RhythmicTunes: Your Melodic Companion

(Music Streaming Application)

NAANMUDHALVAN PROJECT REPORT

Submitted by

S.DIVYASRI 222209357

P.NATHIYA 222209373

K.MAHESWARI 222209370

S.RAJESHWARI 222209380

V.VINTHA 222209392

DEPARTMENT OF COMPUTER SCIENCE

TAGORE COLLEGE OF ARTS AND SCIENCE

(Affiliated to the University of Madras)

CLC WORKS ROAD, CHROMPET, CHENNAI – 600 044

APRIL

2022-2025

TITLE

1.PROJECT OVERVIEW

- ## INTRODUCTION

Creating rhythmic music using JavaScript and React opens up a dynamic way to merge technology with creativity. This approach leverages JavaScript for its robust capabilities in handling audio processing and React for building interactive, responsive user interfaces. Together, they can enable users to compose, control, and visualize rhythmic patterns seamlessly.

JavaScript libraries such as Tone.js are excellent tools for generating and manipulating sound. These libraries allow developers to create complex rhythmic beats by scheduling notes, applying effects, and managing tempo. React complements this by offering a framework for designing engaging visualizations—like a virtual drum pad or sequencer—providing an intuitive and immersive music-making experience for users.

For enthusiasts and developers, exploring this fusion of music and code offers an exciting opportunity to innovate and craft unique audio projects, combining technical skills with artistic expression. With these tools, the possibilities for rhythmic compositions are practically limitless! Let me know if you'd like help building an example or diving deeper into any concepts.

1.2 ABSTRACT

Rhythmic music creation using JavaScript and React represents a fascinating intersection of coding and artistry. JavaScript, with its powerful audio processing libraries like Tone.js, enables developers to generate rhythmic patterns, schedule beats, and manipulate sound effects programmatically. On the other hand, React offers a robust framework for building interactive and responsive user interfaces, making it an ideal choice for designing dynamic rhythm-based applications.

By leveraging these tools, developers can craft engaging projects such as virtual drum machines, sequencers, or even live performance tools. The combination of JavaScript's audio capabilities and React's component-based architecture allows for real-time user interaction, enhancing the overall music-making experience. This innovative approach provides musicians, hobbyists, and developers with endless opportunities to explore rhythm and sound in a digital realm, merging creativity with technical expertise.

SYSTEM REQUIREMENT

2.SYSTEM REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

- OS : Windows, Linux, or macos
- Ram : 4GB
- Rom : 500GB

2.2 SOFTWARE REQUIREMENTS

- Server :Express
- Language : Nodejs,react

- Browser : Chrome,Edge

SYSTEM DESCRIPTION

3.SYSTEM DESCRIPTION

3.1 MODULES DESCRIPTION

3.1.1 User interface module

Provides an interactive environment for users to engage with the system. The UI allows users to create and edit rhythms, visualize the patterns, and listen to the generated sounds.

3.1.2 Audio processing module

Handles all audio-related functionalities, including sound generation, manipulation, and playback. This module ensures that the generated rhythm sounds are of high quality and respond in real-time to user interactions.

3.1.3 Rhythm Generation module

Automatically generates rhythm patterns based on user-defined parameters, or provides pre-designed rhythm templates for users to modify and experiment with.

3.1.4 Temp and timing control module

Controls the pace and timing of the rhythm, ensuring synchronization of beats, and enabling the user to adjust the speed and tempo of the generated rhythm.

3.1.5 Sound library module

Provides a collection of pre-recorded audio samples (e.g., drums, percussion, electronic sounds) for users to apply to their rhythm patterns. This module enables users to experiment with different sound textures and instruments.

3.1.6 MIDI Integration module

Integrates with MIDI (Musical Instrument Digital Interface) devices to allow users to create rhythms using physical MIDI controllers, such as drum pads, keyboards, or electronic drum kits.

