

**ENHANCING MUSIC MIXING EFFICIENCY: A KEY AND BPM-DRIVEN APPROACH FOR
SONG MATCHING AND DATABASE MANAGEMENT**

MIXSYNC: SONG KEY & BPM FINDER

An Application Dedicated for Mashup Artists

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CHAPTER I

INTRODUCTION AND BACKGROUND OF THE STUDY

Have you ever found yourself wondering how you can efficiently determine which song would complement another without making them sound too different from their original versions? One common approach that mashup artists use is to analyze the key and BPM (beats per minute) of the songs. As a mashup artist myself, I prefer to mix songs that share the same key and BPM, or at least are close in these attributes. By "close", I specifically mean that the songs should be at least be no more than 2 keys apart and no more than 15 BPMs apart, although a difference of 5 BPMs is preferable.

However, finding songs that meet these criteria can be quite challenging. You might need to sift through your entire music database—if you even have one—scrolling through numerous irrelevant tracks before stumbling upon a suitable match. If you're not fortunate, you may have to rely on available song key and BPM finders, which often provide inaccurate information. This means you must first verify whether these tools have correctly identified the key and BPM, adding more time and effort to the process.

The key and BPM (beats per minute) of a song are fundamental elements of its musical composition and structure. The key refers to the tonal center or the pitch around which the song revolves melodically and harmonically. They are typically identified by letters such as C, D, E, etc., followed by major (e.g., C major) or minor (e.g., A minor) to denote the mood and tonality. On the other hand, BPM denotes the tempo or speed at which the song is played, measured in beats per minute. It defines how fast or slow the rhythm of the song progresses, influencing its energy level and feel. Together, the key and BPM of a song provide essential information for musicians, DJs, producers, and listeners alike. They help in understanding the mood, style, and compatibility of songs for mixing, mashups, or creating cohesive playlists. Analyzing and knowing these elements enable greater creativity and precision in music production and performance, ensuring that musical pieces harmonize seamlessly or contrast effectively when desired.

With this application, mashup artists will easily and efficiently find songs that would fit with a certain song by providing accurate information on the keys and BPMs of various songs. The application is designed to efficiently match songs in terms of their key and BPM, solving common issues with existing tools that often provide inaccurate data. It includes a robust system to handle songs with multiple keys or BPMs, ensuring that users can find the best matches even when dealing with complex tracks. The application features a comprehensive database meticulously curated through personal analysis and verification by knowledgeable contributors, minimizing inaccuracies. Users can sort songs by title, key, BPM, artist, origin, type, and year, and filter results by specific song types like Anime or K-Pop. Additionally, the application implements a threshold feature that allows users to search for songs based on the key and BPM threshold that the user will specify as well as the selected song's BPM and key, respectively. This ensures that mashup artists can maintain a harmonious and cohesive sound in their mixes. The application's functionalities are tailored to enhance the efficiency of music mixing by providing reliable and detailed musical information.

OBJECTIVES OF THE STUDY

The application aims to accomplish the following:

- ❖ To create an application that provides accurate information of the keys and BPMs of various songs.
- ❖ To efficiently find songs that will match a certain song in terms of their key and BPM.
- ❖ To implement a robust system to handle songs with multiple keys or BPMs
- ❖ To devise a method for handling BPMs within the specified threshold effectively
- ❖ To verify and validate key and BPM data accuracy to mitigate inaccuracies

STATEMENT OF THE PROBLEM

The study attempts to know the efficiency of MixSync as an application to enhance music mixing. Specifically, it seeks to answer the following questions:

1. How is it different from any other song & key bpm finders available?
2. What specific issues does the application aim to solve regarding key and BPM management?
3. How do you plan to handle songs with multiple keys or BPMs?

Causes data redundancy: Multiple records for songs to differentiate k/b changes.

4. How are you going to handle the BPMs if you have a threshold of 70 BPM to 139 BPM?

Formula: $\text{range}((\text{SONG_BPM}/2) \pm 15)$

5. What are the possible issues that you see ahead and how do you plan to solve them?

SCOPE AND DELIMITATIONS

The scope of the application includes the development of a robust database that accurately stores key and BPM (beats per minute) information for a wide range of songs. Unlike existing tools prone to inaccuracies, this database will be meticulously curated through personal analysis and verification by knowledgeable contributors. The application will feature a comprehensive sorting method allowing users to organize songs by title, key, BPM, artist, origin, type, and year, with options for both ascending and descending order. Users will have the flexibility to filter results by specific song types, such as Anime or K-Pop, using checkboxes. Additionally, the application will implement a threshold feature enabling users to search for songs within ± 15 BPM of a selected song's BPM and ± 2 keys of its key.

