

Human-Computer Interaction

MuscleMetrics: A Workout Tracking and Exercise
Analytics Application

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1 Project Description

1.1 Motivation

- For this project, my main motivation for creating **MuscleMetrics** was the increasing use of paywalls in workout-tracking applications. Throughout my fitness journey, I have used several apps designed to record workouts, track progress, and display performance metrics. However, many of these applications require users to pay a monthly subscription simply to access basic services. Other apps allow free workout logging but place useful features, such as detailed progress charts and muscle-group analytics, behind additional fees. This became frustrating because people should not have to pay to understand their own fitness progress. Regular physical activity can improve a person's health, confidence, and overall quality of life. Therefore, tools that encourage people to remain active should be accessible to everyone, especially beginners or students who may not be able to afford another monthly subscription. MuscleMetrics is intended to provide users with a free and uncomplicated way to record exercises, review previous workouts, and understand their training habits. The application will display useful information such as total workout volume, frequently trained exercises, progress over time, and the muscle groups trained most often. By presenting this information through understandable metrics and graphs, MuscleMetrics can help users make more informed decisions about their workouts without requiring them to pay for essential features.

1.2 Personas, Scenarios, and Use Cases

1.2.1 Personas

- The Gym Bro
 - o The Gym-Bro is a seasoned athlete that goes to the gym five times a week and only takes weekends off. Because of his familiarity with the gym, he knows what exercises to do but with the busy schedule he sometimes forgets what exercises he did the previous day. He would also like a way to know what muscle group he is overworking and what muscle group he is neglecting.
- The beginner gym-goer
 - o The beginner gym-goer is new to the gym and has absolutely no idea what exercises to do, what reps and sets stand for, and what each machine does. He wants to build muscle but has difficulty remembering the exercises, weights, and repetitions from previous workouts. He needs a simple application that allows him to log workout and understand which muscle groups he trains most frequently.
- The returning athlete
 - o The returning athlete used to work out, but she had to take a break for whatever reason. She wants to slowly get back into the gym and monitor her progress and track her growth. She does not want to worry about forgetting what exercise targets what muscle group she wants, a straightforward way to get back into the gym and have an application worry about the more complex stuff.

1.2.2 Scenarios

- Scenario 1: The Gym Bro

- The Gym Bro arrives at the gym after a busy day and cannot remember which exercises he completed during his previous workout. He opens MuscleMetrics and reviews his workout history to see the exercises, sets, repetitions, and weights he recorded. After reviewing the information, he begins a new workout and logs each exercise as he completes it. Once the workout is finished, he checks the application's muscle-group analytics and notices that he has trained his chest more frequently than his back. Based on this information, he decides to focus more on back exercises during his next workout.
- Scenario 2: The Beginner Gym-Goer
 - The beginner gym-goer recently started exercising and is still learning how workouts are organized. He often forgets the amount of weight he used and how many sets and repetitions he completed. During his workout, he opens MuscleMetrics and enters each exercise, its targeted muscle group, the weight used, and the number of sets and repetitions. The application organizes the information in a simple format that he can review later. Before his next workout, he checks his previous results so that he can repeat the workout or gradually increase the weight.
- Scenario 3: The Returning Athlete
 - The returning athlete has recently returned to the gym after taking several months off. Because she does not want to overwork herself, she begins with lighter weights and fewer sets than she previously used. She records each workout in MuscleMetrics and reviews her progress over several weeks. The application allows her to compare her workout volume and exercise history over time. By using this information, she can gradually increase the intensity of her workouts while avoiding sudden changes that could lead to overtraining.

1.2.3 Use Cases

Use Case 1: Record a Workout

Primary Actor: MuscleMetrics user

Goal: Record exercises completed during a workout

Precondition: The user has opened the application.

Main Flow:

1. The user selects the Start New Workout option.
2. The user enters or selects an exercise.
3. The user selects the muscle group targeted by the exercise.
4. The user enters the weight, number of sets, and number of repetitions.
5. The user adds additional exercises as needed.

6. The user selects Save Workout.
7. MuscleMetrics stores the workout and displays a confirmation message.

Alternative Flow:

If the user leaves a required field empty, MuscleMetrics displays a message asking the user to enter the missing information before saving the workout.

Use Case 2: Review Workout History

Primary Actor: MuscleMetrics user

Goal: Review previously completed workouts

Precondition: The user has previously saved at least one workout.

Main Flow:

1. The user opens the workout-history screen.
2. MuscleMetrics displays previously recorded workouts by date.
3. The user selects a workout.
4. The application displays the exercises, sets, repetitions, weights, and muscle groups from that workout.
5. The user reviews the information and uses it to plan a future workout.

