PosFit

Your Virtual Fitness Coach

Prepared by Team 03

1. **Zack Wang**   **(zwang14@mail.sfsu.edu)**
2. **Minseon Park**   **(mpark5@mail.sfsu.edu)**
3. **John San Jose**   **(jsanjose@mail.sfsu.edu)**
4. **Jason Cordis**   **(jcordis@mail.sfsu.edu)**
5. **Brian Frey**   **(bfrey@mail.sfsu.edu)**
6. **Vincent Wong**   **(vwong5@mail.sfsu.edu)**
7. **Darshil Dhameliya**   **(ddhameliya@mail.sfsu.edu)**

Milestone 1

Oct. 4, 2021

Revision History Table

Revisions	Revision Date	Summary
V1	10/04	First draft
V2		
V3		

1. Executive Summary

PosFit is an AI based web application that targets home gym exercisers. Due to the time and site limitation, many exercisers start looking for a home gym option. With the convenient online shopping, equipment can be easily purchased via the internet. However, the knowledge about fitness must come from demonstrations. Therefore, exercisers watch tutorial videos and imitate the fitness activities.

There are many existing apps or products that can provide a such service, such as YouTube, Mirror, and Keep, etc. However, PosFit has one feature that none of them have is providing free feedback. Although some of our competitors offer one-on-one sessions between an exerciser and a fitness coach, the cost of the service is very high. It discourages exercisers to seek help.

Correct forms and poses are critical to the effectiveness of exercises. However, many exercisers are not aware of their forms because there is usually no feedback to their performances. Using mirrors is not an ideal solution for two reasons. First, one cannot always observe himself or herself in the mirror because it distracts their concentrations to the exercises. Second, exercises that involve in body rotation do not work well with mirrors because one must face the mirror all the time in order observe the forms. The situation becomes even worse for beginners. Beginners are already having a hard time to follow the videos so that they have time or attention to check if their poses or correct or not. Moreover, the incorrect forms increase the risk of injuries, which may be worse than not doing fitness.

To help exercisers increasing their fitness effectiveness, reducing risk of injuries, and minimizing the cost, we design a product with AI enabled to automatically detect incorrect forms. Our website contains hundreds of exercises varied in different levels and categories. When exercisers follow the video, the camera captures the exercisers' body joints and compare to the instructor's. If the positions are unmatched, the AI model highlights the joints to indicate false forms. We also encourage coaches to create accounts with us, and they can upload videos and provide comments to exercisers' video recording. This business model will also help fitness coaches to establish initial contact with potential clients. Both exercisers and coaches are benefiting from our product.

Our team consists seven member. Three front-end developers and three back-end developers. We pair up one front-end and one back-end developer as a sub-team. Each sub-team is responsible to their assigned components. Since we are building the application based on the concept of microservice architecture, sub-teams are relatively independent to each other. The team lead is responsible to make plans, provide guidance when the team encounters technical difficulties, and help the members to stay on the track. In this project, the team lead is also the main person to implement the AI model.

2. Personas and User Stories

Key Personas:

1) Persona one is an inexperienced user, who is exercising for the first time or coming back after a long break. This user is unfamiliar with basic exercise form. They may be mobility restricted, rehabilitating an injury, or simply not know the proper body positioning. This user might be uncomfortable or unable to exercise in public. This user wants to build basic confidence, and will likely be interested in basic and fundamental exercises.

2) Persona two is an intermediate user, who has some experience with different types of exercise, but wants feedback to improve their form. This user will want targeted and specific feedback which needs to help them improve their form. This user might have a specific initial area of interest, but may also be open to trying new and unfamiliar exercises.

3) Persona three is an experienced user who is either looking to address a particular motion, or might be looking to try a new exercise routine and wants immediate feedback. This user will not have much patience for basic instruction and will want more advanced techniques. This user is familiar with many different types of exercise and will have more focused requirements.