3.1.7 Performance/Sequencer module

Allows users to arrange rhythm patterns in a timeline, creating a sequence of rhythmic patterns that can be played back in real time, similar to a digital audio workstation (DAW).

3.1.8 User profile and data storage module

This ensures that users' projects and preferences are saved, so they can continue where they left off, either locally or online.

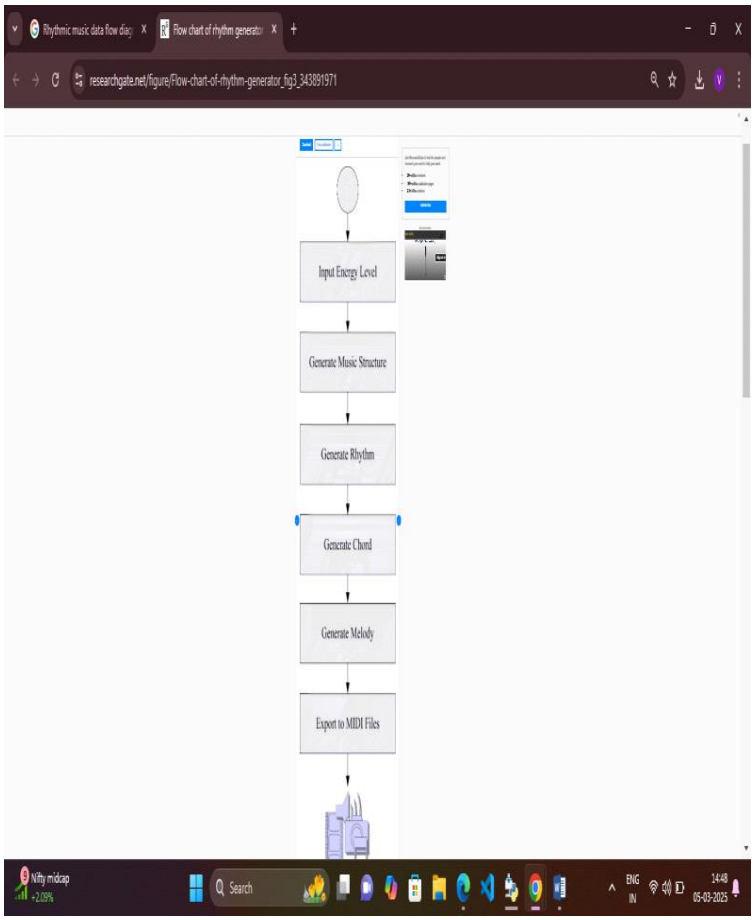
3.1.9 Collaboration module

This optional module allows multiple users to work on rhythmic music projects together, in real-time, making it easier to collaborate on music creation.

