Script for prosodic information extraction of timing and intonation for voice comparison purposes. In a broad sense, this script can be used for voice comparison in:

i. Pronunciation teaching (native vs. foreign speech ad/or different proficiency levels of foreign accent;

ii. Forensic purposes (questioned vs. target voice in a speaker identification scenario, and

iii. Clinical purposes (regular voice vs. voice with some pathology).

For the sake of a finer comparison between voices in this version, we strongly recommend the use of **two audio files** per folder.

This script **requires**:

✓ Two audio (**.wav** format) files containing the same speech information, but spoken by two different voices (a reference voice and a comparison voice);

✓ A text file (**.txt**) containing the speech transcription with the linguistic information of the reference audios.

HOW TO CITE THIS SCRIPT

SILVA Jr., Leonidas. (2023). *BeatMaker* (version 1.05). **[**Computer program for Praat**]**. https://github.com/leonidasjr/ProsodyCode.

1. GETTING STARTED

We will start from the point that you have already installed Praat in your computer.

We provide in *BeatMaker* repository (https://github.com/leonidasjr/ProsodyCode), three files (two audio files and a text file) for testing the script. Files are "L1_speech.wav/L2_speech.wav" and "L1_speech.txt". Once you download the files you may follow the instructions on Table 1:

Data preparation	Examples
For a better performance of *BeatMaker*, we strongly recommend that the audio files are named in the following sequence: ✓ The 1st and 2nd characters = the *reference voice.* ✓ The program accepts the following sequences of 1st-to-2nd characters when tagging the audios: ⚓ **L1/L2** (**L**anguage 1/2); ⚓ **NS/FS** (**N**ative/**F**oreign **S**peech); ⚓ **V1/V2** (**V**oice 1/2); ⚓ **RV/CV** (**R**eference/**C**omparison **V**oice/)	**L1**_speech.**wav** **L2**_speech.**wav**
• Write a text file (.txt) containing the speech transcription of the *reference audio* (**L1** is the *reference audio* of our data)	**L1**_speech.**txt**
• Your folder must have the two audio files, the text file and the *BeatMaker* script as shown on the right.	*BeatMaker*.**psc** **L1**_speech.**txt** **L1**_speech.**wav** **L2**_speech.**wav**

Table 1: Data preparation

2. RUNNING THE *BEATMAKER*

Now that your audio and text files, and *BeatMaker* are in the same folder, you will need to "call the script" into Praat object's window. On Praat's drop-down menu, click Praat > > Open Praat script... as shown in Figure 1. Now choose the directory where your files are.
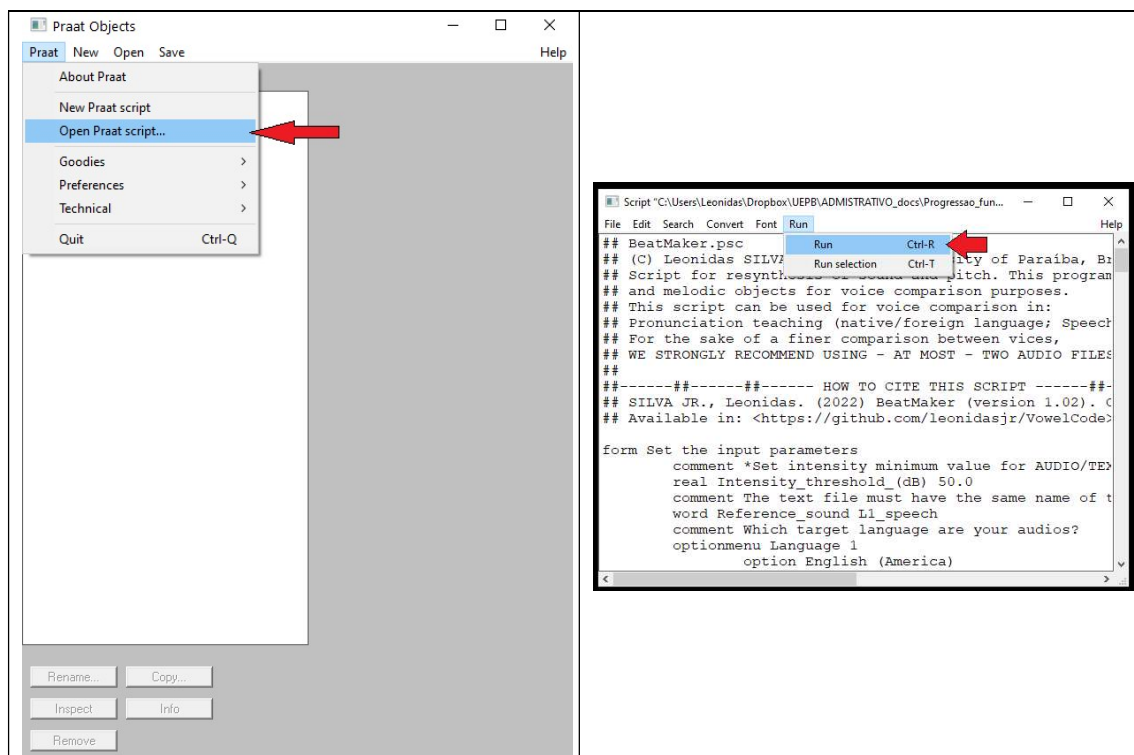

