User Manual

## The Lung Sound Viewer has been developed to visualize, label, and export audio recordings of lung sounds. The application displays sound waves visually, allows you to listen back to segments, and helps you assign meaningful labels (such as “Cough” or “Normal”).

Getting Started and Selecting Data

When you open the application, the window *“Select dataset and metadata”* appears first.

Here, you choose the folder containing your .WAV files. Without these files, the application cannot start.

Optionally, you can also include metadata such as gender, age, or recording location.

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Click **Choose folder…** to select a dataset. The chosen location will appear under Selected path.

Then press **OK** to begin.

## Main Interface

After opening a folder, you’ll see the main interface with two plots stacked vertically.

* The upper plot shows the **waveform**, which represents the amplitude of the sound over time.
* The lower plot shows the **STFT spectrogram** (Short-Time Fourier Transform), which displays how the sound’s energy is distributed across frequencies.

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You can play or pause the sound using the **spacebar**. During playback, the red line (playhead) moves across the waveform.

## Navigating Files

In the top-right corner, you can see the name of the current .WAV file. Below it is the **Open folder** button, which allows you to select a new dataset folder at any time.

Use the **Prev** and **Next** buttons to browse through the files in the folder.

The **Jump to** dropdown lets you quickly jump to a specific file within the dataset.

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## Selecting and Labeling Segments

Below the waveform, you’ll see a blue selection window indicating the currently selected time interval.

You can adjust this interval by dragging the edges of the selection or by manually entering start and end times in the **Selected** fields. The Δ (delta) value shows the duration of the segment.

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To add a new label, type a name into the **New label…** field and click **Add label to selection**.

If you prefer to add labels directly to the JSON file, open labels.json in a text editor, add the label to the array, save the file (Ctrl + S), and then click **Reload labels.json** in the app.

Once you’ve made a selection and added a label, the segment will appear in the segment list at the bottom of the right-hand panel.

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In the waveform, each segment appears as a colored block, allowing you to visually see where labeled fragments are located.

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## Edit Segments

If you’ve added a segment and want to modify it, select it from the list. You can adjust the start or end time, add new labels, or remove existing ones using **Remove selected label**.

When you’re done editing, click **Update** to save your changes or **Delete** to remove the segment.

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## Automatic Segmentation

If you have many recordings, the app can automatically create segments for you.

Click **Auto segment…** and set the desired segment length and overlap between segments.

You can also define which label should automatically be assigned to each segment.

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Once you press **OK**, all segments will be generated across the entire file in one step.

## Bandpass filter

At the bottom of the right panel, you’ll find the **bandpass filter** settings. This allows you to suppress frequencies outside a chosen range, for example, to reduce noise or make specific sounds more audible.

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Adjust the **Low/High (Hz)** cutoff frequencies and the **filter order** as needed.

The **Zero-phase** option applies the filter without introducing phase shifts (recommended for analysis).

Experiment with different settings and listen to how the sound changes, this can help you distinguish between heart and lung sounds.

## Spectrogram and Filter Effect

The lower window shows the STFT spectrogram, where you can observe how the sound evolves across frequencies over time.

When a filter is active, only the frequencies within the selected range are displayed.

## Saving and Exporting

The app automatically saves segments for each file as .json sidecar files. When you reopen the application, these segments are immediately reloaded.

When you’ve finished annotating, click **Export CSV.**



This creates a single CSV file containing all segments from the current dataset, including labels, time intervals, and any metadata.

## Resetting the View

If you’ve zoomed or panned extensively in the plots, press **Ctrl + R** to reset the waveform and spectrogram views to their original state. Your segments and labels will remain intact.

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