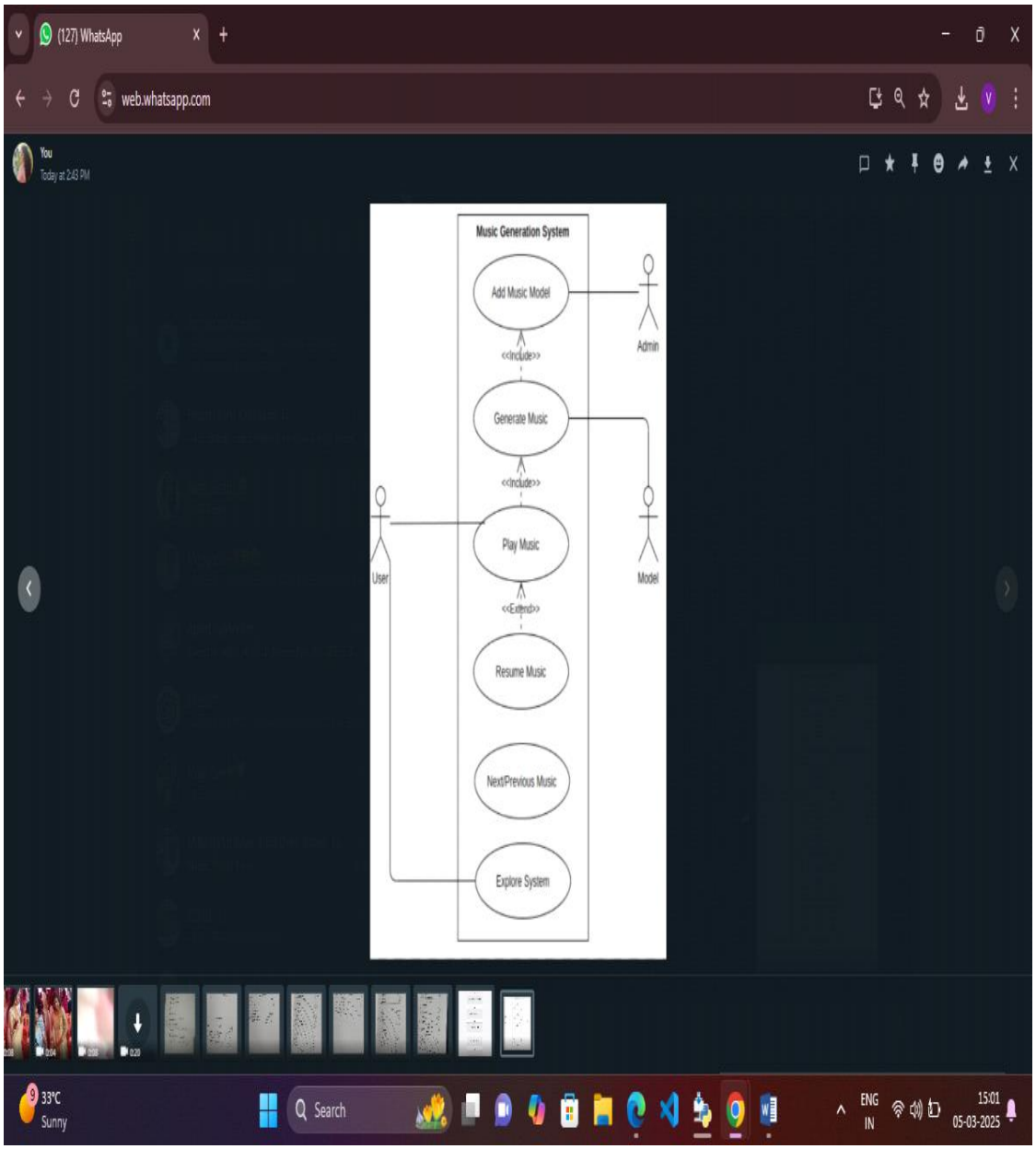
SYSTEM DESIGN

4.SYSTEM DESIGN

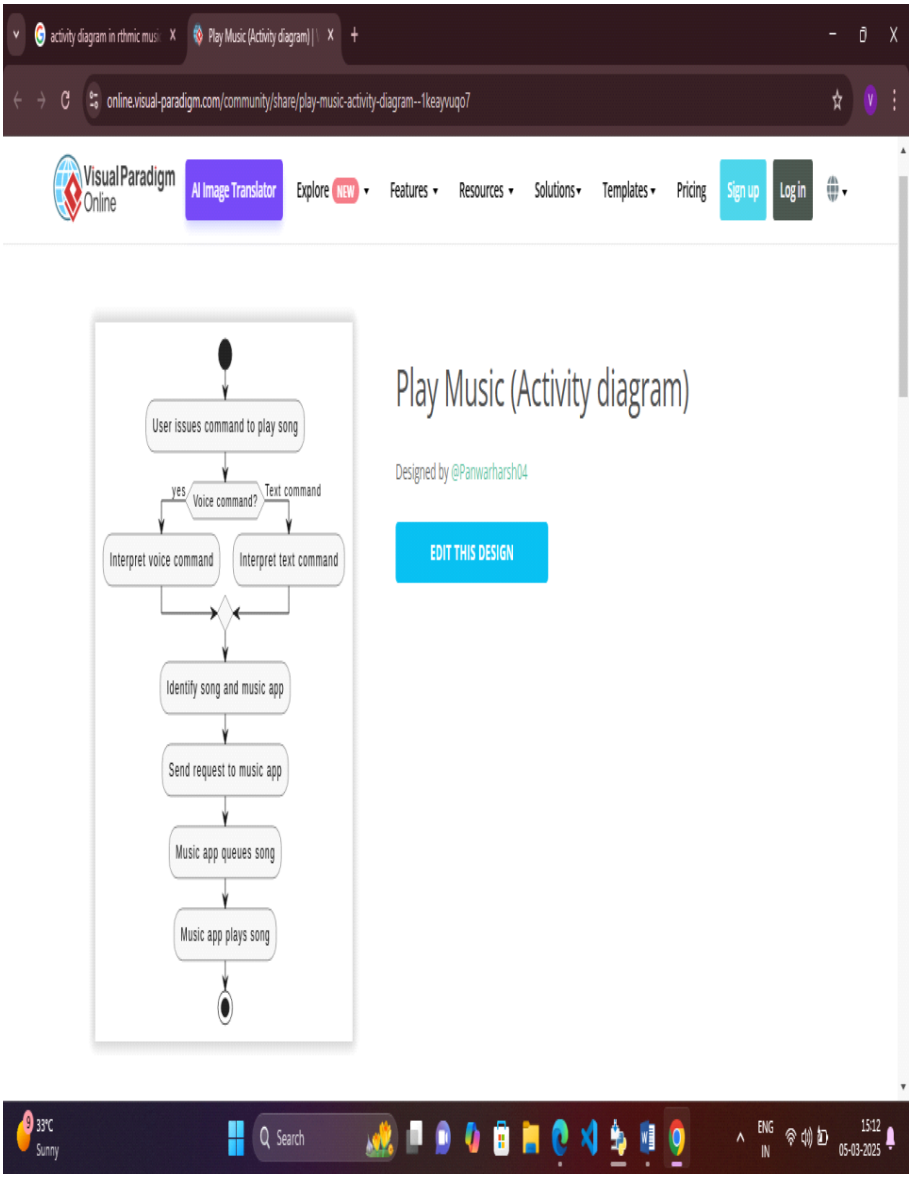
4.1.1 DATAFLOW DIAGRAM



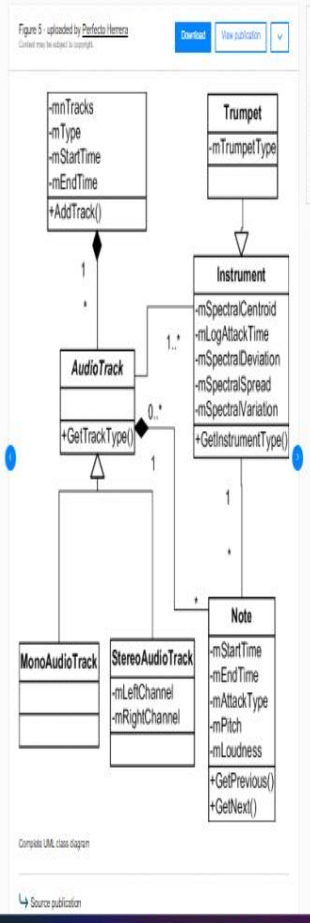
4.1.2 Use case diagram



4.1.3 Activity Diagram


activity diagram in rthmic mus
Play Music (Activity diagram) |
online.visual-paradigm.com/community/share/play-music-activity-diagram--1keayvuqo7
VisualParadigm Online
AI Image Translator
Explore NEW
Features
Resources
Solutions
Templates
Pricing
Sign up
Log in
User issues command to play song
Voice command?
yes
Text command
Interpret voice command
Interpret text command
Identify song and music app
Send request to music app
Music app queues song
Music app plays song
Play Music (Activity diagram)
Designed by @Panwarharsh04
EDIT THIS DESIGN
33°C
Sunny
Search
ENG
IN
15:12
05-03-2025

