

## Tuneln: A Web-Based Interface for Practicing Choral Parts



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### Abstract

Choir singers typically practice their choral parts individually in preparation for joint rehearsals. Over the last years, applications have become popular that support individual rehearsals, e.g., with sing-along and score-following functionalities. In this work, we present a web-based interface with real-time intonation feedback for choir rehearsal preparation. The interface combines several open-source tools that have been developed by the MIR community.

### Demo



### Web-based Interface (<https://www.audiolabs-erlangen.de/resources/MIR/Tuneln/>)

The screenshot shows the Tuneln interface. At the top, there's a navigation bar with 'Tuneln' and 'Home' buttons, followed by logos for 'AUDIO LABS', 'Carus', and 'TECHNISCHE HOCHSCHULE NÜRNBERG GEORG SIMON OHM'. Below this is a section titled 'Configure the training session' with dropdown menus for 'Come on, sing with me now' (set to 'Tenor') and a 'Load session' button. Under 'Player controls', there are buttons for 'To the start', 'Previous measure', 'Play', and 'Next measure'. The 'Score follower' section displays a musical score for four voices: Sopran I, Sopran II, Alt, and Tenor (Instrument ad lib.). The score includes lyrics and a red highlighted box around the current measure. The 'Piano roll with interactive feedback' section shows a piano-roll style visualization for a single voice across five measures. The y-axis lists notes from F4 down to D3. The x-axis shows measures 2 through 5. Colored bars represent pitch deviations in cents, with a color scale from -50 (blue) to 50 (red). Buttons at the bottom include 'Download summary', 'Clear user trace', and 'Download F0 values'.

### Features

- Singer selects piece and part
- Audio playback
- Score following player from [1] highlights current measure
- Piano roll representation with real-time feedback
  - F0-estimation of the singer's voice using CREPE [2] and *Tensorflow.js*
  - Deviations from MIDI pitch in cents color-coded (red: positive deviation, blue: negative deviation)
  - ➔ Suitable for choir recordings with piano accompaniment, which prevents choir from drifting in intonation
- Download the performance as image or CSV file

### References & Acknowledgements

- [1] F. Zalkow, A. V. Corrales, T. Tsai, V. Arifi-Müller, and M. Müller: **Tools for semi-automatic bounding box annotation of musical measures in sheet music**. In Demos and Late Breaking News of ISMIR, 2019.
- [2] J. W. Kim, J. Salamon, P. Li, and J. P. Bello: **CREPE: A convolutional representation for pitch estimation**. In Proceedings of ICASSP, 2018, pp. 161–165.

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