User Stories:

User Story ID=001: John

John is a 30 year old single male living in San Jose. John has never seriously worked out before, but recent life changes have made him more health conscious, and he has decided to exercise. John heard that he should do push ups. He doesn't want to hire a trainer, but he wants to know if he is doing the exercises correctly. John is a casual technology user.

User Story ID = 002: Laura

Laura is a 40 year old married woman living in the Cleveland suburbs. She has been gaining weight for years and recently sprained her ankle. After lying in bed for a week and a half, she has decided to start doing squat exercises in her living room. She is not tech-savvy, but still wants positive reinforcement, critical feedback, and the ability to post clips to Instagram so everyone knows she is exercising. Laura gets easily frustrated if an app isn't easy to understand.

User Story ID = 003: Franklin

Franklin is a 24 year old who just moved to Los Angeles to start a new job. His coworkers invite him to golf, but Franklin has never golfed before . He is looking for a tool to

help give him feedback based on video of his swing recorded at the driving range. He is looking for basic tips. Franklin is comfortable with technology and considered an early adopter. Franklin is critical of apps and will not continue using one if the UI/UX experience is sloppy or disorganized.

User ID = 004: Mckenzie

      Mckenzie is a 27 year old female who recently ran her first marathon. She has recently begun practicing yoga in her studio apartment, but she is uncertain if she is doing many of the poses correctly. She wants to improve her yoga form, and is searching for an app which will tell her how she is doing. She is looking for a product that will help her do a textbook warrior pose. Mckenzie limits her screen time every day, but is comfortable downloading and using apps.

User ID = 005: Jose

      Jose is 52 and has been a Gold's Gym member since 1985. In his youth he was a competitive bodybuilder, but lately he has started playing volleyball and needs to improve his serve. He wants a product that will show him if he is hitting the ball correctly. Jose doesn't have many apps, but is excited to find something to help him. Jose is methodical about his processes and once he downloads an app, he will explore how to use it.

Summary Table

ID	Name	Wants (features, functionality)	So that (benefit)	Constraints
001	John	An app that is beginner friendly to people just starting to exercise	He does not feel frustrated understanding technical jargon or what he is doing wrong	- UI must be simple enough for casual technology users
001	John	The app to possibly suggests other exercises to try out	He can gradually ease into more complex/strenuous exercises	- App must track progress in order to suggest different things to try

002	Laura	Positive, helpful feedback from the app	She knows that she is making progress and can feel good about it	- If she ever feels the slightest doubt it will negatively impact her performance and continued usage of the app
002	Laura	A feature in the app to record her exercise routine in order to post onto social media	She can get share her fitness journey with others	- App must be able to record sessions and upload them to social media platforms
002	Laura	The design of the app to be extremely simple and not cluttered with buttons	She can easily use the app and not get frustrated learning how to use it	- App must have a very shallow learning curve
003	Franklin	General feedback on his golfing technique	He won't look like an amateur in front of his colleagues	- App must also support posture techniques for sports
003	Franklin	A clean UI/UX that is not cluttered or disorganized	He will feel more persuaded to use the app	- Designing a UI/UX that pleases everyone is difficult to do

004	Mckenzie	To practice proper technique and form for yoga	She finds fulfillment in knowing she is doing these forms correctly	- App must have a complete index of all yoga poses
005	Jose	To improve his volleyball serve	He can flex on the other team with his mean serve	- May be hard for the app to capture these motions while the user is in the air

3. Data Definitions

Name	Definition	Usage
Registered_User	A person who signed up with an account on the application, e.g., Carter, @carter001, age 35, male, interests: fitness	The necessary information of the registered users is collected and stored. Some of them, for example, userId and name, will be used to connect users with certified coaches.
Fitness_Coach	A type of user that has been verified to have expertise in a category of Fitness exercises or specializes in certain sport/practices.	A user can make progress in improving their technique because they are being assisted by a certified professional who has expertise in the practice.
Videos / Data	Video files that showcase a user performing fitness activities.	Videos will be analyzed to measure the efficiency of the user's exercise activity.