4.1.4 Class Diagram


-mnTracks
-mType
-mStartTime
-mEndTime
+AddTrack()
Trumpet
-mTrumpetType
Instrument
-mSpectralCentroid
-mLogAttackTime
-mSpectralDeviation
-mSpectralSpread
-mSpectralVariation
+GetInstrumentType()
AudioTrack
+GetTrackType()
1
*
1..*
0..*
1
1
*
*
Note
-mStartTime
-mEndTime
-mAttackType
-mPitch
-mLoudness
+GetPrevious()
+GetNext()
MonoAudioTrack
StereoAudioTrack
-mLeftChannel
-mRightChannel

SYSTEM STUDY

5.SYSTEM STUDY

- The Rhythmic Music System is a specialized platform designed for creating, manipulating, and performing rhythmic patterns in music. It integrates various technologies, including real-time audio processing, rhythm generation, sound synthesis, and collaboration tools to provide users with a seamless, interactive experience. The system's primary goal is to allow users, ranging from

beginners to professionals, to easily create and modify rhythmic music without requiring deep technical knowledge. This study delves into the core components, technologies, and methodologies used in the existing and proposed rhythmic music systems.

- To enable users to compose rhythm patterns using a simple interface, either by selecting pre-made templates or generating new ones from scratch.

- To allow users to modify rhythms and hear the changes instantly, providing immediate feedback during the composition process.

- To offer a variety of sounds and effects that users can apply to their rhythmic patterns.

- To allow users to collaborate in real-time, making adjustments and providing feedback to shared rhythm patterns.

- To design the system such that users with little to no musical background can create rhythms while providing professional-level functionality for experienced musicians.

5.1 EXISTING STUDY

Existing methods for rhythmic music creation include traditional sequencers like FL Studio and Ableton Live, which offer grid-based interfaces for arranging beats. Drum machines and MIDI controllers (e.g., Roland TR-808) are used for creating rhythm patterns through physical inputs. Generative music systems like Pure Data use algorithms to create rhythms automatically, while AI-based systems like OpenAI's MuseNet generate music based on trained data. Web-based tools such as Drumbot offer simple, accessible rhythm creation but with limited features compared to professional software. These methods vary in complexity and accessibility.

5.1.1 DRAW BACK

- **While rhythmic music systems provide a wealth of features and opportunities for music creation, they also come with certain drawbacks that can limit their effectiveness or usability. Below are some key drawbacks of current rhythmic music systems:**

- **Many advanced rhythmic music systems, such as digital audio workstations (DAWs), sequencers, and drum machines, can be overwhelming for beginners due to their complex interfaces and numerous features.**

- **Users, especially those new to music production, may find it difficult to navigate the software or hardware effectively. This can hinder the creative process and lead to frustration, ultimately deterring some users from continuing their musical journey.**

- **Some rhythmic music systems lack full real-time interactivity, meaning users cannot make changes or experiment with rhythms during playback. In**

systems where changes can be made, there's often a delay before they take effect.

