hours, and available equipment, enhancing the user's fitness experience.

By integrating these technologies, the project aims to deliver a comprehensive and user-friendly platform that empowers individuals to create and follow personalized fitness plans effectively.

# Project Scope

## Main Goal

To develop a comprehensive fitness platform offering personalized workout recommendations, gym suggestions, real-time form feedback, and social media features that enable users to share progress, interact with friends, and engage with the fitness community.

## Core functions

### Gym and Workout Site Recommendation **(location-based services)**

* Location-based Suggestions: Integrate Google Maps or other geo-location APIs to suggest nearby gyms, fitness parks, or workout classes.
* Time Availability: Allow users to input their available time slots and based on gym operating hours, suggest the best matches.
* Additional Filters: Add filters like gym amenities, membership type, or class availability.

### Personalized Exercise Recommendation **(AI-based recommendations)**

* Previous Workouts: Track users’ previous exercises, sets, and reps to suggest progressive workout routines.
* Body Status: Integrate data from fitness trackers (e.g., Fitbit, Apple Watch) to understand real-time body metrics like heart rate, recovery, or fatigue levels.
* Goals: Let users set fitness goals (weight loss, muscle gain, endurance) and tailor exercise recommendations to help them reach those goals.
* Variety: Suggest different exercises to avoid workout monotony, while keeping within the user’s fitness plan.

### Movement Supervision and Gesture Correction **(real-time feedback)**

* Real-time Form Analysis: Use computer vision and pose estimation algorithms (like Open Pose or Media Pipe) to analyze body posture during workouts.
* Forms Feedback: Provide instant feedback on whether users are performing movements correctly or incorrectly.
* Instructional Guidance: Offer suggestions to correct form and reduce injury risk. Use voice or visual cues to guide them mid-workout.

### Social Media Integration **(AI-based recommendations)**

* Enables users to share fitness progress, interact with friends, join fitness challenges, and discover workout inspiration through posts and community engagement, fostering motivation and support within the app.
* Posts Recommendation System: The post recommendation system will suggest relevant content to users based on their preferences, interests, and interactions. Here are some key considerations:
* Friend Recommendation System: The friend recommendation system can be designed to help users connect with others who share similar fitness goals, routines, or live nearby.

## Advanced Features

* Gamification (social challenges, leaderboards).
* Integration with smart home devices (Google Home, Alexa).
* AI-driven injury prevention and recovery suggestions.

## Opportunity

In recent years, fitness has become an increasingly popular topic for several reasons. First, with the improvement in material living standards, obesity has become more common, and fitness is an effective way to combat obesity and maintain a healthy body. Secondly, the faster pace of life makes it easier for people to accumulate stress, and exercise is an effective way to relieve this stress, benefiting individuals in multiple ways, including improving mental health and sleep quality. Additionally, with the development of the Internet, communication technologies, and societal changes, people are more willing to share details of their lives, and fitness, as both a hobby and a daily pastime, has gradually become a means of socializing. As of 2024, the fitness industry has amassed a large user base and is thriving.

However, despite the universal appeal of fitness, individual physical differences make personalized fitness planning increasingly important. The development trends in the fitness industry also show that professionalism is no longer solely the pursuit of professional athletes but is becoming a goal for more amateur fitness enthusiasts. In recent years, adopting a professional attitude and scientific approach to fitness has become widely embraced. For example, in China, the "2022 Mass Fitness Behavior and Consumption Research Report," published by the China Sporting Goods Industry Federation, shows that running is the most popular sport, accounting for 61.0% of participants. Also, in 2022, the popularity of topics related to "running specialization" reached 495,000 mentions, representing a 446.3% increase month-on-month. This reflects people's growing desire for more scientific and effective fitness methods.

In 2016, China's State Council issued the "National Fitness Plan (2016-2020)," which proposed that by 2020, 700 million people would participate in physical exercise at least once per week, 435 million people would regularly engage in exercise, and the total scale of sports consumption would reach 1.5 trillion yuan. However, data from market research firm Zhiyan Consulting Group shows that by the end of 2015, China's fitness market was valued at only $15 billion to $20 billion, and the number of fitness clubs per million people was just 4.3. This indicates that many gym-goers still lack the financial means, resources, or expertise to fully engage in fitness activities. Since the COVID-19 pandemic, the proportion of home exercise has increased, and there is a growing need for a platform that can provide professional advice across a variety of fitness environments and cater to a broad range of fitness enthusiasts.

The widespread adoption of communication devices, networks, and emerging technologies such as natural language processing is making such platforms possible. Additionally, due to the increasing computational power available for processing enormous amounts of data, these platforms can generate highly personalized fitness programs. This is an efficient way to address the issue of supply lagging behind demand, as these platforms can integrate past gym users' workout records with professional, science-based knowledge to create tailored fitness solutions for the mass market.

## Restriction

### Data Availability and Quality

The fItneSS us platform contains a recommendation system that needs to operate based on accurate geographic location data and real-time fitness facility information. If the data is not accurate, not updated in a timely manner, or has limited coverage, the effectiveness of the recommendation system could be significantly compromised. For example, some gyms may not publicly share their class schedules or available time slots, which will affect the accuracy of the recommendations.

### Legal Compliance and User Privacy Protection

The recommendation system needs to collect personal data such as users' available time and fitness preferences, which may raise concerns about user privacy protection. Safely storing and processing this data, ensuring it is not misused or leaked, will be a significant limitation and challenge. Different countries and regions may have varying laws and regulations regarding data collection, processing, and storage. The European Union's General Data Protection Regulation (GDPR) has strict rules on the use of personal data. Therefore, the recommendation system must comply with these laws and regulations to ensure data privacy and security and avoid potential legal risks and penalties.

