MusicDiffVision
Visualising Differences in Music Encodings

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Introduction

The collation of musical sources to establish their historical relationships is a foundational, yet complex, aspect of music philology. It is used to create scholarly editions of musical works. A preliminary phase involves the **systematic comparison** of manuscripts to identify variants. We present a web-based application that addresses this phase by providing a comparative overview of **multiple MEI encodings**. Through a variety of visualisation techniques, it visualises the differences between the encodings, allowing researchers to locate and analyze key areas of divergence. We use two methods to create the visualisations, the **force-directed dynamic network layout** of `d3.js` and the **neighbor-joining algorithm** [2].

How It Works

1. **Data Preparation** Start with MEI encodings of a musical work's different versions. These files must be preprocessed into the required `musicdiff` format [1].
2. **Upload Process** Upload the generated `musicdiff` files to the web application via the main control board (Fig. 1).
3. **Visualisation** Select a visualisation type, either a network or a tree diagram. Each can be computed globally (for the entire piece) or locally (for a specific passage).
4. **Exploration** Use the interactive timeline (Fig. 4) to observe how the relationships between sources dynamically evolve throughout the musical work.

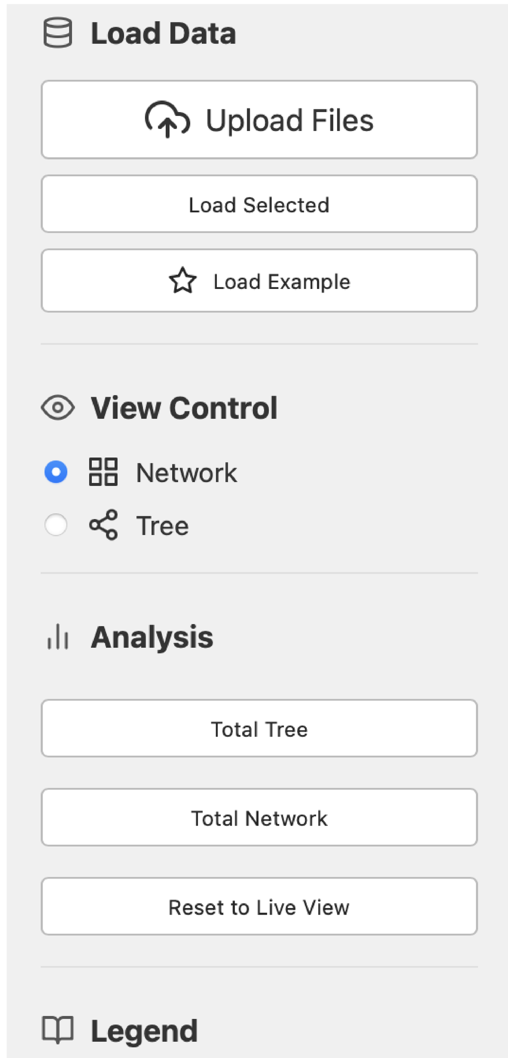

Figure 1: The Main Control Board. You can upload files or use an example and change the visualisation method.

