Northwestern | SCHOOL OF PROFESSIONAL STUDIES

PERSONALIZED MUSIC RECOMMENDATION SYSTEM

Week 4 Status Report

MSDSP 498 - Capstone

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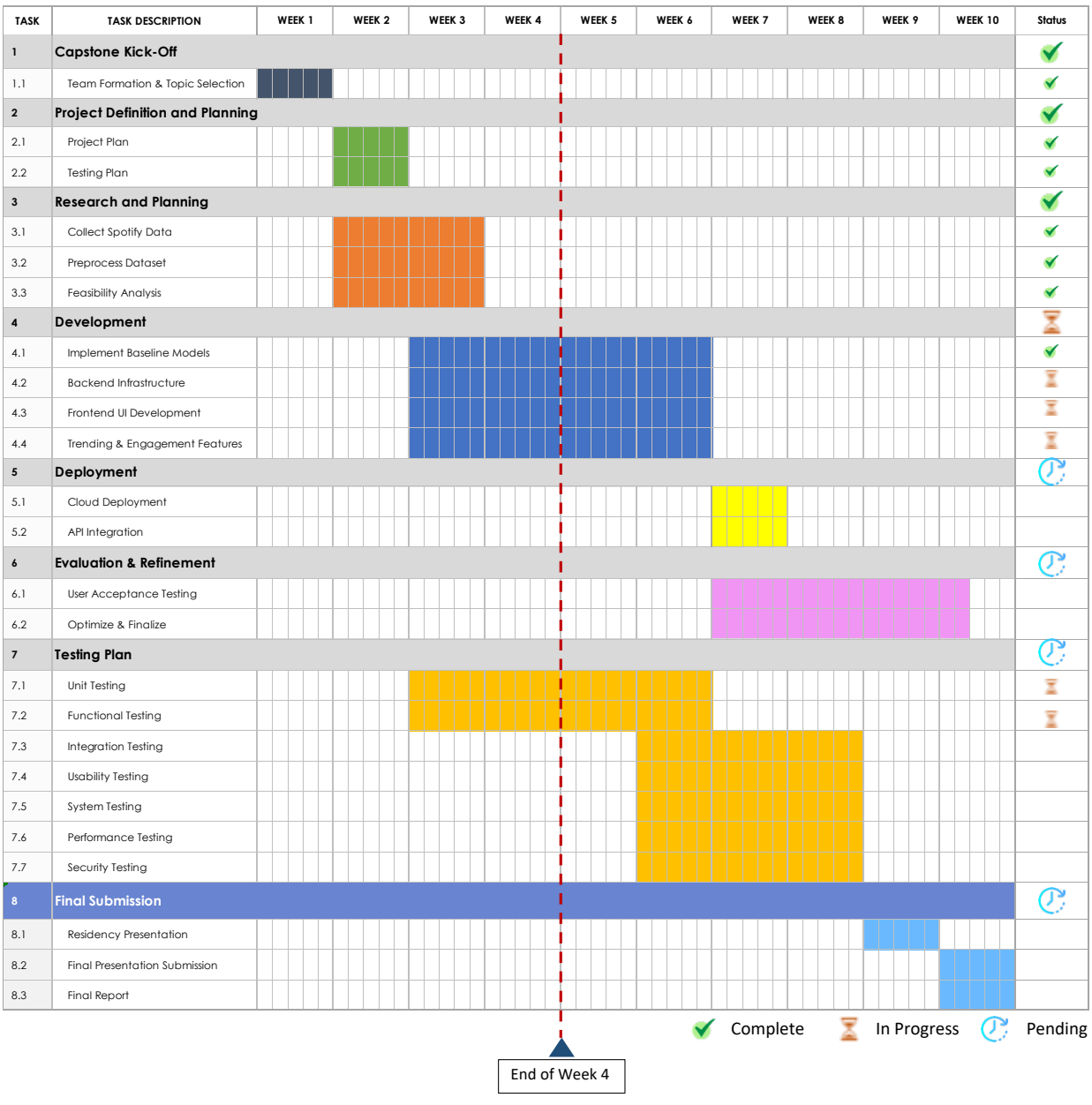
Project Status Summary

Overall, the project is progressing well, with key milestones being achieved as planned. The team has completed data collection, pre-processing, and initial infrastructure setup. We are currently working on data enrichment, UI development, and database integration.

