Frontend Development with React.js

Project Documentation for Rhythmic Tunes

1. Introduction

- **Project Title**: Rhythmic Tunes

- **Team Members:**

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2. Project Overview

- **Purpose**:
  Rhythmic Tunes is a web application designed to provide users with a seamless music listening experience. The application allows users to browse, search, and play music tracks, create playlists, and discover new music based on their preferences.

- **Features**:

  o Music player with play, pause, skip, and volume control. o Search functionality to find songs, albums, and artists. o User authentication (login/signup). o Playlist creation and management.

  o Responsive design for mobile and desktop.

3. Architecture

- **Component Structure**:

The application is built using React.js with a component-based architecture. Major components include:

- **Header**: Contains the navigation bar and search bar.

- **Player**: Music player controls (play, pause, volume, etc.). ○ **Sidebar**: Displays user playlists and navigation links.

- **HomePage**: Displays featured tracks, recommended playlists, and new releases.

- **SearchPage**: Allows users to search for songs, albums, and artists.

- **PlaylistPage**: Displays user-created playlists and allows playlist management.

- **State Management**:
  The application uses **Redux** for global state management. The Redux store manages user authentication, current playing track, playlist data, and search results.

- **Routing**:
  The application uses **React Router** for navigation. Routes include:

  - /: Home page ○ /search:

  Search page ○ /playlist/:id:

  Playlist details page ○ /login:

  User login page

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4. Setup Instructions

- **Prerequisites**:

  - Node.js (v16 or

  higher) ○ npm (v8 or

  higher) ○ Git

- **Installation**:

  1. Clone the repository: git clone
     https://github.com/Rock875455/RhythmicTunes.git

  2. Navigate to the client directory: cd rhythmic-tunes/client

  3. Install dependencies: npm install

4. Configure environment variables: Create a .env file in the client directory and add the necessary variables (e.g., API keys).

5. Start the development server: npm start

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5. Folder Structure

- **Client**:

  - **src/components:** # Reusable components (Header, Player, etc.)
  - **src/pages:** # Page components (HomePage, SearchPage, etc.) ○ **src/assets:** # Images, icons, and other static files ○ **src/redux:** # Redux store, actions, and reducers ○ **src/utils:** # Utility functions and helpers ○ **App.js:** # Main application component ○ **index.js:** # Entry point

- **Utilities**:

  - **api.js**: Handles API requests to the backend.

  - **auth.js**: Manages user authentication and token storage.

  - **hooks/usePlayer.js**: Custom hook for managing the music player state.

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6. Running the Application

Frontend:

  - To start the frontend server, run the following command in the client directory: npm start
  - npm install ○ npx json-server ./db/db.json ○ npm run dev
  - The application will be available at http://localhost:3000

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7. Component Documentation

- **Key Components**:

  - **Header**: Displays the navigation bar and search bar.

    - ✦ Props: onSearch (function to handle search queries).

  - **Player**: Controls the music playback.

✦ Props: currentTrack (object containing track
details), onPlay, onPause, onSkip.

o **PlaylistCard**: Displays a playlist with its name and cover image.

✦ Props: playlist (object containing playlist details), onClick (function to
handle playlist selection).

- **Reusable Components**:

  o **Button**: A customizable button component.

  ✦ Props: text, onClick, disabled.

  o **Input**: A reusable input field for forms and

  search. ✦ Props: type, placeholder, value,

  onChange.

## 8. State Management

- **Global State**:
  The Redux store manages the following global states:

  o **user:** Current authenticated user.

  o **player:** Current playing track, playback status (playing/paused), and volume. o

  playlists: User-created playlists.

 o **searchResults:** Results from the search functionality.