### Personalization of Fitness Recommendations

Everyone has different fitness goals, physical conditions, health statuses, and preferences, making personalized recommendations quite challenging. The system requires complex algorithms and sufficient data to provide accurate recommendations. In the initial stages, however, the effectiveness of the recommendations may be suboptimal due to insufficient data or immature algorithms.

### Changes in Health and Fitness Trends

The fitness industry is constantly evolving, with new fitness methods and health trends emerging, such as yoga, Pilates, HIIT, and outdoor fitness. The recommendation system needs to quickly adapt to these changes and adjust its algorithms to maintain user engagement. If the system cannot keep up with market trends promptly, it may lose its competitiveness.

### Market Demand and User Groups

It is necessary to clearly define the target user groups for the recommendation system. Younger urban professionals may be more inclined to use such time- and location-based fitness recommendation services, while older adults or users in non-urban areas may have less demand. Therefore, clearly identifying the target user group is essential for better assessing the market suitability of the system.

### Cross-Platform Compatibility

The recommendation system may need to be compatible with different operating systems and devices (such as iOS, Android, web platforms, etc.), which will increase the complexity and cost of development. During the development process, it is essential to ensure that the system runs smoothly on various platforms, which may require additional technical support and development resources.

# Data collection and preparation

## Data used to predict

User Data: Workout history, personal goals, body stats (weight, height), recovery information, user preferences and post contents.

Location Data: Information about nearby gyms, fitness centres, parks, etc., sourced from Google Maps API.

Movement Data: Pose estimation data captured via smartphone cameras or wearables to track user form during workouts.

Fitness Tracker Data: Metrics like heart rate, sleep quality, and calorie expenditure from wearables like Fitbit, Apple HealthKit, or Google Fit.

## Data used to train model

### Open datasets for ML and Fitness Research Papers

#### Popular Open Datasets

##### Computer Vision Datasets for Workout Gesture Recognition

Training computer vision models to identify workout gestures typically involves datasets that capture human motion, pose estimation, and physical activity.

* Human Activity Recognition using Smartphones (UCI Machine Learning Repository)
* Yoga-82 Dataset
* Kinetics-700 Dataset
* NTU RGB+D Action Recognition Dataset
* Fitness Activity Recognition Dataset (HAR using Wearable Sensors)
* LSP (Leeds Sports Pose) Dataset
* MPII Human Pose Dataset

##### Language Datasets for Predicting Exercise Habits, Recommending Workout Plans, Post and Friends

* Daily Fitness Activity Tracking Dataset (Kaggle)
* Physical Activity Monitoring Dataset
* Reddit Fitness and Workout Subreddits
* Reddit Post Datasets
* Twitter Health Datasets
* Twitter Social Network Dataset
* Pinterest Image Recommendation Dataset
* Instagram Engagement Dataset
* Foursquare Check-in Dataset
* SQuAD (Stanford Question Answering Dataset)
* Exercise and Sports Science Articles Dataset
* Fitness and Wellbeing App Reviews (need to be crawled by ourselves)

#### Research Papers

PubMed, ResearchGate: These academic databases often publish fitness and health research with supplementary datasets or references to publicly available data.

Papers like "Fitness and Wellness Monitoring Using Wearable Devices" often include valuable insights or benchmarks for training ML models.

### Fitness APIs

* Apple HealthKit API
* Keep API
* MyFitnessPal API
* Strava API
* Fitbit API

### Partnerships and Collaborations

Partnerships with gyms, fitness centers, or sports institutions can provide access to proprietary fitness data, user performance, and health metrics.

### Synthetic Data Generation

#### Simulations

Use simulation tools to generate data that mimics real-world fitness activities. For example, human motion simulators or tools like Unity3D can be used to create synthetic workout sessions or simulate gym environments.

#### Generative Adversarial Networks (GANs)

GANs can be used to create synthetic workout data, particularly for motion or movement analysis. GANs generate new data by learning the distribution of real data and creating realistic samples.

#### Augment Existing Data

# Future Work

## Advanced AI

Explore the use of reinforcement learning to continuously improve workout recommendations based on long-term user progress.

## Virtual Reality Integration

Explore the use of virtual reality for immersive workout experiences, such as virtual fitness classes.

# Develop timeline

## Day 0: Project Setup and Planning

* Finalize project scope, define key features (gym recommendations, workout plans, Movement Supervision and Gesture Correction, social media).
* Set up the development environment (front-end with Vue, back-end with Python/Flask, database with MySQL).
* Assign tasks and define responsibilities for team members (front-end, back-end, database, testing).

## Day 1-4: Focus on AI Model Planning and Initial Implementation

* AI-Powered Features:
  + Gym and Workout Site Recommendation (location-based services)
  + Post Recommendation System: Analyse user behaviour and content preferences to suggest relevant posts.
  + Friend Recommendation System: Suggest friends based on shared interests, social engagement, or workout habits.
  + Workout Plan Recommendations: Suggest personalized workouts using AI based on past workouts, goals, and preferences.
  + Real-Time Feedback System: Use computer vision for workout form correction (e.g., posture during squats, push-ups).
* Model and Algorithm Selection
* Set Up Development Environment
* Data Collection & Preprocessing

## Day 5-7: Core Feature Implementation

* **Front-end**: Basic UI/UX for the main app screens (user profile, gym recommendations, workout plan display).
* **Back-end**: Implement basic API endpoints for user registration, login, and profile management.
* **Database**: Set up user data storage, gym locations, and workout plans using **MySQL**.
* Achieve the first version of the user interface, allowing users to interact with the core functionalities like gym and workout recommendations.

## Day 8: Location-Based Services

## Day 9-10: Social Media Integration

## Day 10-11: AI-Powered Recommendations

## Day 12-13: AI-Powered Real-Time Feedback

## Day 14: Testing and Refinement