

## Tools for Semi-Automatic Bounding Box Annotation of Musical Measures in Sheet Music

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### Abstract

In score following, one main goal is to highlight measure positions in sheet music synchronously to audio playback. Such applications require alignments between sheet music and audio representations. Often, such alignments can be computed automatically in the case that the sheet music representations are given in some symbolically encoded music format. However, sheet music is often available only in the form of digitized scans. In this case, the automated computation of accurate alignments poses still many challenges [1]. In this contribution, we present various semi-automatic tools for solving the subtask of determining bounding boxes (given in pixels) of measure positions in digital scans of sheet music—a task that is extremely tedious when being done manually.

<https://www.audiolabs-erlangen.de/resources/MIR/2019-ISMIR-LBD-Measures>



### Interactive User Interface for Bounding Box (BB) Annotation

BB index	label	row	top	left	height	width
1	1	0	198.0	104.0	100.6	189.6
2	2	0	198.0	295.0	100.6	129.6
3	3	0	198.0	426.0	100.6	141.6

### Interface for Measure-Wise Score Following

### Dataset

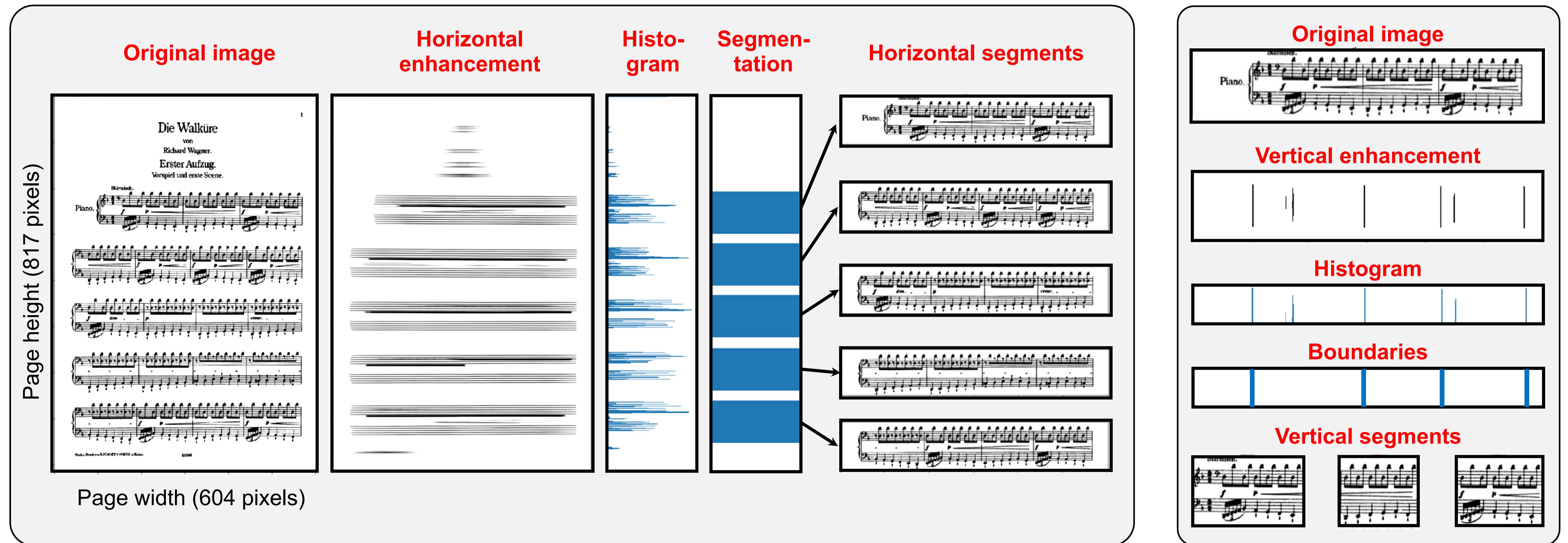
We provide measure annotations for several hundred pages of sheet music:

- Wagner: Der Ring des Nibelungen (piano reduction)
- Beethoven: Selected piano sonatas
- Schubert: Winterreise (piano songs)
- Music from Carus publishing house

# Automatic Tool for Detecting Bounding Boxes in Scanned Sheet Music

We propose a two-stage segmentation approach for automatically detecting bounding boxes of measures in sheet music:

- 1. Stage: Horizontal segmentation for detecting musical stave lines.
- 2. Stage: Vertical segmentation of musical staves for detecting measure boundaries



## References

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- [4] Nils Werner, Stefan Balke, Fabian-Robert Stöter, Meinard Müller, and Bernd Edler. trackswitch.js: A versatile web-based audio player for presenting scientific results. In *Proc. of the Web Audio Conf. (WAC)*, London, UK, 2017.

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