- **Local State**:
  Local state is managed using React's useState hook within components. For example,
  the SearchPage component manages the search query input locally.
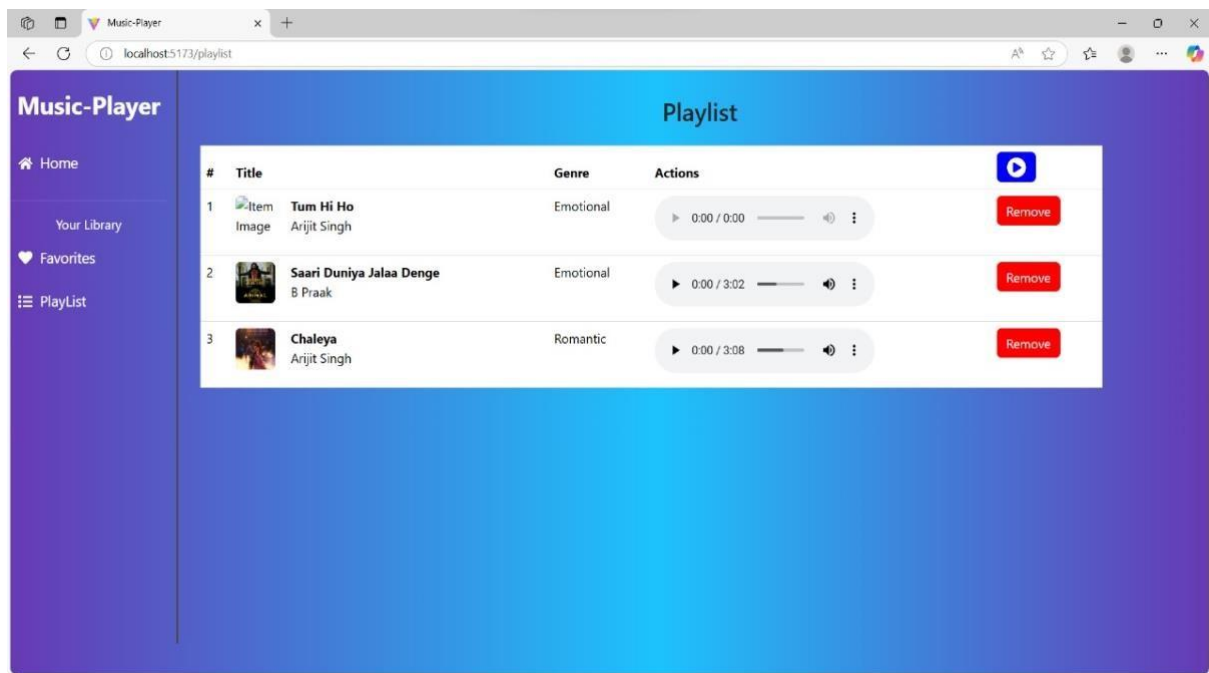
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9. User Interface

