

Overview:

The Signal Analyzer is a software application designed for predicting the magnitude of the sensations rumbling, humming, and booming for a given signal within the context of vehicle interior sounds.

The underlying algorithm was first described in Doleschal and Verhey (2023). The exact reference can be found at the end of the document. This publication must be cited, whenever this program is used.

Usage Instructions:

1. Input Signals:

The Signal Analyzer provides two options for inputting signals: a single file (a in Figure 1) or an entire folder (b in Figure 1) containing multiple files. It is important to note that the signals must be in WAV format and have a sampling rate of 44100 Hz.

2. Configuration:

To select the specific sensation to be examined, simply click on the corresponding field (c in Figure 1). It is possible to select more than one sensation. Additionally, the parameter “full scale” must be appropriately set to ensure an accurate analysis (d in Figure 1). The program operates on a “full scale” of “120”, i.e., a digital root mean square (RMS) of 1 corresponds to 120 dB. If the selected input signal was recorded with a different calibration, the parameter “full scale” must be adjusted accordingly.

3. Analysis Process:

Initiate the analysis by clicking on the "Start Calculation" button (e in Figure 1). A loading bar indicates the progress of the analysis, and the duration of the analysis depends on factors such as the number of signals, their respective durations, and the number of selected sensations.

4. Output Results:

The results of the analysis are presented in a tabular format, which can be conveniently saved as an “.xlsx” file by clicking on the corresponding field (f in Figure 1).

5. Interpretation and Discussion:

The analysis generates results ranging from 1 to 9, representing the lowest and highest levels of presence for the analysed sensation, respectively. For a detailed interpretation of the results, please refer to the discussion provided in the research paper by Doleschal and Verhey (2023).

Reference

Doleschal, Florian; Verhey, Jesko L. (2023): Modeling the perceptions of Rumbling, humming and booming in the context of vehicle interior sounds. In *Applied Acoustics* 210, p. 109441. DOI: 10.1016/j.apacoust.2023.109441.

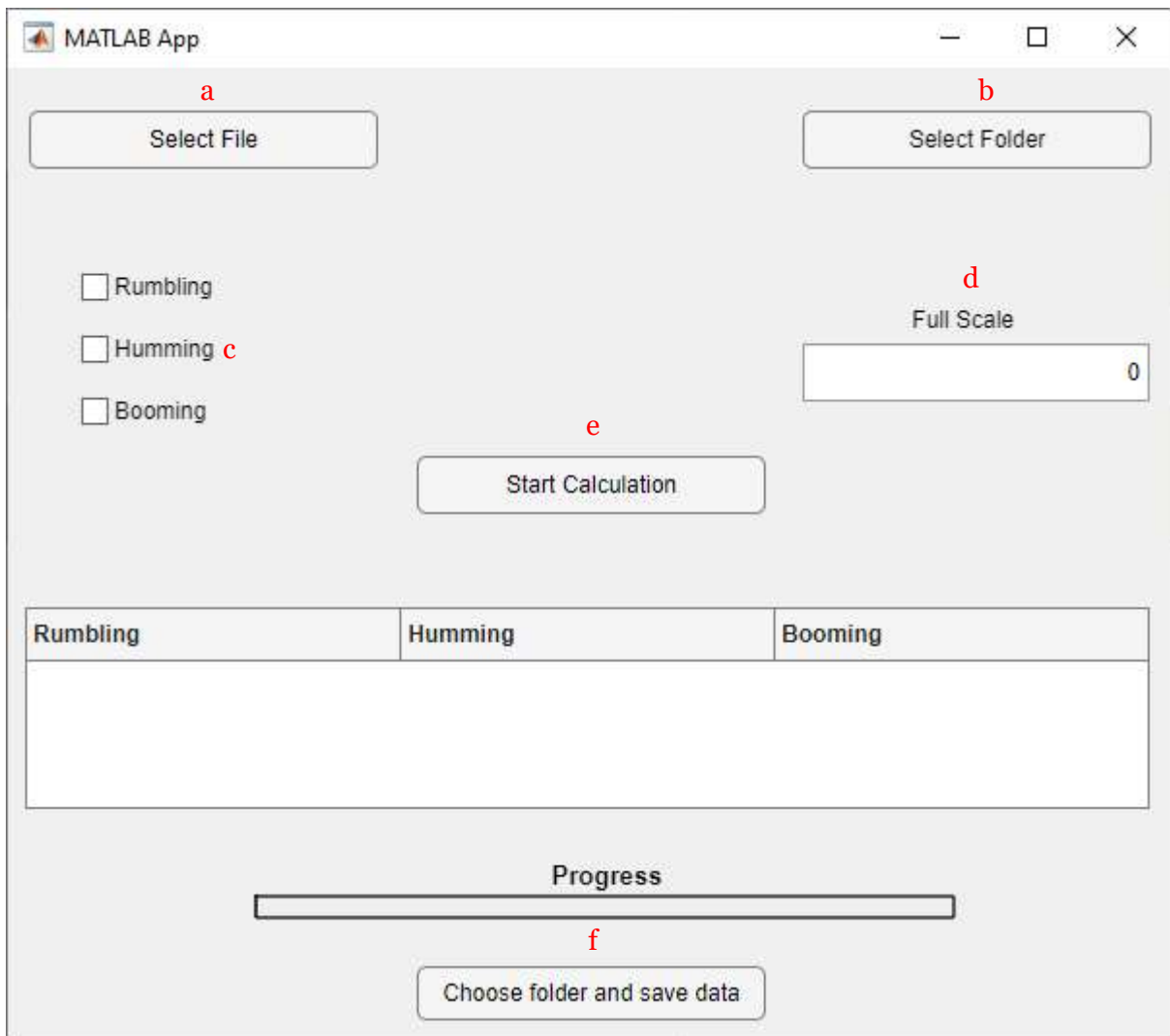


Figure 1: Interface of the signal analyser