GRAPHIC TOOL FOR THE EVALUATION OF LOSSLESS AUDIO CODECS

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1. Introduction

Audio tracks, such as those extracted from commercial CDs, can be losslessly compressed (decompressed) by means of lossless audio coding (decoding) algorithms such as FLAC [1]. To this aim, DOS commands need to be executed [2]. This can be performed through user-friendly graphic tools such as foobar2000 [3]. However, this tool has some disadvantages such as the introduction of unknown delays during the encoding/decoding process, and most of all, it lacks flexibility. In order to overcome these drawbacks, we developed a flexible software with reduced delay time. Additionally it has the following advantages: 1) it allows treatment of a large number of audio files by simply selecting the containing folder, 2) in order to handle errors, this tool allows the operator to pause processing, and 3) encoding/decoding results are shown in a table format.

2. How it works

The previously installed audio codec is executed through appropriate DOS command typed by the user in the graphic interface. For each codec, the DOS commands are detailed either in the help section of the executable file, or in the attached file called "readme.txt". Further details are mentioned in the codec developer's web page. For example, if the user wants to compress a WAV file using FLAC with medium speed, the corresponding DOS command is the following:

-5 -f --no-padding *infile* –o *outfile*

In this case, *infile* and *outfile* are the name of the input and output files with their paths. A list of DOS commands for encoding and decoding with different lossless audio codecs are reported in Table 1 of [2].

The graphic interface works transparently for each codec. It performs the following steps:

- A BAT file in the root of disk C along with the necessary encoding/decoding parameters is created.
- A chronometer starts counting the encoding/decoding time.
- The BAT file is executed. After this step, the processing time measured by the chronometer mentioned above is determined.
- The processing time as well as other relevant information (file names, sizes and extension) is shown in the bottom of the interface.

3. Some features of the interface

The delay time introduced by this tool is approximately 0.38 s in a laptop furnished with 2.4 GHz AMD Turion processor and with Windows Vista Home Premium 6.1.7600. The appearance of the graphic tool is illustrated in Figure 1.

Figure 1. Graphic tool.

Other features of this tool are the following:
- It allows deleting the output folder, which is useful in case only the delay time is of interest.
- If a collection of files is executed, this tool allows pausing the process after encoding or decoding each file. In this way, errors can be detected.

4. How it can be used

This tool has the following user-defined inputs:

Dir. Origen*: Path corresponding to the folder containing the input files which will be processed.

Compresor*: Path corresponding to the executable file of the audio codec to be used.

Dir. Salida*: Path corresponding to the folder containing the output processed files.

Formato de salida: This item has to be filled with the output file extension, being either the compressed extension (e.g. "flac" for the FLAC encoder) if encoding is to be performed, or "wav" if decoding is desired.

Parámetros: DOS commands corresponding to the codec under test. The input and output files are referred as "%infile" and "%outfile", respectively.

The inputs marked with asterisk (*) have associated buttons named **Seleccionar**. By clicking them, a menu for selecting the input folder (**Dir. Origen**), the codec folder (**Compresor**) or the output folder (**Dir. Salida**) is displayed. These buttons allow the user to fill automatically the items on their left with the selected directory.

Other inputs for this graphic tool are the following:

Del dir. salida?: If this input is ticked, the output directory is deleted before encoding or decoding.

Comprime: This input must be ticked in case encoding will be performed.

Descomprime: This input must be ticked in case decoding will be performed.

Pausa?: If it is ticked, encoding or decoding is stopped after processing each file.

The buttons labeled **Run** and **Stop** allow to start and end processing respectively. If the user clicks the button labeled **Test**, the delay introduced by the interface is measured.