Use Case 3: View Workout Analytics

Primary Actor: MuscleMetrics user

Goal: Understand workout habits and muscle-group frequency

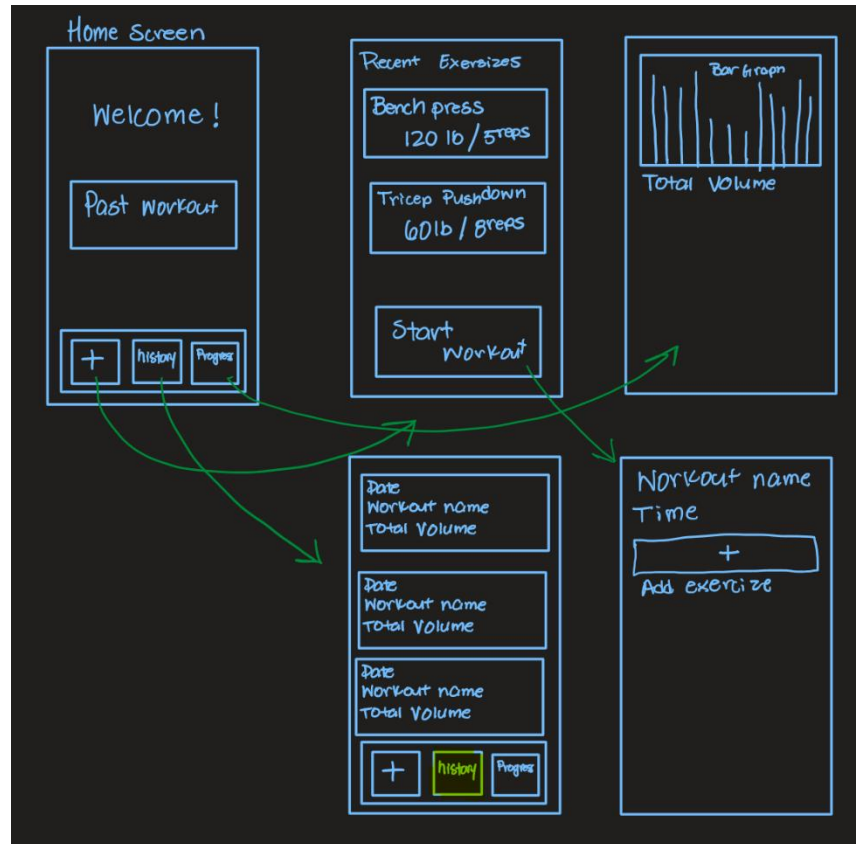
Precondition: The user has saved workout data.

Main Flow:

1. The user opens the analytics screen.
2. MuscleMetrics processes the user's recorded workouts.
3. The application displays graphs showing workout volume and muscle-group frequency.
4. The user reviews which muscle groups are trained most and least frequently.
5. The user uses the information to make changes to future workouts.

1.3 Prototypes

For the first prototype, I sketched a rough draft of what I wanted the project to look like. The first screen is the home screen, which includes a welcome message and a navigation bar at the bottom. I then added a workout screen that displays the user's most recent exercises and includes a **Start Workout** button at the bottom. From the navigation bar, users can also open the history screen to review their previous workouts. I also created a progress screen that would display charts and graphs showing the user's progress over time. At this stage, I had not decided exactly which graphs I wanted to include, but I knew that I wanted the screen to provide users with a detailed view of their workout information.



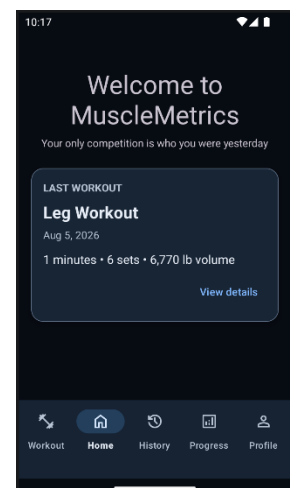
1.4 User Interface

The final user interface of MuscleMetrics was designed to be simple, consistent, and easy to navigate while users are exercising. The application uses a dark navy color theme with blue accents to reduce visual clutter and give the app a modern appearance. A bottom navigation bar appears on every main screen so that users can quickly move between the Workout, Home, History, Progress, and Profile sections. Cards, large headings, and readable text are used to organize information and make important workout data easy to identify.

1.4.1 Home screen

The Home screen serves as the main dashboard of MuscleMetrics. It welcomes the user with a motivational message and displays a summary of the most recently completed workout. The summary includes the workout name, date, duration, total number of sets, and total workout volume. A View Details button allows the user to open the workout history screen, while the bottom navigation bar provides access to the other sections of the application.

