

IntonTrainer

for Chinese

(Version: 2023-02-20)

SPEECH INTONATION ANALIZER AND TRAINER

“IntonTrainer–Chinese”

(USER GUIDE)

1. GENERAL

The Software Package (hereinafter referred to as the SP) "IntonTrainer-Chin" is designed for analysis, screen display and comparison of the intonation contours of the pitch of the reference and pronounced Chinese words and phrases, as well as the numerical assessment of their intonation similarity. The assessment of intonation similarity is carried out on the basis of intonation representation in the form of Universal Melodic Portraits (UMP).

The SP "IntonTrainer" is implemented as a separate application for Windows (7, 8, 10) and it is recommended for use:

- In linguistic education
(used as a means of visualizing intonation);
- For self-learning and self-controlling
(used as a means of intonation training);
- In scientific and practical research
(used as a means of comparing intonation from different sources).

In Chinese, as in other languages, there is a sentence intonation. But in addition, each syllable is pronounced according to one of the tone types (TT). The TTs used are just as important for distinguishing meaning as the sound composition of a word. The same combination of sounds can convey completely different meanings depending on the tone in which it is pronounced.

2. Initial mode of viewing the reference phrases

The initial window of the SP, which opens after starting the program, is shown in Fig. 1.

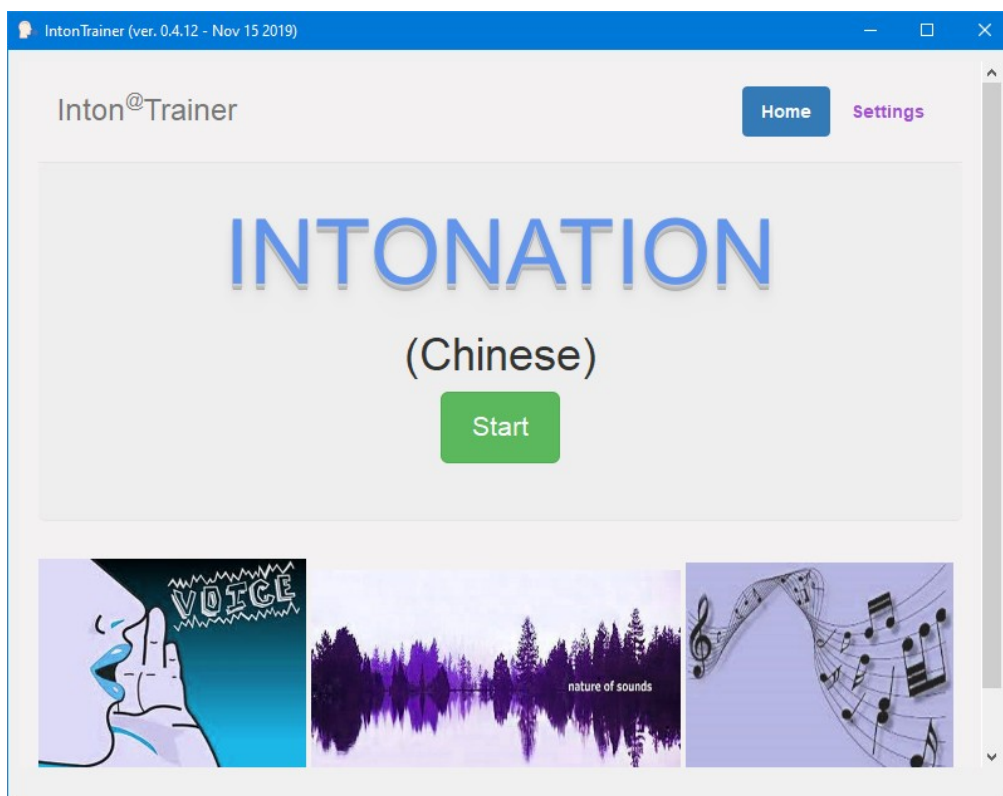


Fig. 1. The Initial Window

When you press the “Start” button, the Information Window opens (Fig. 2), which contains a structured list of texts of reference audio phrases uttered by female and male voices.