Dynamic Network Visualisation

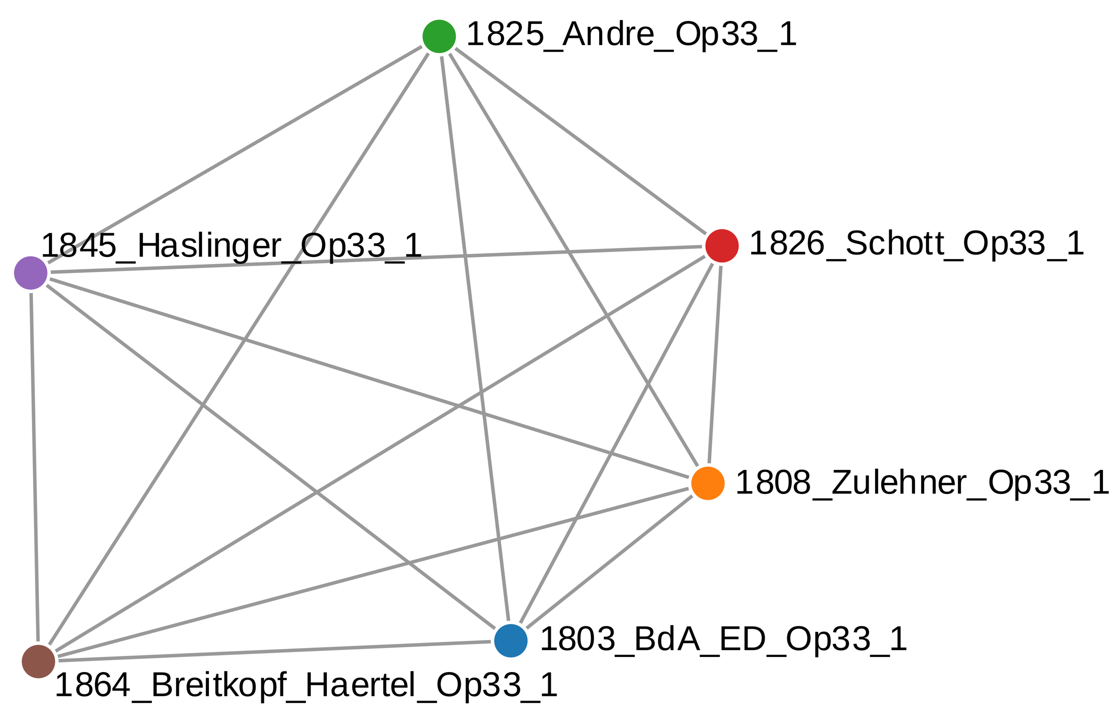

Figure 2: A dynamic network created for six sources of Beethoven's Bagatelles Op. 33.

Neighbor-Joining Tree Visualisation

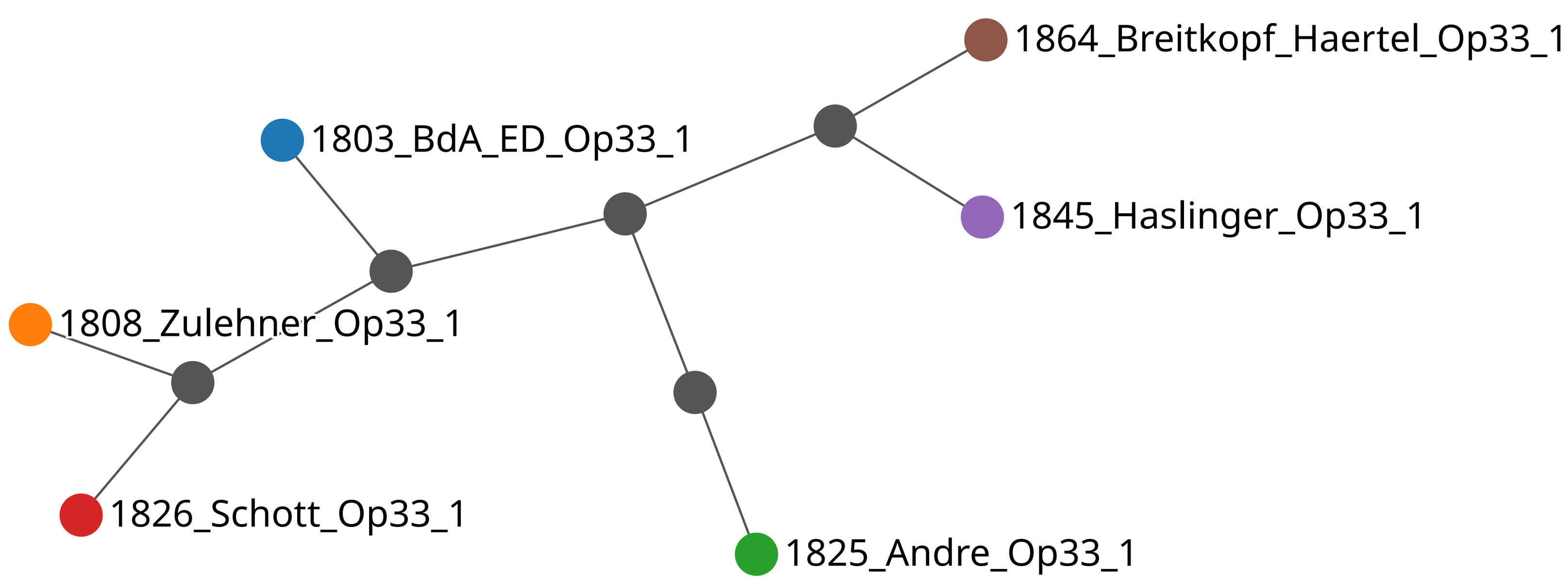

Figure 3: The Neighbor Joining Tree for the same six sources.

