Department of Computer Science and Engineering

SMART FITNESS PLANNER

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Problem Statement and Motivation

- People often struggle with generic workout plans that don't suit their fitness level/goals.
- Existing apps don't personalize plans using past exercise data.
- Manual planning wastes time and is error-prone.
- High dropout rates in unpersonalized fitness programs
- Motivation: Use ML to provide smarter, customized weekly workout plans.

Existing System

- Static workout schedules
- One-size-fits-all fitness apps
- No learning from user feedback or history
- No predictive recommendations
- Fails to adjust for fitness level, time, or equipment
- Limited variety in suggested exercises.

Objectives

- ☐ Generate synthetic user + workout datasets
- ☐ Design realistic fitness datasets (users, workouts, ratings)
- ☐ Build a ML model to predict user exercise preferences
- ☐ Recommend top-rated exercises per user profile
- ☐ Predict ratings for user-exercise pairs
- ☐ Create a 7-day workout plan targeting fitness goals

Abstract

The global shift toward healthier lifestyles and the rise of digital fitness tracking have created an urgent need for personalized workout solutions that are both scalable and data-driven. Traditional workout plans are often generic and fail to consider the unique physiological and motivational differences between individuals. As a result, fitness adherence drops, and users are less likely to achieve their health goals. This research addresses the challenge by developing a machine learning–based personalized workout planner that predicts optimal exercise routines for users based on their personal attributes and historical fitness behavior.

Proposed System

- ☐ **Data Pipeline**: Auto-generation of synthetic users & workouts
- ☐ **ML Model**: Trained neural network with low mean squared error
- ☐ **Recommendation Engine**: Personalized exercise ratings
- ☐ **Weekly Plan Generator**: Balances time, goal, fitness level
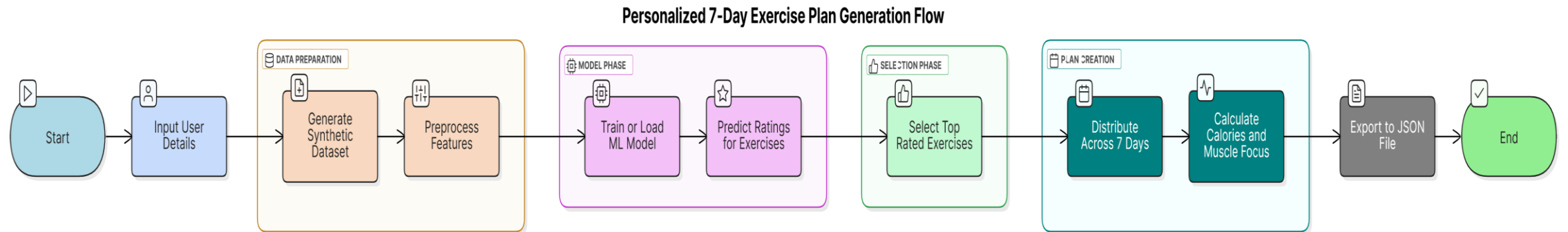- ☐ **Output Module**: JSON for external use