- **Screenshots** o **Home Page:** Display featured tracks and recommended playlists.
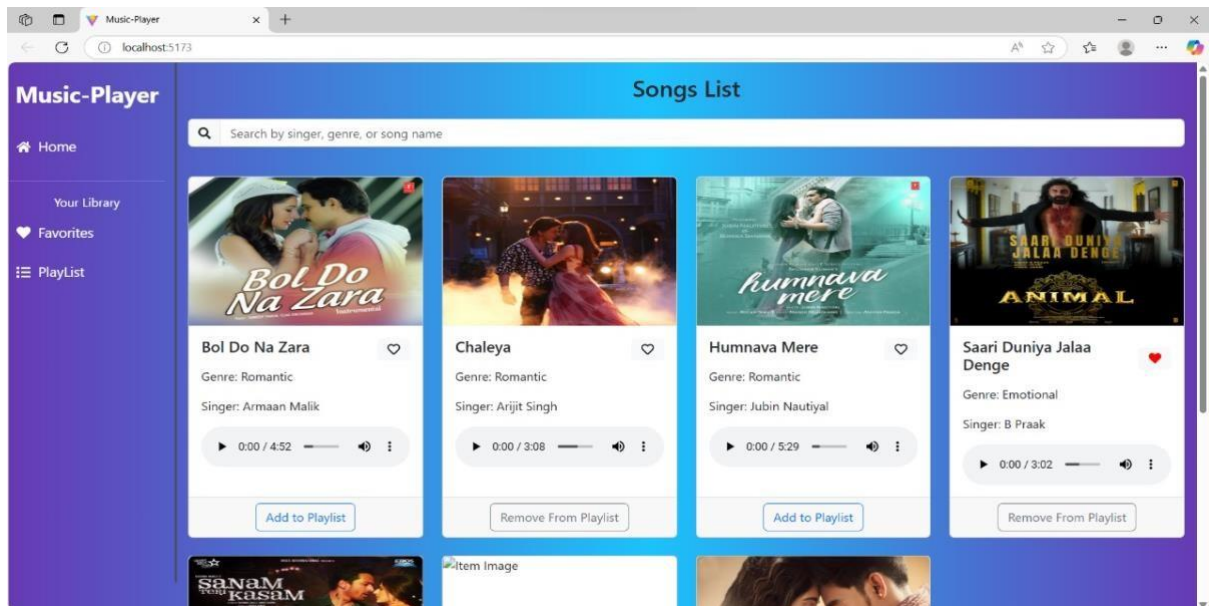
   ○ **Search Page:** Allows users to search for songs, albums, and artists.
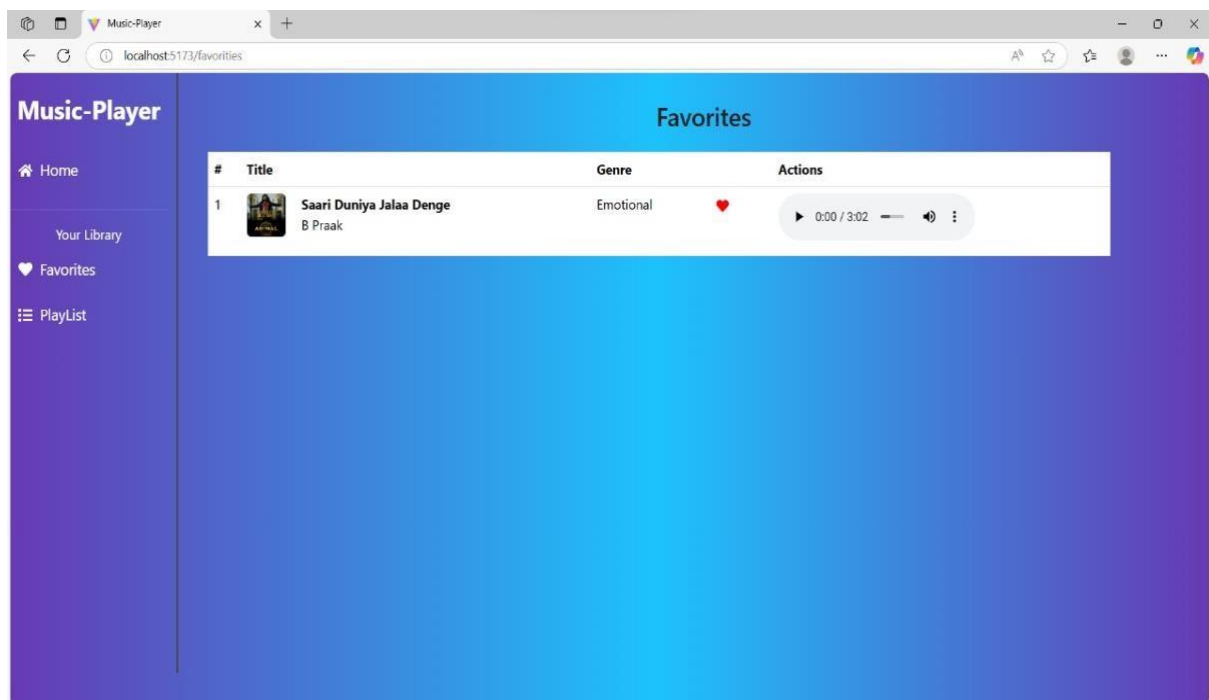
   ○ **Playlist Page:** Displays user-created playlists and allows playlist management.

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10. Styling

- **CSS Frameworks/Libraries**:
  The application uses **Styled-Components** for styling. This allows for modular and scoped CSS within components.

- **Theming**:
  A custom theme is implemented using Styled-Components, with support for light and dark modes.

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11. Testing

- **Testing Strategy**:

  o **Unit Testing:** Using **Jest** and **React Testing Library**.

  o **Integration Testing**: Is performed to ensure that components work together as expected.

  o **End-to-End Testing: Cypress** is used for end-to-end testing of user flows.

- **Code Coverage**:

  o Code coverage is monitored using Jest's built in coverage tool. The current coverage is 85%.

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12. Screenshots or Demo

- **Demo Link:**

  https://drive.google.com/file/d/1XuCQ0SV104KE2qGqwX7m-5Nr3y-KJ3DY/view?usp=drive_link

- **Screenshots:** See section 9 for UI screenshots.

13. Known Issues

- **Issue 1**: The music player sometimes skips tracks unexpectedly.

- **Issue 2**: The search functionality is slow with large datasets.

14. Future Enhancements

- **Future Features**:

  - Add support for user profiles and social sharing. ○ Implement a

    recommendation engine for personalized music suggestions.

  - Add animations and transitions for a smoother user experience.

This documentation provides a comprehensive overview of the **Rhythmic Tunes** project, including its architecture, setup instructions, and future plans.