

CSE 535: Mobile Computing

Project 4

Group 42: Fit Life - Personalised Workout Recommender System

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Introduction

The Fit Life project is a centralized fitness application that not only efficiently tracks users' metrics but also provides valuable insights for a more informed fitness journey. In my role, I've played a significant part in meticulously exploring and cleaning the data, leveraging various data visualizations to gain a comprehensive understanding of the dataset.

Additionally, my contributions include the development of an accurate recommender system, that provides personalized gym workout suggestions based on exercise type, targeted body parts, user experience level, and difficulty ratings. Our goal as a team is to curate a personalized fitness routine and motivate users daily through an innovative scoring system.

Alignment with Guardian Angel:

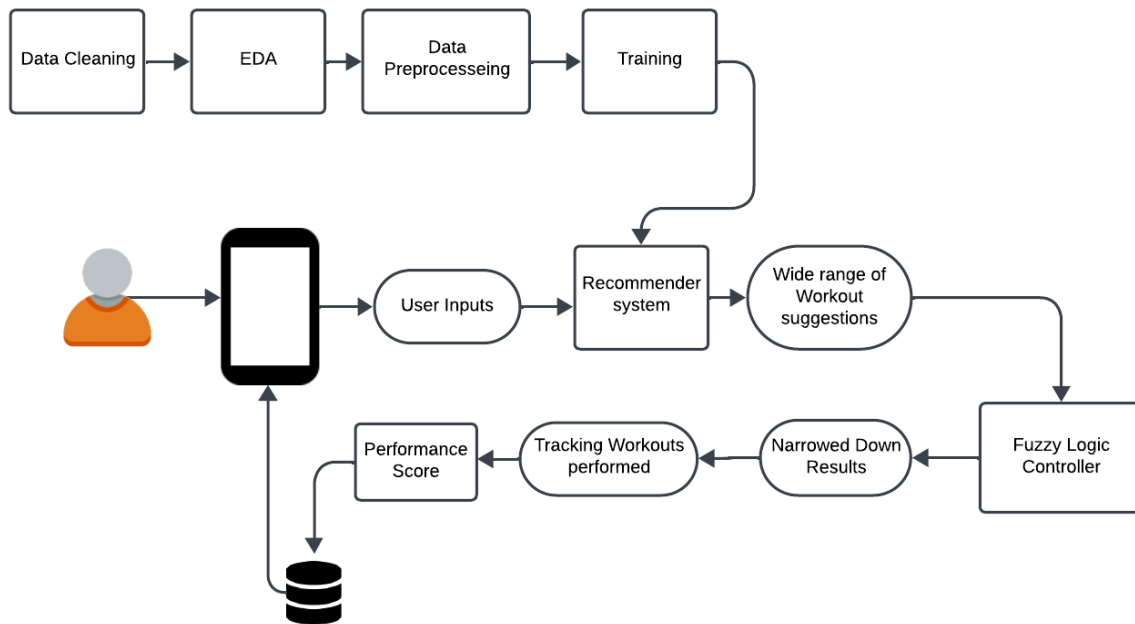
Aligning with the goals of Guardian Angel to provide context-based personalized suggestions to promote better well-being, the Gym Workout Recommender system provides users with user-specific customizability. This empowers users in curating fitness routines that can cater to users gym experience, preferences, and desired intensity, fostering a more personalized and effective approach to their well-being journey.

Specifications:

Control flow:

- The FitLife application first asks the users to provide their health metrics like heart rate and breathing rate and asks for workout specifications for the day like the type of exercise, the muscle group, their experience at the gym, and the level of intensity of the exercises. These parameters act as the inputs for the workout recommender system.
- The Gym Workout recommender system, which is trained on a dataset containing 2917 different workouts encompassing various kinds of equipment, workout environments, and muscle groups, uses this knowledge to provide a list of workout titles. This recommender system segregates the workouts into 6 clusters offering easy finding of similar exercises as per user needs.
- KMeans clustering and DBScan were initially used algorithms to form the clusters but the KMeans algorithm gave better results than DBScan. After this step, the results from the recommender system go to the fuzzy controller which further breaks down the results to give the top 10 workouts for the user.
- After this step, the user can see the 10 recommended workouts from which the user can further personalize his workout plan by selecting the ones he wants to work on ensuring maximum satisfaction and motivation to get started.

UML:



Design:

The design of my workflow is well-streamlined and straightforward. The techstack used for the recommender system are Jupyter Notebook, Pandas, Plotly.express, Seaborn and Scikit learn. For the initial data exploration and understanding of data, Alteryx was used to plan out a workflow for effectively cleaning the data.

Testing strategies:

The testing was done by taking the role of the user and randomly giving input to the recommender system and critically analyzing the results from a user's perspective. This demanded the need for Parameter tuning and feature engineering to improve the training of the model and the efficiency of the results.

Navigating Challenges:

Addressing the challenges in our project involved navigating through some common difficulties. Initially, finding the right dataset that matched our goals was difficult. The data had many missing values that demanded thorough cleaning to ensure data accuracy and smooth workflow as most of the group project revolved entirely around this data. A pivotal aspect of my project centered around the development of a workout recommender system, a task that proved to be complex during the classification algorithm exploration phase. But a strategic shift towards using Clustering algorithms to group similar workouts was a game-changer. The result is a robust system capable of delivering personalized workout recommendations tailored to user specifications, thereby allowing for the creation of personalized workout routines.