

# SmartFit: An AI-Based Workout Recommendation System

<sup>1</sup>Rujal Gaikwad, <sup>2</sup>Kaveri Chavan, <sup>3</sup>Sanika Ugale, <sup>4</sup>Mayuri Narudkar

<sup>1,2,3</sup>Student, Artificial Intelligence and Machine Learning Engineering Diploma, Ajeenkya D. Y. Patil School of Engineering, Charholi, Pune, India

<sup>4</sup>Professor, Head of Department, Artificial Intelligence and Machine Learning Engineering Diploma, Ajeenkya D. Y. Patil School of Engineering, Charholi, Pune, India

**Abstract - Personalized workout guidance is essential for achieving effective and safe fitness outcomes. Most existing fitness applications provide generic workout plans without adequately considering individual body parameters. This paper proposes a Workout Recommendation System that suggests personalized workouts based on user attributes such as Body Mass Index (BMI), age, and gender. The system classifies users into different fitness categories and recommends suitable exercises using machine learning techniques. The proposed approach aims to improve workout effectiveness, reduce the risk of injuries, and promote healthier lifestyles. The system follows a structured pipeline involving data collection, preprocessing, and recommendation generation. Future enhancements may include wearable device integration and diet-based recommendations.**

**Keywords:** Workout Recommendation System, Body Mass Index (BMI), Machine Learning, Personalized Fitness, Exercise Recommendation.

## I. INTRODUCTION

Regular physical activity plays a vital role in maintaining physical and mental health. With the rise of lifestyle-related health issues such as obesity, diabetes, and cardiovascular diseases, fitness has become a major concern worldwide. Although many online workout platforms are available, most of them provide generalized workout plans without considering individual body parameters.

Body Mass Index (BMI) is a widely used metric to assess whether a person is underweight, normal, overweight, or obese. Along with BMI, factors such as age and gender significantly influence workout suitability. An inappropriate workout plan may lead to injuries, fatigue, or ineffective fitness outcomes.

This paper presents a Workout Recommendation System that generates personalized workout suggestions using user-specific data. By analyzing BMI, age, and gender, the system recommends exercises that align with the individual's physical

condition. The proposed approach aims to help users follow safer, more effective, and data-driven workout routines using machine learning techniques.

### 1.1 Problem Statement

In recent years, fitness awareness has increased significantly; however, many individuals still face difficulties in selecting appropriate workout routines. Most existing fitness applications and online platforms provide generalized workout plans that do not consider individual differences such as Body Mass Index (BMI), age, and gender. This lack of personalization may lead to ineffective workout results or increase the risk of injuries. Additionally, users without professional guidance often struggle to identify exercises that match their physical capabilities. Therefore, there is a need for an intelligent and personalized workout recommendation system that can analyze individual user data and suggest suitable workout routines in a safe and effective manner.

### 1.2 Objectives of the System

The primary objective of this project is to design a personalized workout recommendation system that provides suitable exercise plans based on individual user characteristics. The system aims to analyze user attributes such as Body Mass Index (BMI), age, and gender to understand the physical condition of the user. By applying machine learning techniques, the system seeks to classify users into appropriate fitness categories and generate accurate workout recommendations. Another objective is to improve overall fitness outcomes by offering customized exercise plans that are safer, more effective, and tailored to individual needs.

## II. PROPOSED SYSTEM AND METHODOLOGY

The proposed Workout Recommendation System is designed to generate personalized exercise recommendations using machine learning techniques. The system takes user-specific inputs such as age, gender, height, and weight, from which the Body Mass Index (BMI) is calculated. Based on

these parameters, the system analyzes the user’s fitness level and recommends appropriate workout routines.

The system follows a structured workflow that includes data collection, data preprocessing, feature extraction, model training, and workout recommendation generation. Initially, relevant user data is collected and cleaned to remove inconsistencies and missing values. The processed data is then used to train a supervised machine learning model capable of identifying patterns between user attributes and suitable workout categories. Once trained, the model predicts the most appropriate workout type for a given user profile, thereby providing personalized fitness guidance.

### 2.1 System Architecture

The system architecture consists of multiple interconnected components that work together to deliver personalized workout recommendations. The user provides basic personal information such as age, gender, height, and weight through a user interface. The system calculates BMI and forwards the processed data to the machine learning module. The trained model analyzes the input parameters and classifies the user into a specific fitness category. Based on this classification, the recommendation engine suggests suitable workouts tailored to the user’s physical condition. This modular architecture ensures scalability, flexibility, and ease of future enhancements.

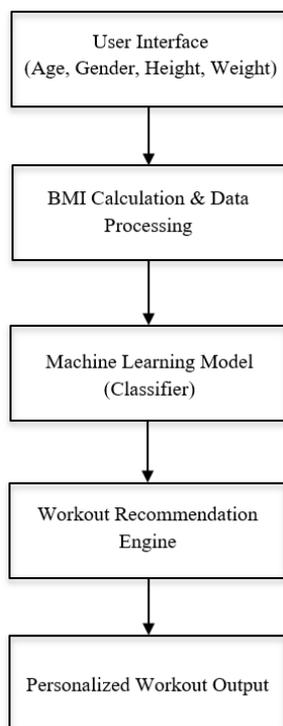


Figure 1: System Architecture of the Proposed SmartFit Workout Recommendation System

### 2.2 Data Collection and Preprocessing

The effectiveness of the proposed Workout Recommendation System largely depends on the quality of data used for training and analysis. User data such as age, gender, height, weight, and activity level is collected as the primary input to the system. Based on height and weight values, the Body Mass Index (BMI) is calculated to assess the user’s physical condition. The collected data is then subjected to preprocessing to ensure accuracy and consistency. Data preprocessing involves handling missing or incomplete values, removing duplicate records, and normalizing numerical features to maintain uniformity across the dataset. Feature selection is also performed to identify the most relevant attributes that influence workout recommendations. These preprocessing steps improve model performance and help generate more reliable and personalized workout suggestions.

