Software Design Document (SDD)
AI Music Recommender System
Snapshot 3 - Social and Collaborative Recommendations

Project Group 5

December 7, 2025

Version Description

Version	Description	Date
3.0	SDD updated for Snapshot 3. Adds social graph (follow relationships) and collaborative recommendation logic.	December 7, 2025

1 Introduction

1.1 Purpose

This document extends the design to include social and collaborative recommendations, combining user–user relationships with existing content and mood-based approaches.[web:14][web:17]

1.2 Scope

Snapshot 3 adds follow/unfollow operations, friends' recommendations, and collaborative algorithms while reusing existing modules.

2 Architecture Changes

2.1 Updated Workflow

1. The user follows one or more other users through the client.

2. The client sends follow/unfollow requests to the backend social service.

3. The social service stores follow relationships in the database.

4. When the user opens the "Friends' Picks" section, the client requests collaborative recommendations.

5. The backend retrieves followed users and their liked tracks, optionally incorporating similar-user data, and returns a ranked list.

2.2 New/Extended Components

2.2.1 Social Service

- Manages follow/unfollow operations.

- Provides APIs to fetch a user's follow list and followers.

2.2.2 Collaborative Recommendation Module

- Aggregates liked songs from followed users.

- Optionally computes similarity scores between users based on interaction patterns.[web:14][web:19]

- Combines collaborative scores with existing content/mood scores in a hybrid ranking model.

3 Database Design Updates

3.1 New Tables

- Follow(userId, followsUserId, createdAt).

- Optional UserSimilarity(userId, otherUserId, similarityScore) for precomputed similarity.

3.2 Relationships

- A User can follow many other Users via Follow records.

- UserSimilarity allows fast lookup of similar users for collaborative filtering.

4 Interface Design

4.1 API Changes

- POST /social/follow

- POST /social/unfollow

- GET /social/following

- GET /songs/friends-picks

5   Design Considerations

- Social features are designed as a separate module to isolate privacy and policy concerns.

- The hybrid approach allows combining content-based, mood-based, and collaborative scores for better recommendations.[web:14][web:17]