System Architecture

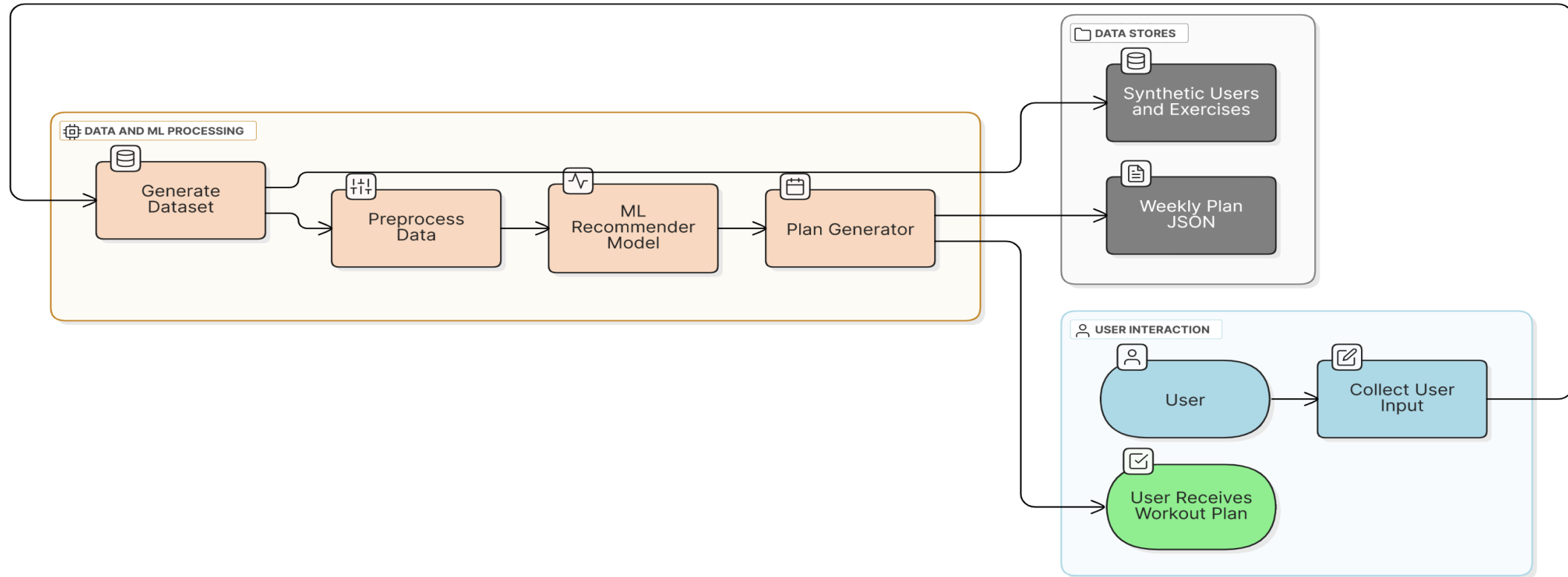ML-Powered Workout Planning Application Flow
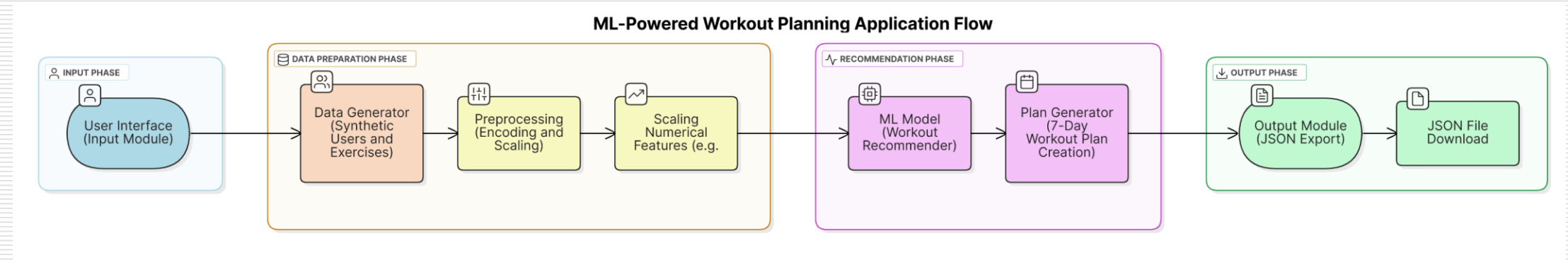
List of Modules

- ☐ **User Data Generator**: Age, weight, goals
- ☐ **Exercise Data Generator**: Type, muscles, calories
- ☐ Workout History + Ratings
- ☐ Label Encoders & Scaler
- ☐ Workout Planner Logic

DATA FLOW DIAGRAM

Personalized 7-Day Exercise Plan Generation Flow

Activity Diagram

Implementation & Results of Module

- ☐ Keras NN trained for 10 epochs with MSE loss
- ☐ Scaled data using StandardScaler.
- ☐ **Training MSE**: ~0.78
- ☐ **Test MSE**: ~0.85
- ☐ Achieved Meaningful rating predictions
- ☐ Weekly plan include sets,reps and calories burned
- ☐ JSON ready for mobile/web app usage

Conclusion & Future Work

- ML successfully used to personalize fitness planning
- Generates diverse, realistic exercise suggestions
- Can help improve consistency in workouts
- Future: Add **wearable integration** (steps, heart rate, calories) for real-time feedback.
- **Chatbot interface** for asking questions, plan reminders, or modifications.
- Include **injury recovery or rehab modes**.
- Real time user ratings to retrain model.

References

- Scikit-learn & TensorFlow Documentation
- ACSM Guidelines for Exercise MET Values
- Numpy, Pandas for data generation
- Research papers on ML-based recommender systems

Paper Publication Status

- ☐ Project at implementation-complete stage
- ☐ Potential for publishing on IEEE or Springer
- ☐ Waiting for full approval from our mentor.

Thank You