### 2.3 Machine Learning Model

The proposed system employs a supervised machine learning approach to generate personalized workout recommendations. A labeled dataset containing user attributes and corresponding workout categories is used to train the model. Classification algorithms such as Decision Tree, Random Forest, or K-Nearest Neighbors (KNN) are considered due to their effectiveness in handling structured data and classification tasks. The model learns patterns and relationships between user characteristics such as BMI, age, and gender and suitable workout types including cardio, strength training, and flexibility exercises. After training, the model is capable of predicting appropriate workout categories for new users based on their input data. This approach enables the system to provide customized workout recommendations that align with individual fitness levels and physical capabilities.

## III. RESULTS AND DISCUSSIONS

To demonstrate the feasibility of the proposed system, a small prototype model was implemented using Python and a Decision Tree classifier. A sample dataset containing user attributes such as age, gender, and BMI was used to train the model. For a test user aged 22 years with a BMI of 25.9, the model classified the user into the overweight category and recommended a weight-loss-focused workout plan. This prototype implementation validates the decision-making logic of the proposed system and demonstrates how machine learning can be effectively applied for personalized workout recommendations.

**CODE**

```
import pandas as pd
from sklearn.tree import DecisionTreeClassifier
data = {
    "Age": [18, 25, 35, 45, 30],
    "Gender": [0, 1, 1, 0, 1],
    "BMI": [18.5, 22.3, 27.1, 31.4, 24.8],
    "Workout_Type": ["Strength", "Cardio", "Weight Loss",
                    "Low Impact", "Mixed"]
}
df = pd.DataFrame(data)
X = df[["Age", "Gender", "BMI"]] y = df["Workout_Type"]
# Train model
model = DecisionTreeClassifier() model.fit(X, y)
sample_user = [[22, 1, 25.9]]
prediction = model.predict(sample_user) print("Recommended
Workout:", prediction[0])
```

**OUTPUT**

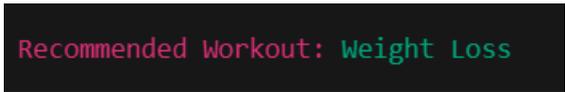


Figure 2: Output of the sample code

**IV. CONCLUSION**

This paper presented a proposed machine learning-based workout recommendation system aimed at providing personalized fitness guidance. By considering factors such as BMI, age, and gender, the system aims to generate safe and effective workout plans. The proposed approach demonstrates the potential of intelligent fitness systems in promoting healthier lifestyles. Future work includes system implementation, real-time monitoring, and integration with wearable fitness devices.

**ACKNOWLEDGEMENT**

The authors would like to express their sincere gratitude to Prof. Sakshi Kasar, for their valuable guidance, constant encouragement, and insightful suggestions throughout the course of this project. The authors also extend their heartfelt thanks to Prof. Mayuri Narudkar, Head of the Department, Artificial Intelligence and Machine Learning, for their continuous support, motivation, and for providing a conducive academic environment to successfully carry out this research work. The authors are also thankful to all faculty members and the institution for their cooperation and support.

**REFERENCES**

- [1] T. Mitchell, Machine Learning, McGraw-Hill Education, New York, 1997.
- [2] S. R. Gunn, "Support Vector Machines for Classification and Regression," University of Southampton, Tech. Rep., 1998.
- [3] R. S. Sutton and A. G. Barto, Reinforcement Learning: An Introduction, MIT Press, Cambridge, MA, 2018.
- [4] K. Hornik, M. Stinchcombe, and H. White, "Multilayer Feedforward Networks Are Universal Approximators," Neural Networks, vol. 2, no. 5, pp. 359–366, 1989.
- [5] P. De Choudhury, M. Gamon, and S. Counts, "Predicting Depression via Social Media," ICWSM, pp. 128–137, 2013.
- [6] World Health Organization, "Physical Activity and Health," WHO Guidelines, 2020.
- [7] A. Patel and S. Shah, "Machine Learning-Based Recommendation Systems: A Survey," International Journal of Computer Applications, vol. 174, no. 8, pp. 25–30, 2021.
- [8] J. Chen, Y. Li, and X. Zhang, "Personalized Fitness Recommendation Using Machine Learning Techniques," International Journal of Engineering Research & Technology (IJERT), vol. 10, no. 6, pp. 112–117, 2021.

**Citation of this Article:**

Rujal Gaikwad, Kaveri Chavan, Sanika Ugale, & Mayuri Narudkar. (2026). SmartFit: An AI-Based Workout Recommendation System. International Research Journal of Innovations in Engineering and Technology - IRJIET, 10(1), 20-22. Article DOI <https://doi.org/10.47001/IRJIET/2026.101002>

\*\*\*\*\*