Project Title

Personalized Recommendation Engine (Media) Web App

Sprint 4 Documentation

Overview

During Sprint 4, the team focused on improving the intelligence and accuracy of the recommendation system. Building on previous progress, we refined the Two Tower Recommendation Algorithm and introduced behavior pattern recognition to make the system more aware of user context, mood, and listening environment. This sprint marked a significant improvement toward creating a more realistic and adaptive recommendation experience.

Project Overview

The Personalized Recommendation Engine aims to deliver accurate and meaningful media recommendations such as songs, videos, and movies based on user mood, activity, and preferences. The system analyzes behavioral data to understand how, when, and where users listen to music, providing suggestions that adapt to individual habits and surroundings.

Problem Statement

Users spend considerable time searching for entertainment content that fits their mood or setting. This project reduces that effort by providing an AI-driven system that recommends music based on emotional patterns, location, and time of day. The system creates a personalized experience that matches the user's environment and state of mind.

Intended Users

- Students and young adults
- Music and movie enthusiasts
- General users seeking personalized media suggestions

Sprint 4 Goals and Objectives

The main focus of Sprint 4 was to upgrade the recommendation logic and integrate new behavioral data for context-based personalization.

Key Objectives:

- Update and retrain the Two Tower Algorithm to include behavior pattern recognition.
- Use contextual data such as time of day, location, and emotional mood for recommendations.
- Process a new two-week listening dataset to extract listening patterns.
- Improve recommendation accuracy by adjusting suggestions to user context.
- Strengthen team coordination between the frontend, backend, and QA members.

Sprint 4 Deliverables

- Enhanced Two Tower Algorithm with behavioral and contextual features.
- Mood and context-based recommendations using the new dataset.
- Backend improvements for faster data processing and model response.
- Extended dataset structure including time, place, and mood attributes.
- Updated Jira board with new user stories related to context and behavior analysis.
- QA testing of the new system to verify accuracy and stability in multiple scenarios.

Team Collaboration

The Sprint 4 team included:

- One Frontend Developer who improved the dashboard and integrated dynamic song suggestions.
- One Backend Developer who enhanced the recommendation algorithm and data pipeline.
- One QA Tester who verified all new features and ensured the system performed correctly.

This collaboration resulted in significant improvements in accuracy, reliability, and user experience.

Planned for Next Sprint (Sprint 5)

- Add movie and video recommendation functionality.
- Implement a feedback learning loop to refine model predictions.
- Improve backend speed and scalability for larger datasets.
- Begin A/B testing to compare recommendation quality across user groups.

Tools and Technologies

- **Frontend:** HTML, CSS, JavaScript (Express-based interface)
- **Backend:** Node.js with Express and Gemini integration
- **Database:** Firebase and SQLite

- **AI Model:** Enhanced Two Tower Recommendation Algorithm with context recognition
- **Authentication:** bcrypt for secure user login
- **Project Management:** Jira for sprint tracking and GitHub for version control

Risks and Challenges

- Maintaining high performance as more behavioral data is added.
- Ensuring data diversity while respecting user privacy.
- Accurately detecting mood and context without intrusive data collection.

Summary

By the end of Sprint 4, the Recommendation Engine achieved major progress in personalization and context awareness. The updated algorithm now recognizes user behavior patterns and adapts recommendations based on time, place, and mood. These improvements make the system more intelligent, user-centered, and ready for expansion into movie and video recommendations in future sprints.