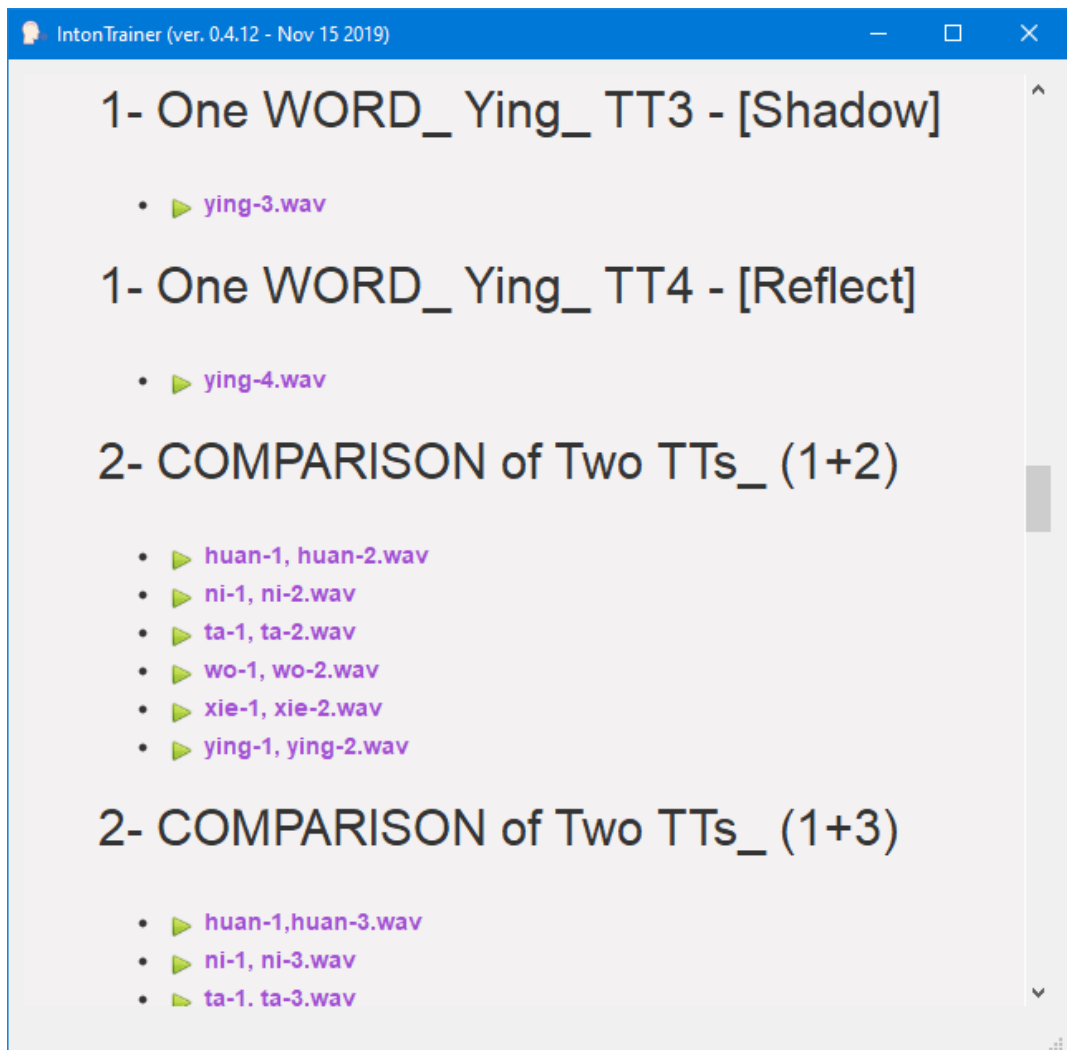


Fig. 2. The Information Window

The sets of words and phrases used in the database reflect the specific tonal types of the Chinese language. There are four main types of tone (TT): TT1 - flat, TT2 - rising, TT3 - falling-rising and TT-4 - falling tone. Mastering and freely using these TTs is one of the main obstacles in teaching Chinese. SP "IntonTrainer-Chin" provides the ability to visualize and quantify the correctness of the reproduction of these four TTs of Chinese speech. A structured list of reference words and phrases is stored in the "PATTERNS" folder. The folder contains examples of monosyllabic words from TT-1 - TT4, comparative examples of their subsequences, as well as simple phrases and a fragment of dialogue.

On fig. 3 shows four types of TT for the word "xie", which has different semantic meanings with the same sound composition. Translated into English, this word has the following meanings: "xie-1" - *rest*, "xie-2" - *shoes*, "xie-3" - *write*, "xie-4" - *thank you*.