Figure 1: Praat objects screenshot   **Figure 2**: Script screenshot

Once the script is open, you will need to run it. For running the script, click Run > > Run as shown in Figure 2.

When you click Run, the script will pop-up a window (a form containing the settings for the input parameters) as shown in Figure 3. Click the Ok button to run the script.

3. SYSTEN RESULTS

Figure 3: Script form screenshot

Figure 3 describes the form for the input parameters.

1. The 'Intensity threshold' in decibels (dB) forces the alignment at the sentence level for a better performance of the word-level alignment. It is recommended the maintenance of the default values. *BeatMaker* realizes an automatic forced-alignment of the text based on the reference audio file and returns a two-tier TextGrid file (a word and a phrase tier, cf. Figure 4). The phrase-level alignment is based on intensity correlates, and the word-level alignment is run from a built-in command in Praat. The system

also returns a multi-colored plot which contains both of the F0 contours and the aligned TextGrid (cf. Figure 4).

2. The 'Reference sound' is the audio file of reference in the folder. The text file needs to be tagged as the reference sound. From the audio files, the program extracts the delexicalized prosodic information, such as the timing (beat) and pitch and then, creates new sound files based on prosody (cf. Figure 4).

3. The 'Language' button displays the ten languages aforementioned that the user can choose according to one's audio files. *BeatMaker* brings up to ten different languages, such as English (U.S. and U.K.), Portuguese (Brazil and Portugal), Spanish (Latin America and Spain), French, Japanese, Russian and Interlingua. The user can also choose the speaker's gender for a more precise extraction of the F0 contours

4. The 'Customize' option makes available the manual configuration of voice pitch.

5. In the 'Pitch Contour Color' buttons, the user can choose one from six different colors for both the reference and the comparison voices for didactic purposes.

6. In the 'Save' options, the user is able to save the audio files and/or the plot of the F0 curves and the TextGrid (to be used in classes and/or presentations without Praat software).

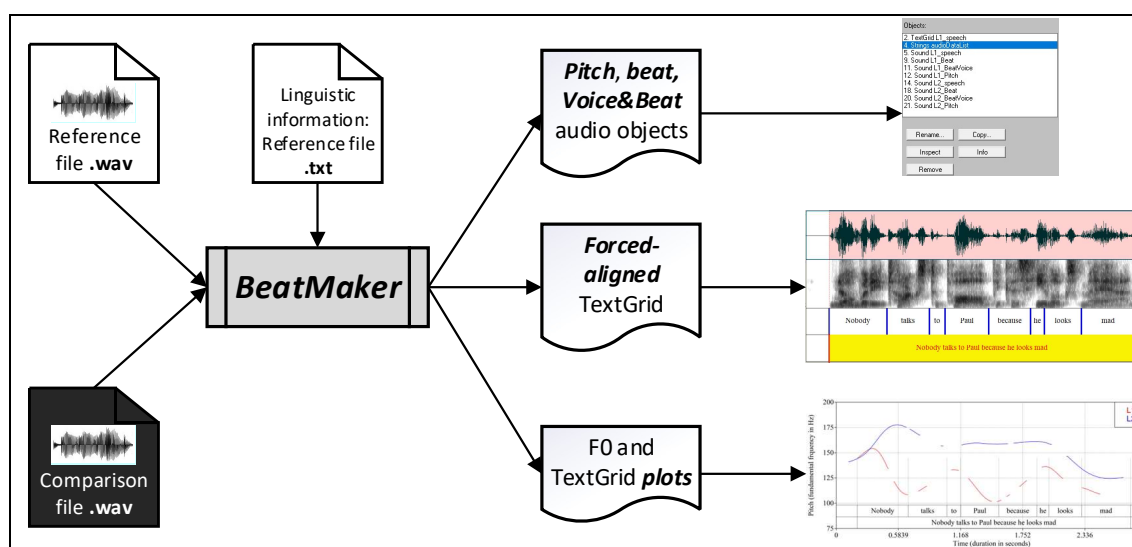Figure 4 details the workflow of the system:

Figure 4: Workflow of the system.