# VISUALISING CHORD PROGRESSIONS IN MUSIC COLLECTIONS: A BIG DATA APPROACH

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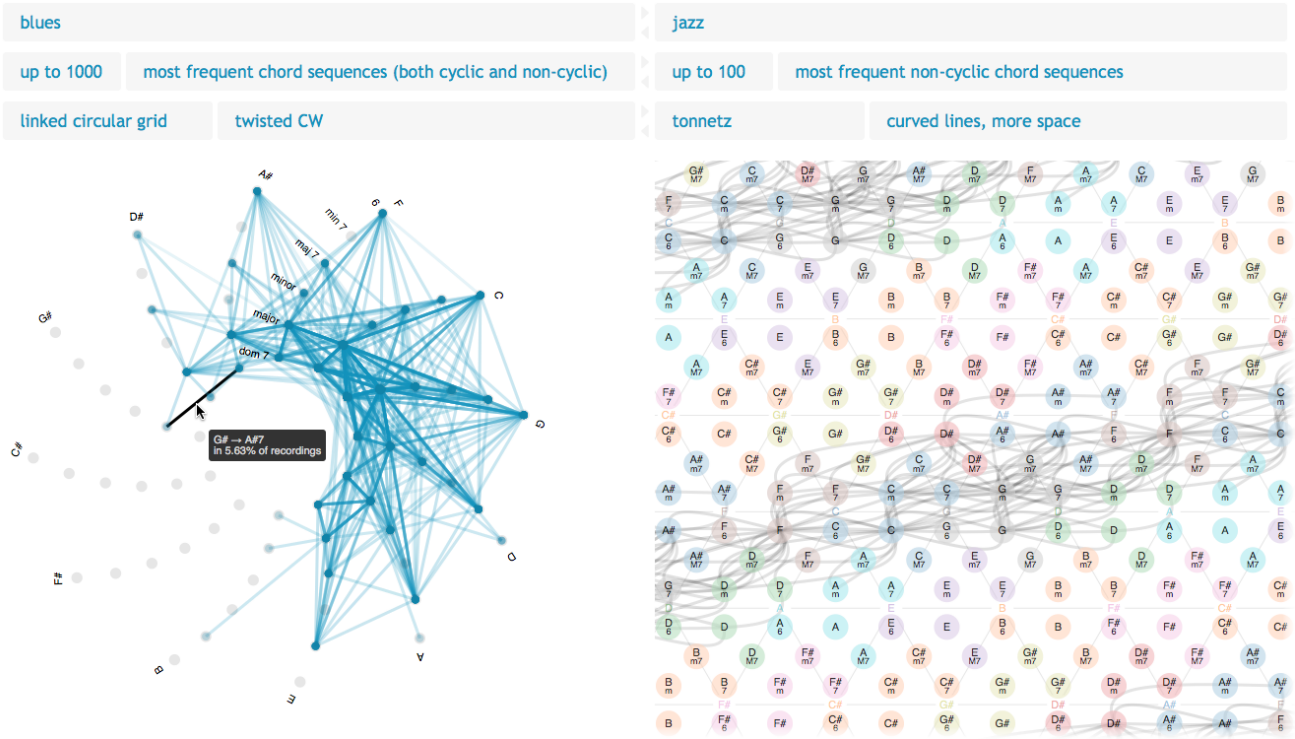


**Figure 1**. Interface of the chord progressions visualising tool.

## ABSTRACT

The analysis of large datasets of music audio and other representations entails the need for techniques that support musicologists and other users in interpreting extracted data. We explore and develop visualisation techniques of chord sequence patterns mined from a corpus of over one million tracks. The visualisations use different representations of root movements and chord qualities with geometrical representations, and mostly colour mappings for pattern support. The presented visualisations are being developed in close collaboration with musicologists and can help gain insights into the differences of musical genres and styles as well as support the development of new classification methods.



## 1. THE NEED FOR LARGE-SCALE MUSIC DATA VISUALISATION

In the Digital Music Lab [1] project we work on the automatic analysis of large audio databases that results in rich annotations for large corpora of music. The musicological interpretation of this detailed data from thousands of pieces is a challenging task that can benefit greatly from specifically designed configurable visualisation. Most existing big music data visualisation focuses on cultural attributes, mood, or listener behaviour whereas we are focusing on attributes characterising the music content itself (e.g. chords, keys, transcriptions, etc.).

## 2. THE DATASETS

In our ongoing work we explore chord sequence patterns generated by sequential pattern mining (CM-SPADE algorithm [1]) of more than one million tracks in the "I Like Music" commercial music collection [2]. We design new visual methods that summarise chord patterns including

[1] http://dml.city.ac.uk/

chord types, chroma and circle-of-fifths facets, enabling musicologists to answer and develop questions relating to the structure of chord patterns and their frequency.

## 3. VISUALISATION TECHNIQUES

We apply and adapt existing techniques including origin-destination matrices [3], parallel coordinate plots [4] and Tonnetz-based diagrams [5]. Thereby we provide musicologists with a tool that allows them to explore root movement and chord qualities.

The interface (Figure 1) consists of two independent panels with controls to choose music genre, number of chord sequences to show, type of these sequences (non-cyclic, cyclic or both), visualisation technique to use and its configuration. Such layout encourages the comparison between different representations of a corpus highlighting complimentary musical aspects, and emphasizes differences between datasets, here representing different genres.

## 4. APPLICATION

We explore the benefits and limitations of our approaches based on preliminary user testing. We find that differences between chord patterns of different genres, e.g. rock vs. jazz, are clearly identifiable and can be used to generate hypotheses for the study of individual pieces, further statistical investigations or new data processing and visualisation. In this way, the proposed visualisations can complement and support related methods for automatic genre classification (e.g. [6]). Our designs will adapt as user needs are established through ongoing visual exploration. Means of aggregating, focusing and filtering by selected characteristics (such as key, melodic patterns etc.) will be added as we develop our design for the visualisation of chord patterns in close collaboration with musicologists.

More details are available at dml.city.ac.uk/csvd.

## 5. ACKNOWLEDGEMENTS

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