Figure 1: Home Screen



1.4.2 Workout Screen

Figure 2: Workout Screen

The Workout screen allows users to record a new workout. The user enters a workout name and can add multiple exercises. Each exercise includes fields for the exercise name, targeted muscle group, weight, and repetitions. Users can add or remove exercises and sets as needed. When the workout is completed, the Finish Workout button validates the information and saves it to the local database.

1.4.3 Workout History Screen

The Workout History screen displays previously saved workouts in reverse chronological order, with the newest workout shown first. Each card displays the workout name, date and time, duration, total sets, and total volume. This screen allows users to review their previous activity and use earlier workout information when planning future sessions.

1.4.4 Progress Screen

The Progress screen provides a basic summary of the user's recorded workout activity. It displays the total number of saved workouts, total sets completed, and total workout volume. These values are automatically calculated using information stored in the application's database. A Coming Soon section informs users that detailed graphs, workout comparisons, and muscle-group analytics are planned for future versions.

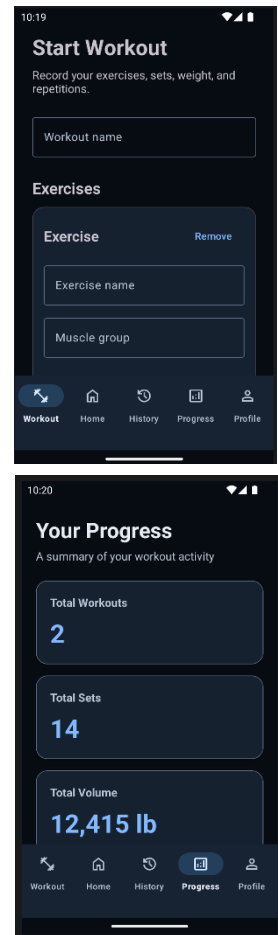


Figure 3: Progress Screen

1.4.5 Profile Screen

The Profile screen currently presents planned features that may be included in future versions of MuscleMetrics. These features include personal fitness information, fitness goals, unit preferences, and cloud backup. The screen was included to demonstrate how the application could later provide a more personalized experience while maintaining the same navigation and visual design as the rest of the application.

2 Evaluation Plan

The purpose of this evaluation plan is to determine whether MuscleMetrics is understandable, efficient, and easy to use for people with different levels of gym experience. The evaluation will focus on the main functions of the application, including recording a workout, reviewing saved workout history, viewing the most recent workout, and checking overall progress statistics. The results will be used to identify usability problems and determine which parts of the interface should be improved in future versions.

2.1 Evaluation Goals

The main goal of the evaluation is to determine whether users can complete the application's primary tasks without confusion or unnecessary assistance. The evaluation will examine whether the navigation bar is easy to understand, whether workout information can be entered correctly, and whether saved results are presented clearly. It will also measure how quickly users can complete common tasks and whether the interface provides useful feedback when information is missing or entered incorrectly.

2.2 Evaluation Method

A usability test will be used to evaluate MuscleMetrics. Each participant will be given a short list of tasks to complete while using the application. Participants will be encouraged to use the think-aloud method by explaining what they are looking for, what they expect each button to do, and anything they find confusing.

The evaluator will observe the participants without immediately providing assistance. Notes will be taken on task completion, errors, hesitation, and requests for help. After completing the tasks, participants will answer a short questionnaire about the application's appearance, navigation, ease of use, and usefulness.

2.3 Participants

The evaluation will include approximately five to eight participants with different levels of workout experience. Participants may include experienced gym users, beginners, and people returning to exercise after a break. This variety reflects the three personas identified earlier in the project.

Participants should also have basic experience using smartphone applications. Prior experience with workout-tracking applications will not be required because one purpose of the evaluation is to determine whether MuscleMetrics is understandable to new users.

2.4 Evaluation Tasks

Participants will be asked to complete the following tasks:

1. Open MuscleMetrics and identify the most recent workout shown on the Home screen.
2. Navigate to the Workout screen.
3. Create a workout with a name.
4. Add at least two exercises.
5. Enter the muscle group, weight, repetitions, and multiple sets for each exercise.
6. Remove one set or exercise.

7. Finish and save the workout.
8. Navigate to the History screen and locate the newly saved workout.
9. Return to the Home screen and confirm that the latest-workout card has updated.
10. Open the Progress screen and identify the total workouts, total sets, and total volume.
11. Open the Profile screen and identify the features planned for future development.

These tasks test the main features that are currently implemented in the application.

2.5 Evaluation Metrics

Several measurements will be collected during the usability test:

- **Task-completion rate:** Whether the participant successfully completes each task.
- **Completion time:** How long the participant takes to finish each task.
- **Error rate:** The number of incorrect selections, missing fields, or unsuccessful attempts.
- **Assistance required:** How often the participant asks the evaluator for help.
- **Navigation difficulty:** Whether the participant can locate each screen using the bottom navigation bar.
- **User satisfaction:** The participant's rating of the application on a scale from 1 to 5.
- **Qualitative feedback:** Comments about confusing features, visual design, and requested improvements.