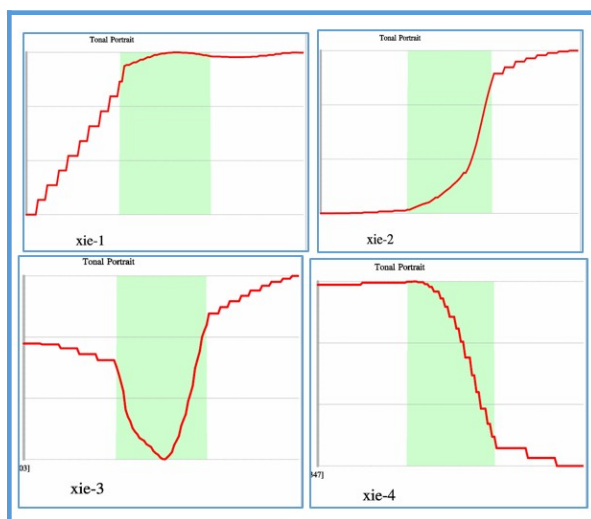


Fig. 3. Four fragments of the main window for the word **XIE** (TT1 - TT4)

The reference words and phrases included in the database sets are recorded as audio files read by professional teachers. The main sources of filling the database were the initial self-learning language courses available on the Internet.

3. Pitch viewing of the reference phrases

By scrolling the page of the Information Window (Fig. 2), the user gets the opportunity of auditory and visual acquaintance with the main intonation structure of English speech by selecting the required directory with the cursor.

When you select, for example, “*This is my dad*” - the Main SP Window opens (see Fig. 4).

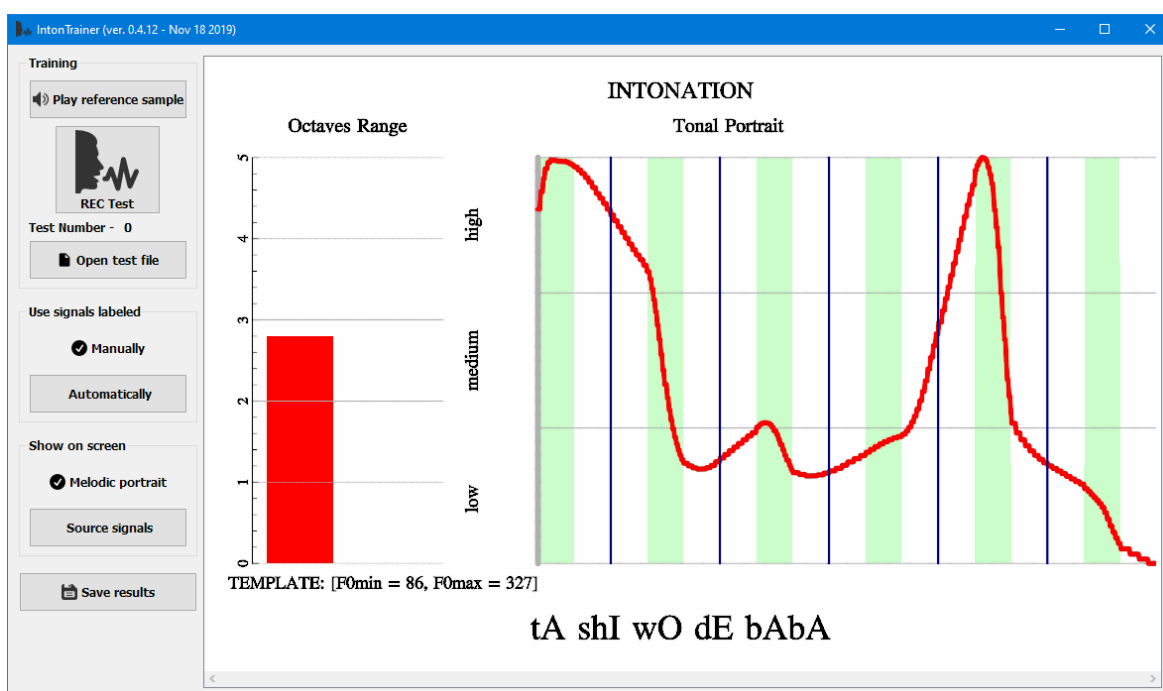


Fig. 4. The Main Window (“*This is my dad*”)

The left part of the window contains controls that allow listening to the reference speech signal - *Play reference sample*, recording a test phrase by students - *REC Test*, calling pre-prepared test phrases - *Open test file*, as well as setting various modes of graphic display of the analyzed signals and the results of intonation analysis.

In the right part of the window, the results of the analysis of the reference phrase are presented in graphical form, namely:

- The graph showing the pitch changes in a phrase in the form of a *Universal Melody Portrait (UMP)*, consisting of three sections for each word: *pre-nucleus, nucleus and post-nucleus*. The *nucleus* is marked in green.
- Below the graph, the text of the phrase is shown. A phrase consists of two Accent Units (AU) separated by a sign (-) in which the nuclear vowels are indicated by the sign "+".
- The red column (to the left of the melodic curve) displays the range of change in the pitch frequency in the phrase, calculated by the formula:

$$\text{Octave's Range} = (F0_{\max} / F0_{\min}) - 1.$$
- Below the *Octave Range* column, the minimum and maximum values of F0 in Hertz for the selected reference phrase are shown:
TEMPLATE: [F0min=86, F0max=327].

