Music Dashboard Documentation

Overview

This project is a full-stack music analytics dashboard that lets users:

- View top tracks globally, by genre, by artist, or by release date range
- Filter and sort tracks by genre, artist, and time period
- See key info: track name, artist, release date, and streams

The backend is built with Flask and connects to the Chartmetric API for real music data. The frontend uses React and Material UI for a modern, interactive UI.

Backend (Flask)

Main Features

- /api/top-tracks: Returns the top 50 global tracks.
- /api/genres: Autocomplete endpoint for genres.
- /api/artists: Autocomplete endpoint for artists (from a fixed list).
- /api/tracks-by-filters: Returns tracks filtered by selected genres and/or artist.
- /api/tracks-by-release-date: Returns tracks filtered by release date range (Last 1 Week, Month, Year, All Time).

Key Functions and Endpoints

- Authentication: Uses a Chartmetric refresh token to get an access token for API calls.
- Genre & Artist Filtering: Accepts genre IDs and artist IDs as query params, fetches and merges results, deduplicates tracks by name, and sorts by streams/score.
- Release Date Filtering: Accepts a human-readable filter option, calculates the correct date, and fetches tracks released after that date.

Example Endpoint Usage

- `GET /api/top-tracks?order=desc`
- `GET /api/genres?search=pop`
- `GET /api/artists?search=ed`
- `GET /api/tracks-by-filters?genre_ids=3648,3852&artist_id=3648`
- `GET /api/tracks-by-release-date?filter_option=Last%201%20Month`

Data Format Returned

Each track object includes:

```
{
  "track": "Song Name",
  "artist": "Artist Name",
  "release_date": "YYYY-MM-DD",
  "streams": 1234567
}
```

Frontend (React + Material UI)

Main Features

- Genre Filter: Multi-select autocomplete with checkboxes, powered by backend `/api/genres`.
- Artist Filter: Autocomplete, powered by backend `/api/artists`.
- Release Date Range Filter: Dropdown for "Last 1 Week", "Last 1 Month", "Last 1 Year", "All Time" (calls `/api/tracks-by-release-date`).
- Sorting: Dropdown and toggle for sorting by streams, playlist count, popularity, or playlist reach, ascending or descending.
- Table Display: Shows top 50 tracks with columns: Track, Artist, Release Date, Streams.

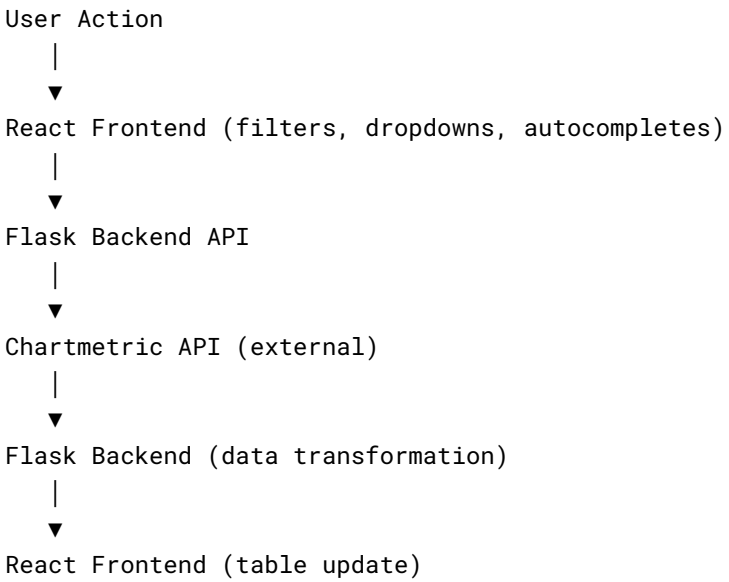
How Filtering Works

- Genre and Artist: When either or both are selected, the frontend fetches from `/api/tracks-by-filters`.
- Release Date Range: When a range is selected, the frontend fetches from `/api/tracks-by-release-date` and shows those results.
- Sorting: Always applied client-side to the currently displayed data.

