Project Title: Music Recommendation System using Spotify and Genius Track Datasets

Project Overview:

The goal of this project is to develop a personalized music recommendation system that leverages the rich audio features from the Spotify Track Dataset and the textual information from the Genius Track Dataset. The system will employ machine learning algorithms to analyze user preferences and deliver accurate and engaging music recommendations to users. By combining audio analysis and lyrics annotations, we aim to create a comprehensive recommendation engine that caters to diverse user tastes and moods.

Project Objectives:

1. **Data Collection and Integration:**
   - Gather the Spotify Track Dataset and Genius Track Dataset from their respective sources.
   - Clean, preprocess, and merge the datasets to create a unified dataset that includes audio features and textual annotations.
2. **Feature Engineering and Model Selection:**
   - Extract relevant features from the combined dataset, including audio features and lyrics annotations.
   - Explore different recommendation algorithms, such as collaborative filtering, content-based filtering, hybrid models, and neural collaborative filtering.
   - Choose the most suitable algorithm based on performance metrics and project requirements.
3. **Model Development and Evaluation:**
   - Implement the chosen recommendation algorithm using Python and appropriate machine learning libraries.
   - Split the dataset into training, validation, and test sets.
   - Train and fine-tune the model using the training set while preventing overfitting using the validation set.
   - Evaluate the model's performance using metrics like precision, recall, F1-score, and Mean Average Precision.
4. **System Architecture and User Interface:**
   - Develop a user-friendly web interface that allows users to input their preferences, such as favorite artists, genres, or moods.
   - Integrate the trained recommendation model with the user interface to generate personalized music recommendations.

- Ensure the system is scalable, responsive, and provides a seamless user experience.
5. **Documentation and Presentation:**
   - Create detailed documentation outlining the project's objectives, data sources, preprocessing steps, model architecture, and implementation details.
   - Prepare a presentation summarizing the project's key findings, challenges, and outcomes for the capstone presentation.

Ethical Considerations:

The project will address ethical considerations related to user privacy, bias mitigation, and transparency. We will implement techniques to minimize biases in recommendations and ensure that user data is anonymized and handled responsibly. The system will provide clear explanations for recommendations and allow users to control their data and preferences.

Expected Deliverables:

- Unified and preprocessed dataset from Spotify and Genius Track Datasets.
- Trained music recommendation model based on selected algorithm.
- User-friendly web interface for users to input preferences and receive recommendations.
- Comprehensive project documentation and presentation materials.

Timeline:

- **Weeks 1-2:** Data collection, preprocessing, and integration.
- **Weeks 3-4:** Feature engineering and initial model development.
- **Weeks 5-6:** Model refinement, evaluation, and system architecture design.
- **Weeks 7-8:** User interface development and integration.
- **Weeks 9-10:** Documentation, presentation preparation, and final testing.

Conclusion:

This project aims to create an advanced music recommendation system that combines audio features and textual annotations to deliver highly personalized and engaging music recommendations. By addressing ethical considerations and ensuring a user-friendly interface, the system will provide an enjoyable and responsible music discovery experience for users.