

whitenoise v1.0

User Documentation

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1 Introduction

`whitenoise` is a little utility that allows your computer to act as an ambient random noise generator. You may find this useful for drowning out noisy neighbors, helping you sleep, etc.

2 Usage

2.1 Command-line syntax

Syntax: `whitenoise [option(s)]`

options:

<code>-c CUTOFF</code>	Sets the lowpass frequency cutoff. <code>CUTOFF</code> is a number in the range $(0, 1)$, with a default value of <code>0.3</code> .
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<code>-r RATE</code>	Sets the samplerate for the sound card, in Hz. Acceptable values are 11025 and 22050, with a default value of 22050.
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<code>-F FILTNUM</code>	Use a filter of type <code>FILTNUM</code> , which may take the following values: 0 : Blackman-windowed FIR lowpass (default) 1 : Bartlett-windowed FIR lowpass 2 : Hanning-windowed FIR lowpass 3 : Hamming-windowed FIR lowpass 4 : Rectangular-windowed FIR lowpass
<code>-l LENGTH</code>	Sets the FIR filter length. <code>LENGTH</code> is an integer in the range <code>[1, 100]</code> , with a default value of 25.
<code>-t TIME</code>	Sets the length of time to generate noise, in minutes.
<code>-f FADETIME</code>	Fade the noise out over <code>FADETIME</code> seconds. Valid only when used along with the <code>-t</code> flag.
<code>-p WIDTH</code>	Output a plot of the filter frequency response, <code>WIDTH</code> is the horizontal resolution of the PNG image, with default 320. The image will have filename <code>~/.whitenoise/filter.png</code> .
<code>-L LATENCY</code>	Configure the audio buffers for approximately <code>LATENCY</code> milliseconds of delay, with default 200. Increase the value to alleviate problems with skipping.
<code>-a</code>	Interface with aRts instead of opening <code>/dev/dsp</code> directly.
<code>-s</code>	Read commands from stdin in realtime.
<code>-v, --version</code>	Print version information.
<code>--help, -?</code>	This help page.

Increasing or decreasing the frequency cutoff value will increase or decrease the amount of high frequency content in the noise. The samplerate can be lowered to 11025 Hz for "warmer" noise that is dominated by lower frequencies. Choosing a different filter will impact the overall balance of frequencies in the noise. Increasing the filter length will make the lowpass filter more

ideal, at the cost of increased CPU usage.

If whitenoise tends to skip (for example, under high CPU load), then it may help to increase the latency via the “-L” option.

The “-p” option is available only if whitenoise is compiled with support for FFTW 3.x. Similarly, the “-a” option is only available when whitenoise has been compiled against aRts.

When the “-s” option is used, whitenoise will continually read commands from stdin. This may be useful for creating a frontend to control whitenoise (`gnome-whitenoise` is one example). See Section 2.2 for further information.

2.2 Controlling whitenoise via standard input

If `whitenoise` is launched in interactive mode via the “-s” option, then it will continually scan standard input for command strings. Acceptable command strings take the form

```
xaaaaaa...
```

and should be terminated with newline. ‘x’ represents a command character; the possible characters are the same as the command-line switches: {c, r, F, l, t, f, p}. “aaaaa...” is a string providing the argument of the command. The character ‘q’ can also be used to terminate whitenoise. Some special cases deserve attention:

- Using the “tTIME” command will reset the timer; i.e. the command “t30” will shut off whitenoise 30 minutes after the command is entered.
- To cancel the timer or the fade option, use “-1” as the argument to those commands.

You should expect a short delay between entering a command and hearing the result.

3 Requirements

`whitenoise` requires a sound card with Open Sound System-compatible drivers. I use GNU/Linux for development, but I expect that it should work without difficulty on *BSD machines, and users have previously reported that `whitenoise` also works fine on Windows via Cygwin¹. On very low-end systems, it may be necessary to decrease the filter length to prevent skipping.

The aRts² library and header files are required only if you want whitenoise to support output to `artsd`, the sound server that ships with KDE. (Specifically, `artsc.h` and `libartsc` are required.)

FFTW v3.x³ is required if you want whitenoise to be able to generate plots of the filter frequency response. `gnuplot`⁴ is also a requirement for plotting, although it is not needed during compilation.

¹<http://www.cygwin.com/>

²<http://www.arts-project.org/>

³<http://www.fftw.org/>

⁴<http://www.gnuplot.info/>

4 Installation

In general, enter the root of the `whitenoise` source directory and use

```
$ ./configure
$ make
```

to compile the executable (which is, of course, called `whitenoise`). Run

```
$ make install
```

to install it (you may need to be root to have permission to copy the executable to a system directory).

You can use

```
$ ./configure --help
```

to see some of the options that `configure` accepts. In particular, you may be interested in the options that identify the locations of the aRts and FFTW headers and libraries. For example, on my system I use

```
$ ./configure --with-arts-inc=/usr/include/kde/artsc
```

to properly detect `artsc.h`.

5 License

`whitenoise` is Free Software, released under the GNU General Public License. You are free to modify and redistribute `whitenoise` under certain conditions; see `COPYING` for details.

6 How it works

Uniform random noise is generated with `rand()`. This noise sounds awful because it has too much high-frequency content, so it is lowpass filtered. There are a number of standard filters available for this purpose, all of which are designed using the window method. Yes, I am aware that the noise generated by this scheme is not technically “white”, but real white noise has rather disturbing audio characteristics.

7 Future work

It is unlikely that there will be any significant changes in the future.

8 Contact info

Feel free to contact me if you:

- like whitenoise
- hate whitenoise
- find bugs

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