Despite its functionalities, the application has certain limitations. It does not facilitate the actual creation of mashups; rather, it focuses on providing accurate data to assist in the process. Furthermore, it does not claim ownership of the songs stored within its database, which are sourced from publicly available information and contributed by users. Therefore, any legal or copyright issues pertaining to the songs themselves are not the responsibility of the application. These delimitations ensure a clear focus on data accuracy and usability while maintaining ethical and legal standards in music information management.

SIGNIFICANCE OF THE STUDY

Mashup Artists. These artists can easily find songs that fit well together in terms of key and BPM, enhancing the cohesiveness and harmony of their mixes. With a reliable database of keys and BPMs, the information provided can be trusted, reducing the time spent on manual verification.

DJs. This application can be used to find songs that match their current track's key and BPM, ensuring smooth transitions during live sets. The ability to sort and filter songs by various attributes helps DJs curate and organize their playlists more effectively.

Music Producers. This application can discover tracks with specific keys and BPMs for sampling, remixing, or integrating into new productions. Its precise data helps producers experiment with different musical elements, fostering innovation and creativity.

Music Educators. This application can demonstrate key and BPM relationships to students, providing practical examples of harmonic and rhythmic compatibility. Curating song lists that fit specific educational goals are made easier, aiding in developing music theory and production courses.

Music Enthusiasts. Music lovers can create playlists with songs that are harmonically and rhythmically compatible, enhancing their listening experience. The application helps enthusiasts explore new songs that fit their preferred musical criteria, broadening their musical horizons.

Event Planners. This application can select music that maintains a consistent mood and energy level, crucial for setting the right atmosphere at events. Its sorting and filtering capabilities allow for quick and efficient music selection, saving time during event preparations.

Future Researchers. The application provides a meticulously curated and accurate database of song keys and BPMs, enabling efficient data collection, sorting, and filtering for comprehensive and reliable music research. This facilitates advanced analysis, trend identification, and educational research while supporting collaborative efforts through data sharing and contributions.

FUNCTIONALITIES

A. Database with Accurate Key and BPM

Some song key & bpm finders available on the Internet (e.g. TuneBat, SongBPM) provides inaccurate information more specifically with keys. As someone who personally analyzed the songs with the help of other people,

B. Sorting Method

Title, Key, BPM, Artist, Origin, Type, Year

Order: Ascending, Descending

Checkbox: You have an option to select whether to show a specific/multiple type/s of song only (e.g. Anime, K-Pop, etc.).

C. Threshold

± 15 BPM from the song's BPM

± 2 keys from the song's key

DEFINITION OF TERMS

- ❖ **TITLE.** The name of the song.
- ❖ **KEY.** Refers to the tonal center or the pitch around which the song revolves melodically and harmonically. C, C#, D, D#, E, F, F#, G, G#, A, A#, B.
- ❖ **BPM.** The number of beats per minute of the song – having the lowest at 70, and the highest being 139.
- ❖ **PART.** Specifies the part of the song that is being described of the key and BPM such as Intro, Verse, Pre-chorus, Chorus, Post-chorus, Bridge. This will be used for handling key and BPM changes.
- ❖ **ARTIST.** The name of the artist.
- ❖ **ORIGIN.** Specifies if the particular song is being used as a soundtrack for a series, movie, or drama. It includes categories such as Anime Title, Movie Title, Drama Title, and Series Title.
- ❖ **TYPE.** Specifies the type of song. Anime, J-Pop, K-Pop, Western, OPM.
- ❖ **YEAR.** Specifies what year the song was released. This will be used by mashup artists who are planning to make year-end mashups.

CHAPTER II

REVIEW OF RELATED LITERATURE

Tunebat.com is an online platform designed to assist musicians, DJs, and music enthusiasts in analyzing and discovering music. The website provides a comprehensive database where users can search for songs and access detailed information about their musical attributes, including key, BPM (beats per minute), energy, danceability, and more. Tunebat's primary feature is its powerful search tool, which allows users to find tracks that match specific criteria, such as songs in the same key or with a similar BPM, facilitating seamless music mixing and mashups. Additionally, Tunebat offers a key and BPM analyzer where users can upload their own tracks to obtain accurate readings of these attributes. This makes it an invaluable resource for those looking to enhance their music production and performance by ensuring harmonic compatibility and rhythmic consistency between tracks.

SongBPM.com is an online service that provides users with quick and accurate information about the beats per minute (BPM) of a vast array of songs. Designed for DJs, musicians, dancers, and music enthusiasts, the website allows users to search for any song by title or artist to find its BPM and key. This information is crucial for creating smooth transitions between tracks, ensuring consistent pacing in performances, or simply understanding the tempo of favorite songs. In addition to its search functionality, SongBPM.com offers a clean, user-friendly interface that makes it easy to navigate and retrieve BPM data efficiently. The site's comprehensive database and straightforward approach make it an essential tool for anyone involved in music mixing, production, or analysis.