- **While music theory provides a solid foundation for understanding rhythm, it can have several drawbacks when applied rigidly to rhythmic music creation.**

• PROPOSED METHOD

- The proposed method in rhythmic music aims to enhance the creative possibilities for musicians and producers by integrating modern technology and advanced music theory. This method focuses on combining traditional rhythmic techniques with new approaches using artificial intelligence (AI), machine learning (ML), and digital music systems to offer more flexibility, spontaneity, and precision in rhythm generation.
- Use AI and machine learning algorithms to generate rhythmic patterns. By training models on vast databases of rhythmic styles across various genres, AI can create new, innovative rhythms, patterns, and beats, tailored to user input or based on learned musical trends.
- Implement real-time modulation of rhythm based on user interaction and improvisation. This would allow musicians to dynamically change the rhythm and tempo while maintaining musical coherence. For example, rhythm could be adjusted by varying the intensity or pace of the beat using touch or gesture-based interfaces.
- Integrate hybrid time signatures and polyrhythms into the rhythmic structure. Many traditional rhythmic systems are based on simple time signatures like 4/4 or 3/4, but more complex time signatures (e.g., 5/8, 7/8) or polyrhythms (simultaneous contrasting rhythms) are commonly used in non-Western music traditions, jazz, and experimental genres.
- The proposed method for rhythmic music creation integrates modern technological advances, such as AI, machine learning, gesture controls, and real-time adaptive systems, to provide a more interactive, flexible, and creative environment for rhythm creation. By allowing for spontaneous rhythm modulation, complex time signatures, real-time feedback, and a personalized experience, this method aims to break the boundaries of traditional rhythmic

composition, opening new possibilities for musicians and producers across genres.

5.2.1 ADVANTAGE

- Rhythmic music systems, which blend traditional music theory with modern technological advancements, offer a wide range of benefits for musicians, producers, and enthusiasts alike. These systems can significantly enhance the creative process, provide more flexibility, and help artists push the boundaries of rhythm and sound. Below are some of the key advantages of rhythmic music systems
- Real-time updates in rhythmic music systems provide several benefits that enhance the music creation and production process. These updates allow musicians to interact with rhythms dynamically, adjust elements instantly, and improve the overall workflow. Below are the key advantages of real-time updates in rhythmic music systems
- One of the significant advantages of modern rhythmic music systems is their ability to reduce errors during music composition, performance, and production. These systems leverage advanced technologies, including AI, machine learning, and precise software tools, to help musicians achieve more accurate and reliable rhythms. Below are the key benefits of reduced errors in rhythmic music
- rhythmic music systems refers to providing enhanced support, user-friendly features, and responsive assistance to users, ultimately ensuring a seamless and satisfying experience when creating or interacting with music. When applied to the context of rhythmic music, improvements in customer service can be achieved through various strategies, including product support, personalized recommendations, user engagement, and continuous updates.

SAMPLE CODING

6.APPENDIX

6.1 SAMPLE CODING

```
import React, { useContext } from 'react'
import Sidebar from './components/Sidebar'
import Player from './components/Player'
```

