



Team: Joe Selvanandan, Bryan Chan, Ben Cohen, Ryu Morgan, Joe Fang, Xingyan Huo, Trung Nguyen

Advisor: Milad Toutouchian

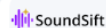
Introduction

Our AI-powered platform aims to help you find songs that resonate with you. Whether you're searching for heartfelt ballads about love or upbeat tracks, our system aims to deliver semantically similar songs tracks based on a given text-input or audio query.

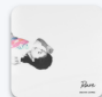
We combine advanced language models to understand lyrics and deep audio analysis using Mel-Frequency Cepstral Coefficients (MFCC) to capture audio. You can search by typing a theme or providing a recorded or uploaded audio and our tool will return back the most similar sounding tracks from our database.

Methodology

- A dual-modal architecture combines text-based semantic search and audio-based acoustic matching.
- Text search uses LLM-generated semantic embeddings of lyrics and queries (stored in Chroma DB), matched via cosine similarity.
- Audio search extracts MFCCs from user audio, comparing them against a database using a sliding window technique for acoustic similarity.
- This integration of semantic and acoustic analysis provides a flexible and intuitive music search



Results for "Heartbreak"



Lose You To Love Me

Selena Gomez

Score: 49.86

Show Relevant Lyrics



Rolling in the Deep

Adele

Score: 49.43

Show Relevant Lyrics



Cupid (Twin Version)

FIFTY FIFTY (피프티피프티)

Score: 48.79

Show Relevant Lyrics



Too Good at Goodbyes

Sam Smith

Score: 48.19

Show Relevant Lyrics



exile

Taylor Swift

Score: 47.36

Show Relevant Lyrics

Text Audio

Analyze Song Lyrics

Heartbreak

Love Christmas Wonder

Upload audio file

Choose File | No file chosen

Record

0:00 / 0:03

Use Recording as Query

Key Features

- **Vector-Based Embeddings:** Lyrics are converted to vectors for semantic meaning comparison.
- **Spotify Integration:** Access to song metadata and access song directly
- **Audio Feature Analysis (MFCC):** Discover songs based on acoustic similarity.
- **Audio-Based Search:** Query by recording or uploading audio, with transcription or MFCC analysis.
- **Lyric Summarization:** Generate AI-powered summaries of song lyrics.

Next Steps

- Improve audio-based search for fuzzy/inconsistent user recorded audio
- Create dedicated and comprehensive results page for audio-based queries
- Allow audio-based search to also search based on semantics rather than just similarity
- Develop a purpose built music specific AI model that is trained on lyrics and finding themes.

Problem Statement

Streaming platforms offer millions of songs, making it hard to find music that fits a specific mood or theme. Current search methods, relying on metadata or exact titles and can miss the emotional essence of songs. Listeners struggle to find music for abstract ideas like "longing" or "resilience." Our tool provides a more intuitive and personal way to discover music.