Comments	Text given by the Fitness_Coach user (for now) that are tips and suggestions given to the User that posted the video	Registered_User who posted the video can identify incorrect posture and form by the assistance of a Fitness_Coach.
Video_Description	A short description of the video as well as it's listed category.	Assists Fitness_Coach users in identifying what the video is about and helps give better feedback as well as filter out appropriate help.
Camera_Captured_Videos	Videos recorded on the user's webcam of the user performing fitness activities.	Webcam videos will be analyzed to measure the efficiency of the user's exercise activity.
Key_Search_Terms	Keywords that are used to find videos in the database, can vary from categories to a User's username.	Helps coaches sift through videos efficiently and find their client's video.
Joint_Position	The returned data that go through the deep learning model	After the videos go through the detection model, we will get each joint's position in each frame.
Category	A category describes the specific type of activity displayed in the user video.	Registered users choose categories for their videos.
User_Biography	A personalized biography by the user about their fitness background.	All user types of users (emphasis on Fitness_Coach's) can view a client's information to better work with them and have a more intrapersonal experience when giving advice.
User_Survey	A survey that asks the user questions about their schedule and types of exercises.	Helps generate a list of videos that a user requests.

4. Initial list of functional requirements

1. Functional Requirements for Users:
   - Users can register a unique user id and password.
   - Users can login with their user id and password.
   - Users can log out.
   - Users can change their password.
   - Users can personalize a profile page. This will include a personal biography about their fitness background.
   - Users can fill out a user survey to track their fitness progress.

2. Functional Requirements for Videos:
   - Users can upload their own videos.
   - Users can view their own videos on a video viewing page, which also shows the date published.
   - Users can add video descriptions and select a video category which will be displayed on the video viewing page.
   - Users can delete their own videos.
   - Users can record videos on their webcam to be uploaded.
   - Certified Fitness_Coach users can view other user videos.
   - Certified Fitness_Coach users can post text comments on other user videos.
   - Certified Fitness_Coach users can post audio comments on other user videos by recording a message through their microphone.
   - Users can share their videos on social media platforms.
   - Other Users can also make comments on other user videos.

3. Functional Requirements for AI/DeepLearning:
   - AI cycles through each individual frame of a video and identifies a User's Joint_Position(s) in each frame.
   - AI highlights misaligned joints that need to be corrected for the user.

5. List of non-functional requirements

We identify two categories of non-functional requirements: users and developers. The importance of the requirements in each category is listed in a descending order.

UX requirements:
1. Provide accurate feedback
2. Easy to use
3. Fast website and video loading
4. Various exercises to suit different groups' needs

Development requirements:
1. Ensure use/data privacy

2. The app should be at least compatible with Chrome, Firefox, and Edge.
3. Monitor database storage situation and make sure that the storage will be scaled up when needed
4. All variable names must be meaningful and in camel style
5. Unified CSS stylesheet
6. Follow the Continuous Integration and Continuous Development philosophy

6. Competitive analysis:

Competitor's Features	PostFit's Features
Apple Fitness+ ● Real time metrics like heart rate. ● Upto 10 workout types. ● Smart Suggestions for exercises.	● Diverse category of exercise videos ● Coach's comment
TONAL ● A complete training setup ● It sets weights for you and adapts weights as you lift	● Users record their work out video and upload it. ● Not only coaches, other users can comment it
Freeletics ● Customized training sessions ● One-to-one digital coaching	● Users can see other users' training video ● Users also can upload training video
mirror.co ● Real-time feedback using advanced body tracking ● Progress tracking	● Clients can get diverse feedback not only coaches, any users can give feedback to other users' work out ● AI will identify user's motion in users' workout video
Forme ● Virtual trainer ● Real-time feedback	● Coaches comment remotely ● AI will identify user's motion