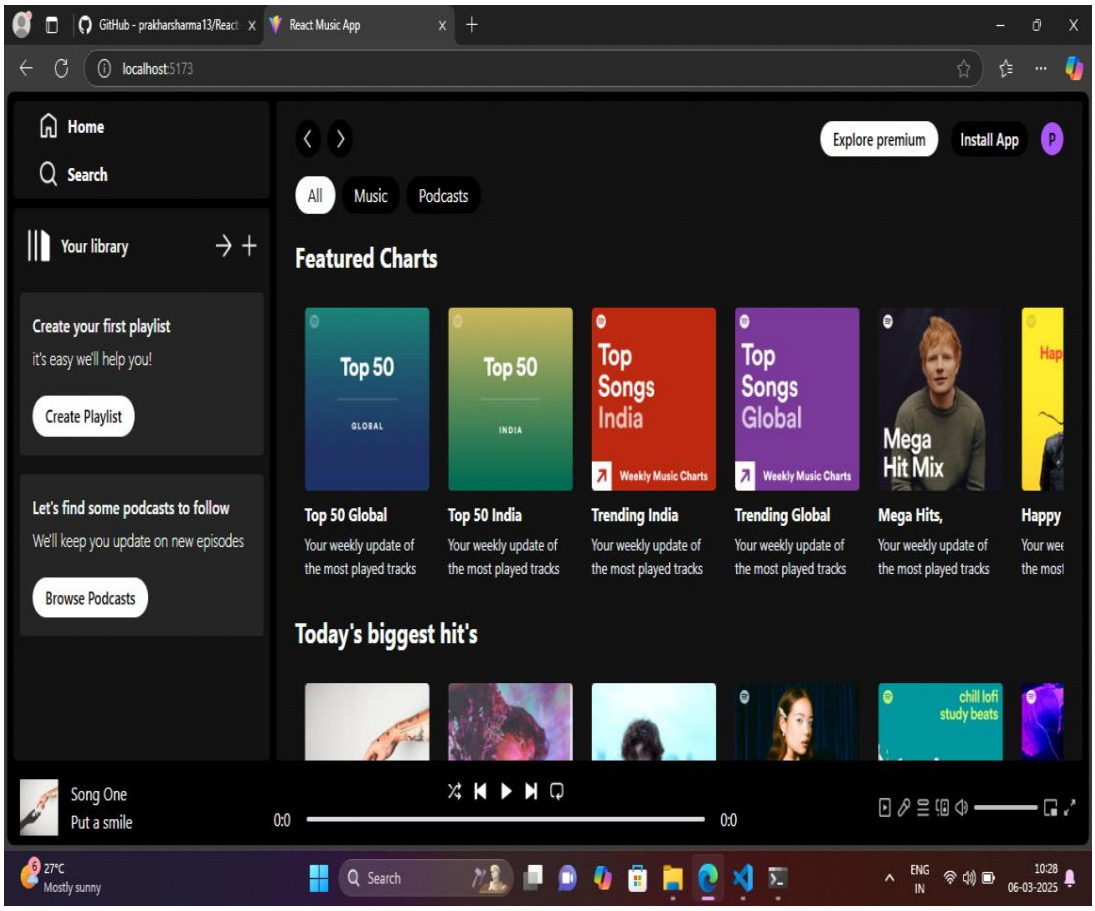
```
import Display from './components/Display'
import { PlayerContext } from './context/PlayerContext'

const App = () => {
  const {audioRef, track} = useContext(PlayerContext)
  return (
    <div className='h-screen bg-black'>
      <div className="h-[90%] flex">
        <Sidebar />
        <Display />
      </div>
      <Player />
      <audio ref={audioRef} src={track.file}
preload='auto'></audio>
    </div>
  )
}

export default App
import { StrictMode } from "react";
import { createRoot } from "react-dom/client";
import App from "./App.jsx";
import "./index.css";
import { BrowserRouter } from "react-router-dom";
import PlayerContextProvider from
"./context/PlayerContext.jsx";
```

```
createRoot(document.getElementById("root")).render(
  <StrictMode>
    <BrowserRouter>
      <PlayerContextProvider>
        <App />
      </PlayerContextProvider>
    </BrowserRouter>
  </StrictMode>
);
```

6.2 SCREENSHOT


GitHub - prakharsharma13/React
React Music App
localhost:5173
Home
Search
Your library
Create your first playlist
it's easy we'll help you!
Create Playlist
Let's find some podcasts to follow
We'll keep you update on new episodes
Browse Podcasts
Explore premium
Install App
P
All
Music
Podcasts
Featured Charts
Top 50
GLOBAL
Top 50 Global
Your weekly update of the most played tracks
Top 50
INDIA
Top 50 India
Your weekly update of the most played tracks
Top Songs India
Weekly Music Charts
Trending India
Your weekly update of the most played tracks
Top Songs Global
Weekly Music Charts
Trending Global
Your weekly update of the most played tracks
Mega Hit Mix
Mega Hits,
Your weekly update of the most played tracks
Happy
Today's biggest hit's
chill lofi study beats
Song One
Put a smile
0:0
0:0
27°C
Mostly sunny
Search
ENG
IN
10:28
06-03-2025