5. Example

Suppose the user wants to encode with MPEG-4 ALS [4] a collection of WAV files located in "D:\Ej\Origen" and store the results in a folder named "D:\Ej\Salida". Suppose also that the executable file of the codec named "mp4als.exe" is located in the folder "D:\Ej\Codec". When executed for the first time, the graphic tool will be displayed as shown in Figure 2.
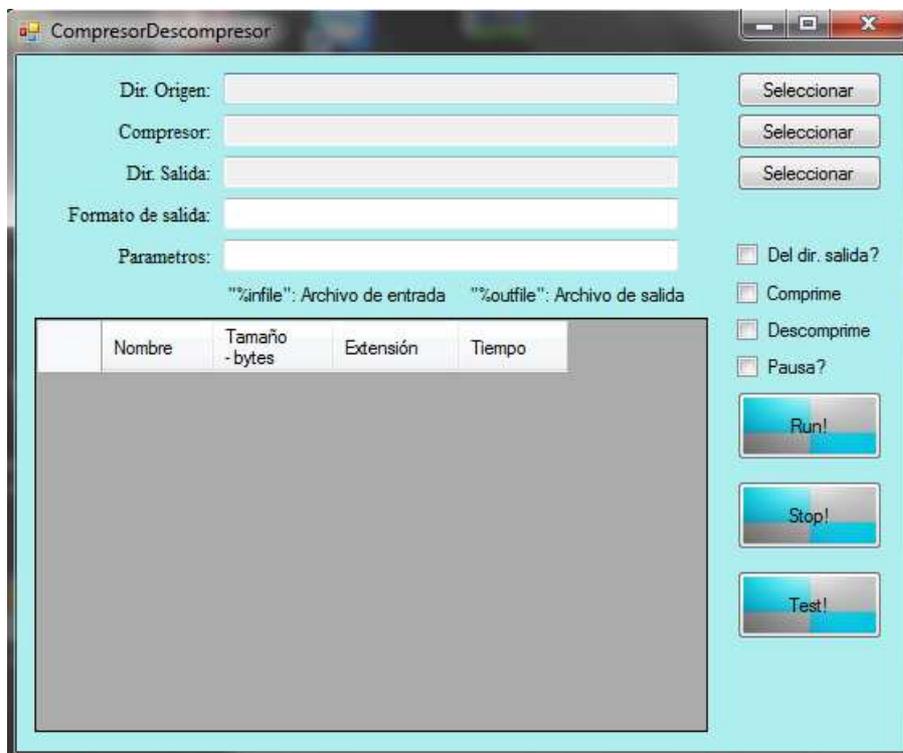
Figure 2.

The input directory can be either typed or selected by clicking the button **Seleccionar** at the right of the item labeled **Dir. Origen**. If this last option is adopted, a window is opened (see Figure 3) and the input is filled (see Fig. 4).
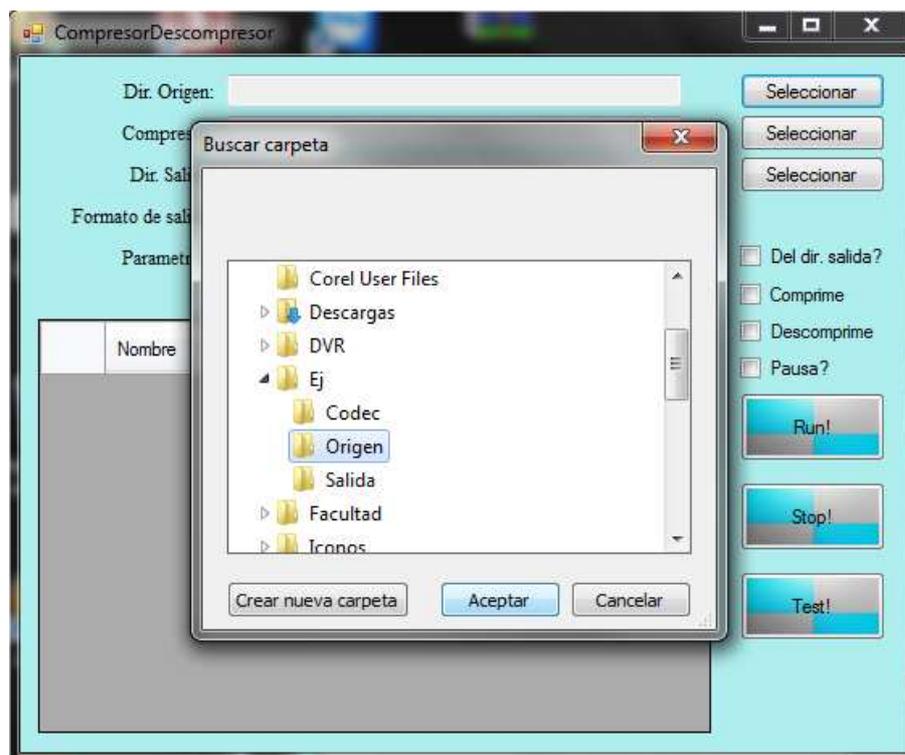
Figure 3.
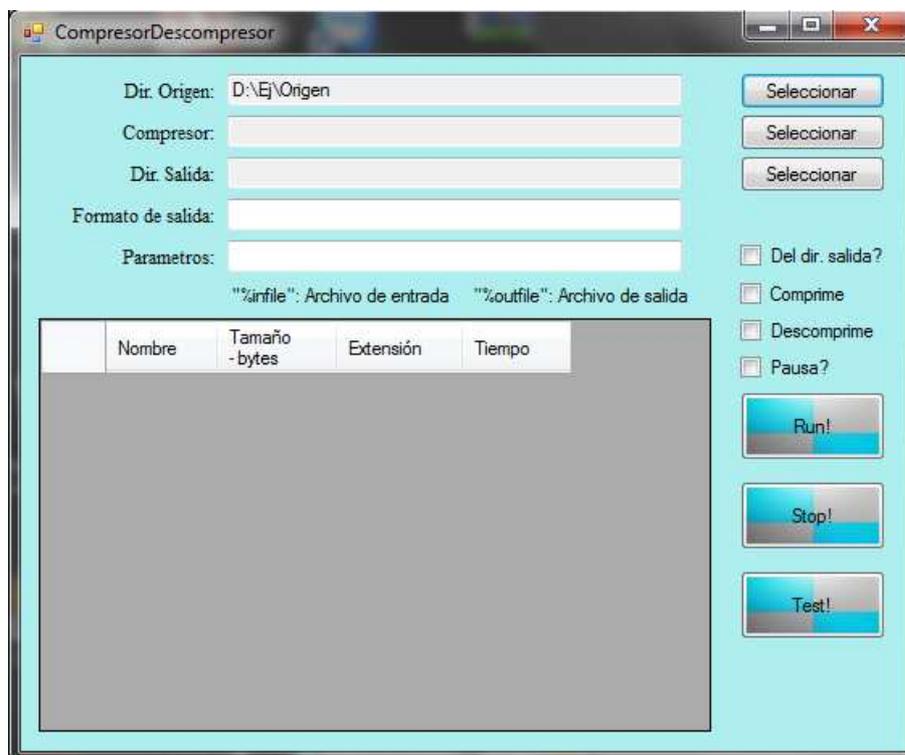
Figure 4.