Timeline Synopsis

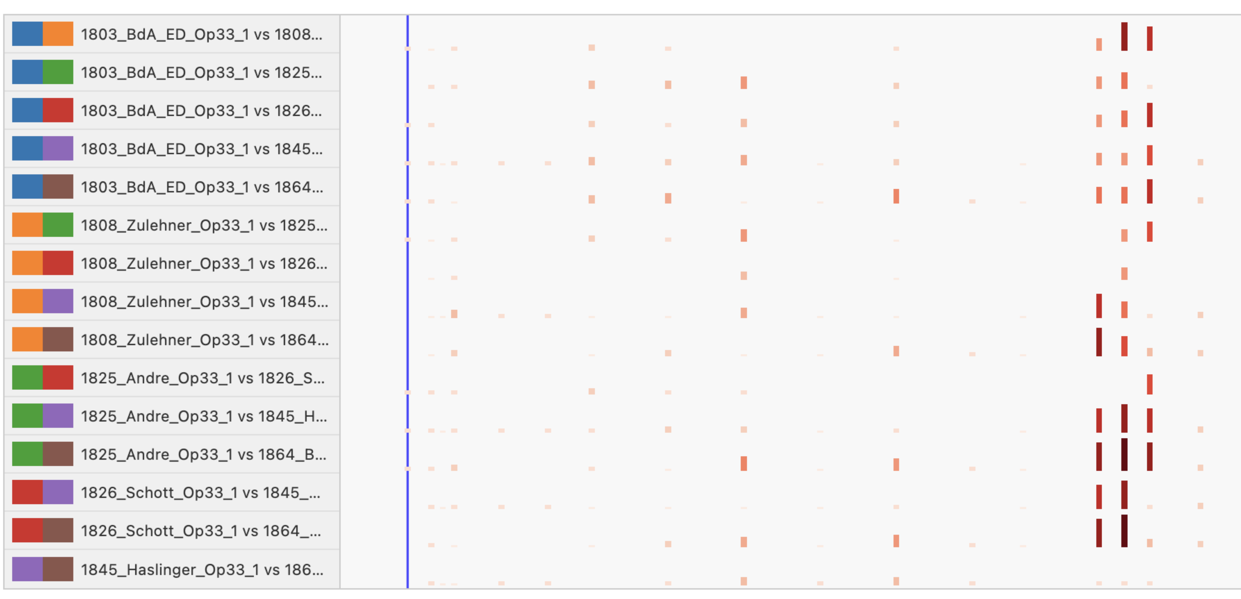

Figure 4: The scrollable timeline visualises the number of differences between each pair of editions at each beat. On the left the colorcoded pairs of editions are listed.

Discussion & Future Research

- **These are visualisations of different similarity concepts, not historical stemmata.** The neighbor-joining algorithm generates a tree that visually resembles a *stemma*. However, this is a model of computational similarity, not historical descent. The same is true for the network visualisation. This is evident as the tree's structure does not align with the known chronological publication dates of the sources in the example.
- **It's purpose is overview.** The tool's primary purpose is to visualise these complex relationships and discrepancies. It helps researchers identify „zones of interest"—such as a non-chronological grouping—that require closer scholarly analysis.
- **It can be helpful in various contexts.** Future work could use the tool for tasks of philology, check its value in finding **contamination**, and experiment with its use for evaluating **automatic music transcriptions** via OMR.

Try It Out

Scan the QR code to get the to the web app directly. All files and the poster are available at the DOI `https://doi.org/10.17605/OSF.IO/CZMW8`.

References

[1] F. Foscarin, R. Fournier-S'Niehotta, and F. Jacquemard. "A diff procedure for music score files". In: *Computation and visualization of the differences between two music score files. 6th International Conference on Digital Libraries for Musicology (DLfM)*. Den Haag, November 2019, pp. 7–13. URL: `https://inria.hal.science/hal-02267454v2`.

[2] N. Saitou and M. Nei. "The neighbor-joining method: a new method for reconstructing phylogenetic trees.". In: *Molecular biology and evolution* 4.4 (1987), pp. 406–425.