A successful evaluation would show that most participants can complete the major tasks without assistance and can understand the workout summaries displayed by the application.

2.6 Cost and Restrictions

The evaluation would have little or no financial cost because the application can be tested using an Android emulator or a personal Android device. Participants may be recruited from classmates, friends, or family members, and no specialized equipment is required.

However, the evaluation has several restrictions. The number of participants may be small because of limited time and access to testers. A convenience sample may not represent every type of fitness-app user. The current version also stores information locally and does not include user accounts, cloud backup, detailed progress graphs, or complete profile customization. Because of these limitations, the evaluation will focus primarily on the workout-recording, history, navigation, and basic progress features that are currently available.

3 Conclusion

MuscleMetrics was developed to provide users with a simple and accessible way to record workouts and review their fitness activity without requiring a paid subscription. The final prototype successfully demonstrates the application's main workflow. Users can create a workout, add exercises and sets, enter weight and repetition information, and save the completed workout. The saved information is then used to update the Home, History, and Progress screens.

The project also demonstrates several important Human-Computer Interaction principles, including consistent navigation, understandable feedback, readable information, and a clear visual hierarchy. Although the current version does not contain every feature originally planned, it provides a functional foundation that can be expanded through future development and usability testing.

3.1 Development Challenges

One of the main challenges during development was learning how to organize an Android application with multiple screens. Each screen required its own activity, XML layout, and bottom-navigation behavior. Maintaining consistent navigation while preventing unnecessary duplicate screens required careful testing.

Another challenge was creating a workout form that could support multiple exercises and multiple sets. Unlike a fixed form, the Workout screen needed to dynamically add and remove interface components while keeping the set numbers organized.

Connecting the user interface to a database was also difficult. The application needed to store workouts, exercises, and sets as related information. It also needed to retrieve that information and calculate workout summaries, including duration, total sets, and total volume.

Emulator performance was another problem during testing. The original virtual device occasionally became slow or stopped responding, which made it difficult to determine whether an issue was caused by the application or the emulator.

3.2 Solutions

The navigation challenge was addressed by creating separate activities for the Home, Workout, History, Progress, and Profile screens. Each activity uses the same bottom-navigation menu so that the application remains visually and functionally consistent.

Dynamic exercise and set layouts were created so users can add or remove information based on the workout they are performing. Validation was also added to prevent workouts from being saved when required information is missing or invalid.

Room was used as the application's local database system. Separate tables were created for workouts, exercises, and sets, with relationships connecting each exercise to its workout and

each set to its exercise. Database operations were performed on background threads to prevent them from blocking the user interface.

The emulator problem was reduced by creating a smaller virtual Android device that required fewer computer resources. This made the application more responsive and allowed its features to be tested more reliably. The interface was also refined through repeated testing, including improvements to spacing, card layouts, navigation icons, splash-screen styling, and the dark-mode color palette.

3.3 Current Limitations

The current version of MuscleMetrics has several limitations. The Progress screen displays total workouts, total sets, and total workout volume, but it does not yet include interactive graphs or comparisons over time. Muscle-group frequency is entered and stored with each exercise, but detailed muscle-group analytics have not yet been implemented.

The History screen displays summaries of completed workouts, but users cannot currently open a complete workout-detail screen to examine every saved exercise and set. Users also cannot edit or delete saved workouts through the interface.

The Profile screen is currently a preview of planned features and does not allow users to enter personal information, set fitness goals, or change their preferred measurement unit. The application currently displays weight in pounds.

Finally, all information is stored locally on the device. The application does not currently include account registration, cloud backup, synchronization between devices, or recovery of data if the application is removed.

3.4 Future Improvements

Future versions of MuscleMetrics could include progress graphs that show changes in workout volume, sets, and strength over time. Muscle-group analytics could also be added to help users identify which areas they train most often and which areas may be neglected.

A detailed workout screen could allow users to open a saved workout and review every exercise, muscle group, weight, set, and repetition. Editing, duplicating, and deleting workouts would give users greater control over their saved information.

The Profile screen could be expanded to support personal information, fitness goals, pounds or kilograms, theme preferences, and other application settings. User accounts and cloud backup could also be implemented so that workout information can be restored and synchronized across multiple devices.

Additional usability testing with beginners, experienced gym users, and returning athletes would provide feedback about the application's navigation, terminology, input process, and visual

design. This feedback could be used to improve MuscleMetrics and make the application more useful for a wider variety of users.

4 References

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- [Styles and themes | Views | Android Developers](#)
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