Similarly, the directories containing the encoder executable file and the processed files are selected by clicking the remaining buttons labeled **Seleccionar** (see Figure 5).
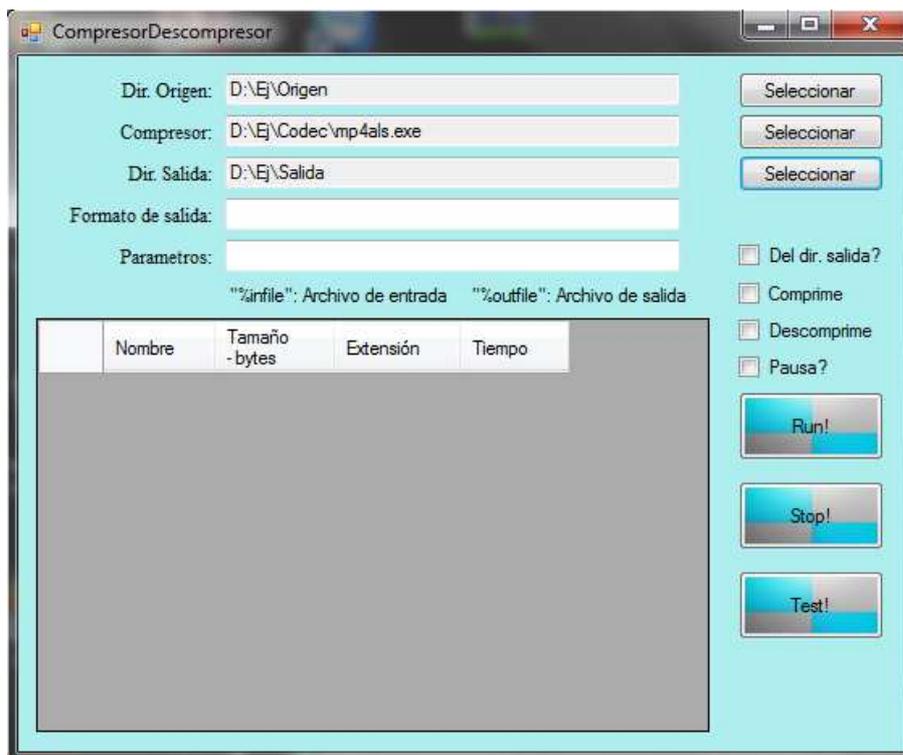
Figure 5.