Apps like **Nike Training** and **Keep**	
• Almost all types of workouts available • Integration with smart devices for real-time metrics • Routine planner	• Diverse types of users' work out videos will be uploaded • Learning work out videos are provided • Users can plan their work out routine free
Real **Personal Coach**	
• Real-time in-person feedback • Physical assistance	• Coaches will comment users' uploaded work out video • AI will identify users' motion in their videos
YouTube	
• Ability to publish your own videos • Millions of people use this platform everyday, which makes it easy to reach to your audience	• Users can upload/ delete their work out videos free • Easy to find other users' videos based on category

Advantages of our app PostFit:

While services like TONAL provide top to bottom services including the weights and a virtual instructor, it is very expensive and many people can not spend a lot of money on services like TONAL: PostFit is all about accessibility to every human being. Our service is free to use. Some other services like Apple Fitness, Nike Training, and Freeletics provide various types of workouts that can be followed through the instructions provided by the platform. But these services do not provide real time feedback for posture correction and other general feedback. Our platform is specifically designed for coaches to be able to give feedback, possibly real time. TONAL, mirror.co, Forme and Apple Fitness require the users to use their specific hardware, which makes it hard for many athletes to use it as they already have necessary instruments for exercising. PostFit is available as an app and website, which makes it very easy to use our service.

PostFit also analyzes body movements of the user using Deep Learning. Many of our competitors do not provide a platform to share user's progress to other users. We have added functionalities to resolve this. Users publishing their progress would get positive reinforcement by getting motivated to share their progress. PostFit will have a low coach to user ratio so that it will be very easy for users to get proper feedback from the coaches. PostFit also believes in the concept of Atomic Habits i.e. long-term progress starts with small steps. We have enforced algorithms to keep users engaged in exercising with their desired schedules, all that by using a very simple, intuitive and personalized User Interface.

7. High-level system requirements

Server Host: AWS S3
Database: AWS S3 and AWS DynamoDB
Main Developing Language: Javascript, HTML, CSS
Framework: React
Server-side Development Software: Node.js
Prototyping: Webflow
IDE: VS Code and WebStorm
APIs: AWS databases and Cognito (handle registration and login)

8. Team

Zihao (Zack) Wang   Team Lead
John San Jose   SCRUM
Jason Cordis   GitHub Master
Brian Frey   Front-end Lead
Darshil Dhameliya   Back-end Lead
Minseon Park   Front-end Member
Vincent Wong   Back-end Member

9. Checklist

a. **Team found a time slot to meet outside of the class**
   Wednesday 4 - 5 PM
   Sunday 4 - 5 PM

b. **Scrum Master shares meeting minutes with everyone after each meeting.**
   Yes, all the recorded meetings and minutes are shared in the discord.

c. **Github master chosen**
   Yes, Jason Cordis

d. **Everyone sets up their local development environment from the team's git repo.**
   Yes, everyone has already set up the same development environment.

e. **Team decided and agreed together on using the listed SW tools and deployment server**
   Almost there. We are still deciding between AWS DynamoDB and MongoDB based on its documentation and development complexity. We are leaning to DynamoDB because it shares a similar setup as our other database, AWS S3. We will have a final decision by the end of this week. However, it is also possible that we may adapt both DynamoDB and MongoDB for different components since we are building a microservice architecture.

f. **Team ready and able to use the chosen back and front end frameworks.**
Yes, almost ready. There are two more study sessions this week and next week.

g. **For each technology (front-end/back-end/DB/cloud) , team decides who will lead the study of each technology, and what will be output of the (feasibility) study by end of Oct.**
Yes, Zack and John will lead the study sessions and make sure that all group members are ready for their tasks.

h. **If you list a detailed explanation (other than Yes/No/Issues), earn extra point!**

i. **Team lead ensured that all team members read the final M1 and agree/understand it before submission.**
Yes, we worked together to complete this milestone by reading and commenting on each other's section. Then, we combine all the information to refine functionalities and features of the application.

Study Plan

In the past weeks, we have already hosted multiple study sessions. For this week, we will have two more sessions.
1. Oct. 06   Build two simple pages to integrate all the concepts we learned in the past weeks
2. Oct. 10   Detailed demonstration of how to handle AWS database (S3 and DynamoDB) from the front-end