RAJALAKSHMI
ENGINEERING COLLEGE
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Department of Computer Science and Engineering

SMART FITNESS PLANNER

Mrs Divya M , M.E
Assistant Professor

Nishal I P
220701187

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

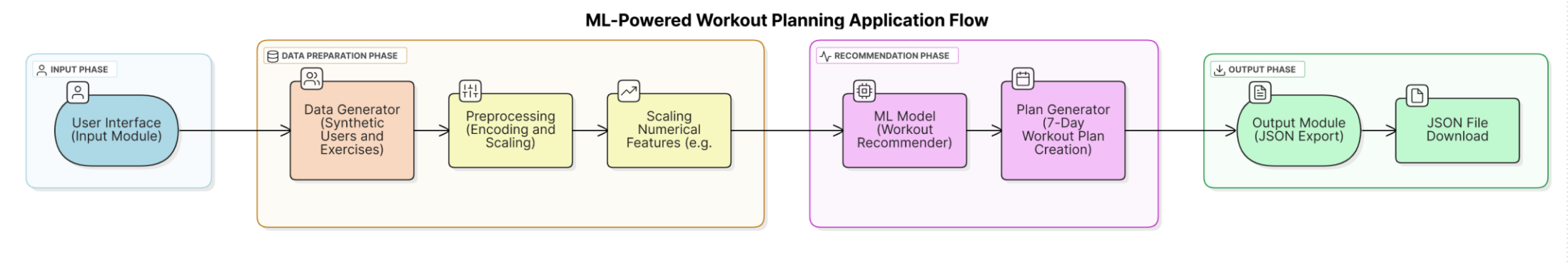
Abstract

- ML model trained to predict user preferences
- Inputs: fitness level, goal, history, difficulty
- Weekly plan created with calorie targets and muscle balance
- Saves output as JSON for future use or app integration
- Enables smarter, healthier exercise recommendations

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

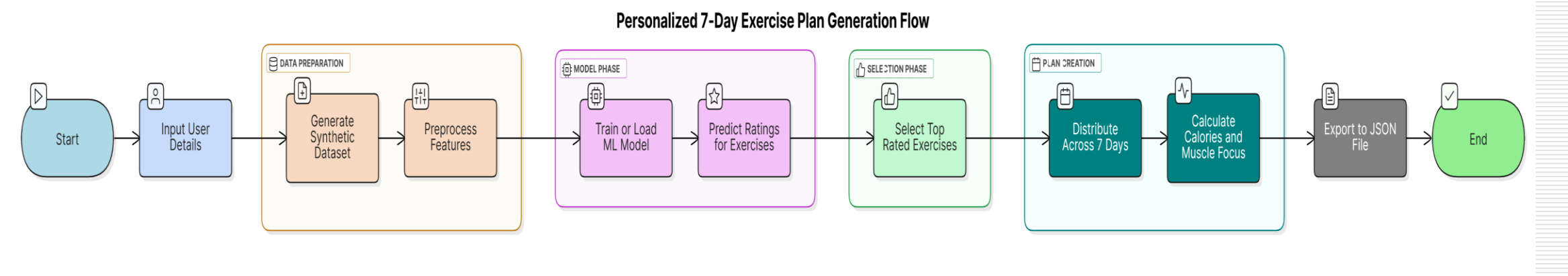
System Architecture



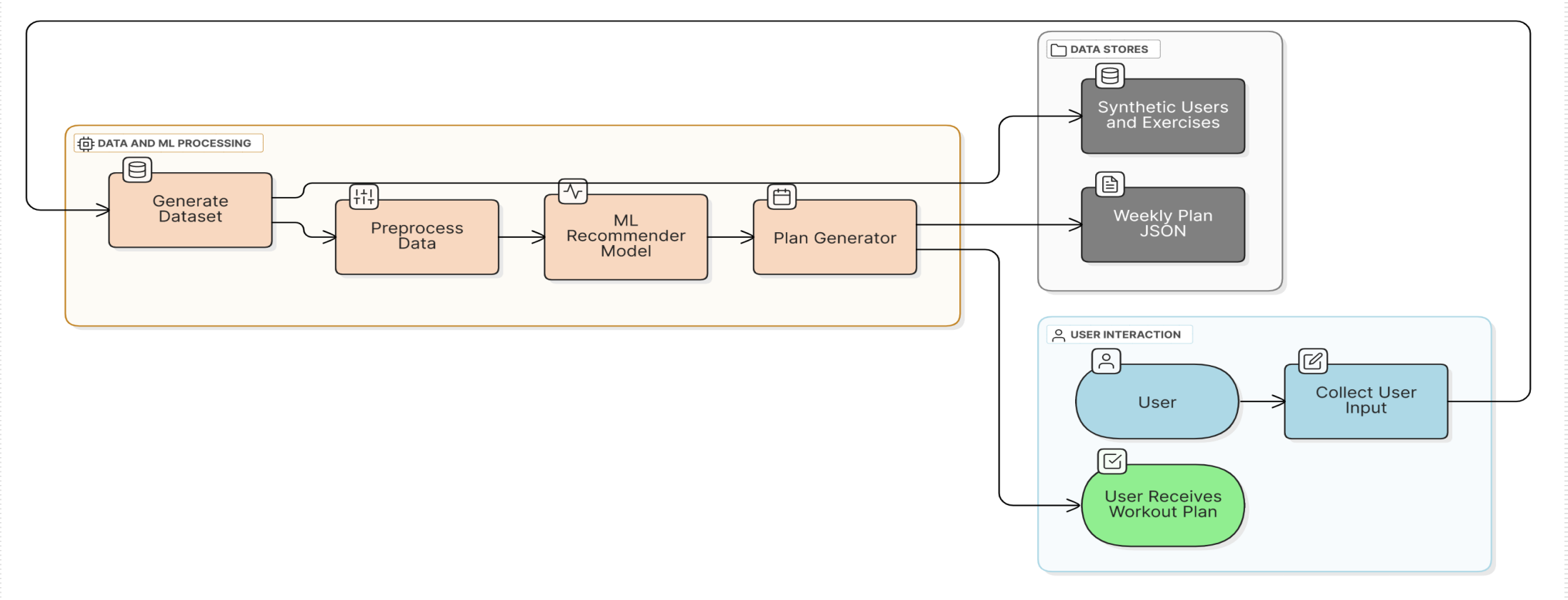
List of Modules

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

DATA FLOW DIAGRAM



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
- 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**.

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
- Future testing needed with real-world user data

Thank You