Example UI Flow

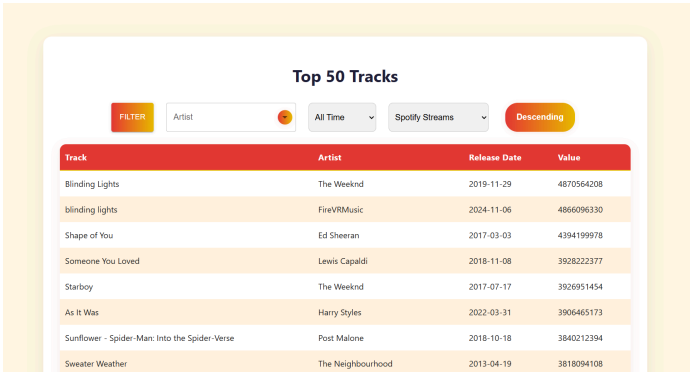
1. User types in the genre box, selects "Pop" and "Rock".
2. User types in the artist box, selects "Ed Sheeran".
3. The sort by dropdown (streams, Spotify playlists, popularity, etc.) is used to sort the returned tracks by the selected metric and we can do it either ascending or descending.
4. Table updates to show top tracks by Ed Sheeran in Pop/Rock genres
5. If a user wants to see, for example, the most streamed songs released in the last month, they select "Last 1 Month" in the release date filter and "Streams" in the sort dropdown, and the dashboard will show the top 50 songs released in that period, sorted by streams.

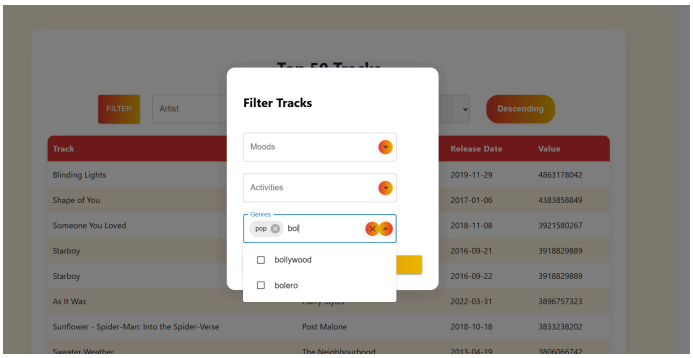
Data Flow Diagram

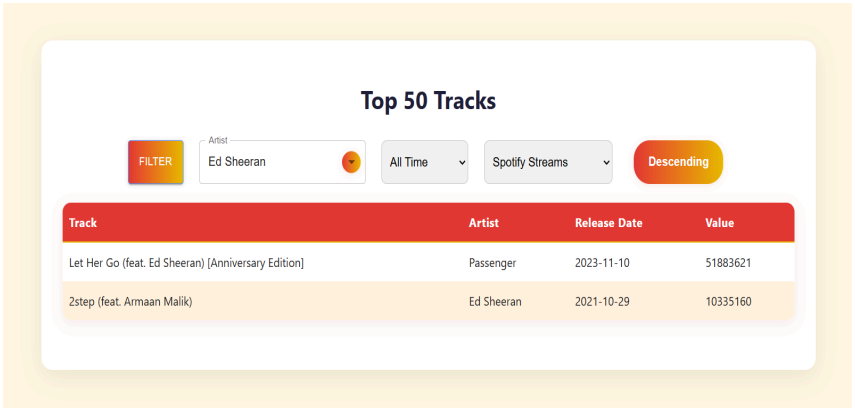


How to Run

1. Backend:
    - Install dependencies: `pip install flask flask-cors requests`
    - Run: `python app.py`
2. Frontend:
    - Install dependencies: `npm install`
    - Run: `npm start`
    - Visit `http://localhost:3000`


Top 50 Tracks
FILTER
Artist
All Time
Spotify Streams
Descending
Track
Artist
Release Date
Value
Blinding Lights
The Weeknd
2019-11-29
4870564208
blinding lights
FireVRMusic
2024-11-06
4866096330
Shape of You
Ed Sheeran
2017-03-03
4394199978
Someone You Loved
Lewis Capaldi
2018-11-08
3928222377
Starboy
The Weeknd
2017-07-17
3926951454
As It Was
Harry Styles
2022-03-31
3906465173
Sunflower - Spider-Man: Into the Spider-Verse
Post Malone
2018-10-18
3840212394
Sweater Weather
The Neighbourhood
2013-04-19
3818094108


Filter Tracks
Moods
Activities
Genres
pop
bol
bollywood
bolero
Descending
Track
Release Date
Value
Blinding Lights
2019-11-29
4863178042
Shape of You
2017-01-06
4383858849
Someone You Loved
2018-11-08
3921580267
Starboy
2016-09-21
3918829889
Starboy
2016-09-22
3918829889
As It Was
2022-03-31
3896757323
Sunflower - Spider-Man: Into the Spider-Verse
Post Malone
2018-10-18
3833238202


Top 50 Tracks
FILTER
Artist
Ed Sheeran
All Time
Spotify Streams
Descending
Track
Artist
Release Date
Value
Let Her Go (feat. Ed Sheeran) [Anniversary Edition]
Passenger
2023-11-10
51883621
2step (feat. Armaan Malik)
Ed Sheeran
2021-10-29
10335160