4. Comparison of spoken and reference words and phrases

After the user has listened to and viewed the UMP of the selected phrase, he can use an external or built-in microphone to input a speech signal with his voice.

To do this, he must press the "REC Test" button in the left part of the window (see Fig. 4), wait for a short "beep signal" and say the phrase into the microphone, the text of which is indicated at the bottom of the window. After recording the speech signal, the user will hear the 2nd "beep", and the image in the Main Window (Fig. 4) will be replaced by the image shown in the Main Window (Fig. 5).

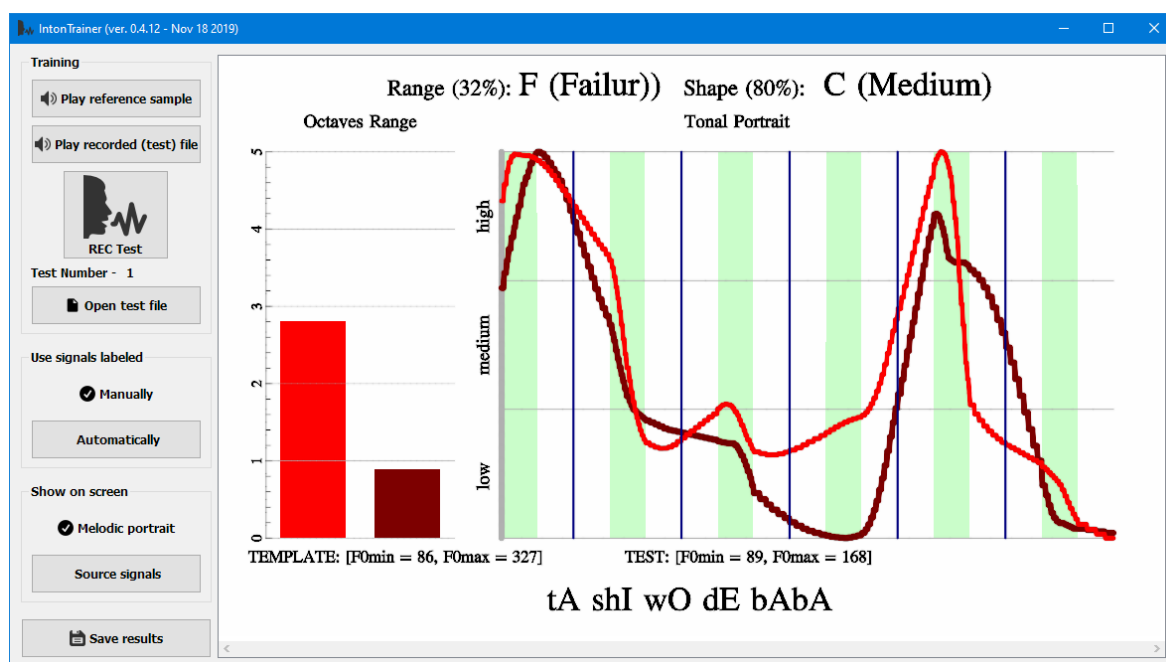


Fig. 5. The Main Window
(The result of comparing of the reference and spoken phrase "This is my dad")

Figure 5 shows the results of comparing of the reference phrase - red line and red column - and the same phrase pronounced by the student - brown line and brown column.

The evaluation of the intonational similarity of phrases is carried out according to two main criteria: the degree of similarity of the pitch ranges - Range, and the similarity of the UMP curves - Shape.

The upper part of the window shows the results of comparing the reference and spoken phrases: Range (32%) - similarity in the range, and Shape (80%) - similarity in the shapes of the compared UMP curves. Next to the percentage estimates of proximity are grades according to the 5-point school system.

The student, not satisfied with the result of the test, has the opportunity to repeat the phrase many times, achieving the desired mastery of the skill.

5. CONCLUSION

The software complex "IntonTrainer" is an open system. Modification of the used settings and audio materials is allowed. Reference databases - PATTERNS - can be supplemented or modified in accordance with the task, or created anew to work with new language applications.

This version of the User's Guide is intended for a wide range of users. The "Manual" does not describe the numerous settings available to allow an experienced specialist to experiment and improve the technical capabilities of the "IntonTrainer" program.

A much more complete description of the features of the Program can be found on our Website. See: "Advanced User's Guide".

To learn more about the theoretical foundations and code of the SP "IntonTrainer" development see additional information posted on our site <https://intontrainer.by/>