Following, the items labeled **Formato de salida** and **Parametros** are filled according to the information of the MPEG-4 ALS encoder tested (see Figure 6).
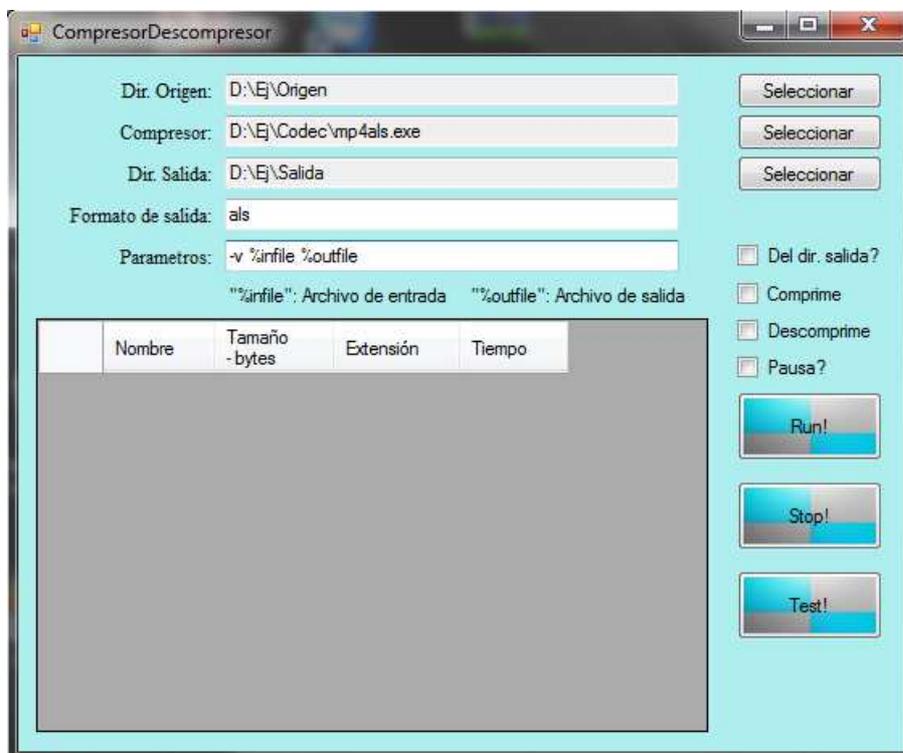
Figure 6.

Finally, the corresponding checkbox items are ticked and the encoding process starts when the button **Run** is clicked (see Figure 7). Once the encoding process has finished the results are shown in a table format (see Figure 8).
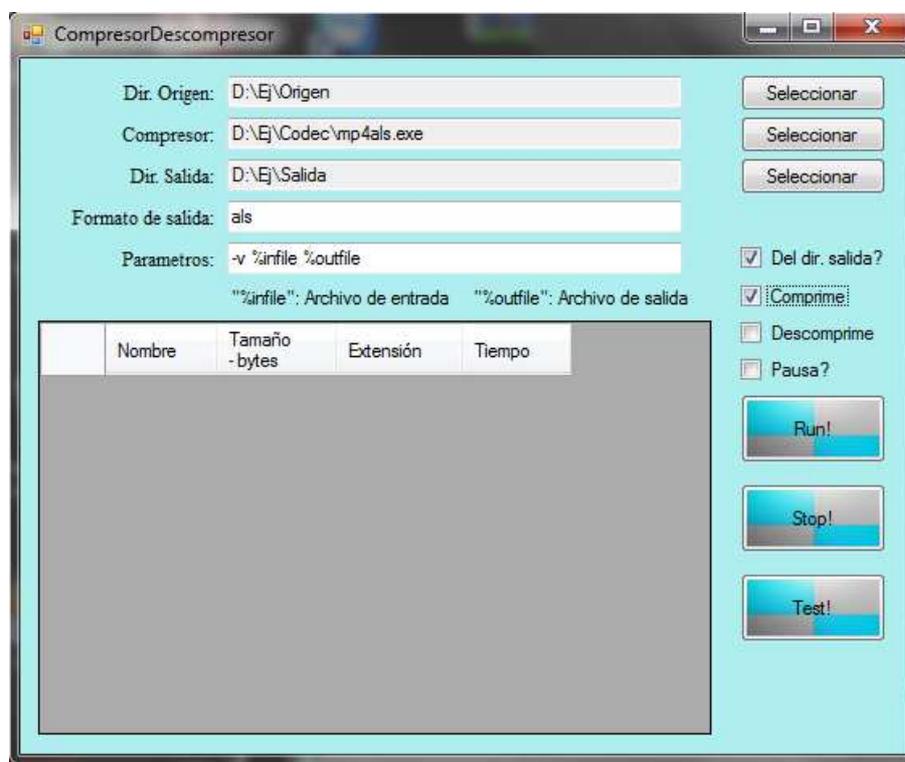
Figure 7

Figure 8

6. Conclusion

In this document, a transparent user-friendly graphic interface is explained. It was developed in the Acoustics and Electroacoustics Laboratory (National University of Rosario, Argentina), and it has many advantages for the analysis of any lossless audio codec such as flexibility, reduced delay, and easy processing of many files simultaneously.

References

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[3] P. Pawlowski (2011). "*Foobar2000. Freeware audio player for the Windows platform*". http://www.foobar2000.org/

[4] T. Liebchen "MPEG-4 ALS. The standard for lossless audio coding", J. Acoust. Soc. of Korea, vol. 28, Oct. 2009, pp. 618–629.