Project Plan Status Report



Progress Against Project Plan

Phase	Planned Tasks	Current Status	Next Steps	Comments
Data Collection	Collect users' last 50 songs dataset	✅ Completed	Train Models.	Successfully gathered user interaction data
Data Preprocessing	Clean and preprocess 1 million song dataset	✅ Completed	Add Locale using LLM.	Data ready for enrichment
Data Enrichment	Fill missing locale information for songs	🟡 In Progress (Batch Processing)	Continue batch processing using LLM	Estimated completion in 1 week.
Database Setup	Create SQL database for user login and preferences	✅ Completed	Integrate recommendation data.	Database is functional and storing user preferences
Frontend Development	Start building React UI	🟡 In Progress	Develop recommendation page, sentiment filter	Initial setup completed
Backend Development	Implement recommendation engine	🟡 In Progress	Integrate API calls, model training and inference.	Estimate completion in 2 weeks.
Testing	Create Test cases.	🔴 Not Started	Start working on proposed test plan and user feedbacks.	Pending as app is in development phase.
Deployment	Deploy app to cloud.	🔴 Not Started	Start looking into cloud services and products to choose for deployment.	App is not ready for initial use.

Risks, Issues & Mitigation Plans

Risk/Issue	Impact	Mitigation Plan	Status
Slow LLM Processing for Locale Data	Delays in completing data enrichment	Optimize batch size, explore parallel processing	🟡 In Progress
UI Development Complexity	Potential delays in frontend features	Prioritize core features first	🟡 In Progress
Cold-Start Problem for New Users	Reduced recommendation accuracy for new users	Use genre-based or trending song recommendations	🟡 In Progress
Chat Feature	Project delays	Start immediately after data enrichment	🔴 Not Started

Cloud Deployment	Project delays	Start immediately after beta app is created.	🔴 Not Started
Test Cases Creation	We will not be able to analyze the recommendation accuracy.	Start Parallelly after backend is completed.	🟡 In Progress

Next Week's Priorities

- **Complete Data Enrichment**

We will finalize the data enrichment process by leveraging LLM to fill in the locale information for all 1 million songs. This step is crucial for improving the personalization and contextual relevance of our recommendations. Additionally, we will optimize batch processing methods to enhance efficiency ensuring seamless data integration.

- **Continue UI Development**

Our UI development will continue toward implementing the recommendation page, allowing users to explore personalized song suggestions. We will also integrate the song like/unlike functionality, enabling users to refine their music preferences over time. The "Trending Now" feature will be introduced to display the most popular songs in real-time, and sentiment filtering will be implemented to allow users to discover songs that match their mood and emotional state.

- **Continue Backend Development**

We have started working on the backend development by setting up APIs and integrating our machine learning models. These APIs will act as a bridge between the frontend and the recommendation engine, facilitating seamless data retrieval and processing. We will also design and implement user authentication, ensuring secure access to personalized recommendations and user data storage.

- **Performance Testing**

Initial load testing will be conducted to assess the database's performance under varying loads. This will include testing query execution times, optimizing database indexing strategies, and ensuring smooth handling of concurrent requests. The goal is to identify potential bottlenecks early in the development cycle and optimize system responsiveness for a seamless user experience.

- **Start Working on Integration & Deployment**

Integration between the UI and backend services will begin, focusing on smooth data flow and API connectivity. Additionally, we will evaluate deployment strategies, such as choosing the right cloud infrastructure, setting up CI/CD pipelines, and configuring necessary security measures.

- **LLM Development**

Development of the LLM-based chat feature will progress, with a focus on refining prompts and making the chatbot context-aware. This feature will enhance user engagement by providing interactive music recommendations based on user input. We will also fine-tune the model to generate meaningful and relevant responses that align with the user's listening habits and preferences.