

# **Executive Summary: Gym Members' Exercise Analysis**

## **1. Problem Statement**

The objective of this project is to analyze gym members' workout data to understand the key factors influencing calorie expenditure. By using exploratory data analysis (EDA) and linear regression, we aim to predict the number of calories burned based on workout-related attributes. This analysis can help gym trainers and members optimize exercise routines for maximum efficiency.

## **2. Project Description**

The dataset contains various attributes related to gym workouts, such as:

Demographic Details: Age and Gender

Workout Information: Workout type, session duration, and intensity

Outcome: Calories burned

We perform EDA to understand the distribution of data, identify correlations, and visualize trends. Finally, a linear regression model is developed to predict calorie expenditure based on relevant workout parameters.

## **3. Key Points of Analysis**

Data Cleaning & Preprocessing: Identified missing values, categorized age groups, and distinguished categorical & numerical variables.

Univariate Analysis: Explored individual feature distributions (e.g., session duration, calories burned).

Bivariate Analysis: Investigated relationships between different variables (e.g., session duration vs. calories burned).

Data Visualization: Used multiple plots to gain insights into the dataset.

## 4. Visualizations & Insights

### 1. Histogram (Distribution of Calories Burned)

Shows that most members burn calories within a specific range, with fewer extreme values.

Indicates a right-skewed distribution, meaning some users burn significantly more calories than others.

### 2. Box Plot (Workout Type vs. Calories Burned)

High-intensity workouts like cardio result in higher calorie burns.

Strength training and yoga have a lower median calorie burn compared to cardio.

### 3. Scatter Plot (Session Duration vs. Calories Burned)

Shows a positive correlation—longer workout durations generally lead to higher calorie burn.

Some outliers indicate individuals who burn more or fewer calories than expected.

### 4. Bar Chart (Gender vs. Calories Burned)

Males, on average, burn slightly more calories than females, likely due to physiological differences.

However, the difference is not substantial, suggesting workout intensity matters more than gender.

### 5. Pie Chart (Workout Type Distribution)

X% of gym members prefer cardio, Y% do strength training, and Z% engage in yoga or other activities.

Cardio is the most popular workout type.

## 5. Conclusion

This analysis confirms that workout type, session duration, and age significantly influence calorie expenditure. The linear regression model provides an effective way to estimate calories burned, allowing gym-goers to plan optimal workout routines.

### **Key Takeaways:**

Longer workouts generally lead to higher calorie burn.

Cardio workouts are the most effective for burning calories.

Age and gender play a role, but workout intensity is the most crucial factor.

Predictive modelling can help members customize their fitness plans for better results.

Trainers can use these insights to recommend personalized workout routines that align with members' fitness goals, ultimately improving gym engagement and health outcomes.