University of Stuttgart
Institute for Natural Language Processing
http://www.ims.uni-stuttgart.de

Carnival - a GUI for Festival

Bernd Amann

Manual (english)

Version 1.03 (July 2005)

http://carnival.sourceforge.net

Contents

1 Introduction

Carnival has been programmed in C++ using the wxWidgets framework [5]. It is a graphical user interface (GUI) for Festival [1], a speech synthesis package.

Carnival is currently running under the following operating systems (due to the platform independence of wxWidgets): Windows (32bit), Unix (GTK, Motif and X11), MacOS and OS/2. Up to now, Carnival was only tested under Windows and GTK. This document refers to the version 1.03 (July 2005) of Carnival.

So far, the use of Festival was not so easy and required some knowledge about this system. Festival has no graphical interface and can only be used via a console. Further, good skills of Scheme [3], the skripting language of Festival, are required.

With Carnival, it is now possible to make synthesis requests without having deeper skills about Festival (or Scheme). Carnival completely supports the currently accepted markup languages (Sable and SSML), so that more complex requests can also be made. Carnival also supports the Festival server, so that Festival can be controlled via a (remote) network as well.

Carnival is a Sourceforge [2] project and released under the GNU public license. For any news and information around Carnival please visit the homepage (`http://carnival.sourceforge.net`).

1.1 Installation

Carnival is quite easy to install. The package consists of three files only (the binary and two HTML files) that are usually copied to a directory. The two HTML files can also be stored in a different location, but then the path to the "documentation directory" has to be changed in the settings dialogue (or via command line option) in order to access the two documentations (Sable and SSML) correctly.

Carnival needs write access in a freely adjustable directory to save the resulting Sable, SSML and wave files. The application can be removed easily if the three files are being removed again.

Enjoy working with Carnival!

Thanks to: Martin Barbisch, Hanns Maier, Bernd Möbius

2 The markup languages

The markup languages usable in Carnival are not discussed in detail here due to lack of space. In Carnival, detailed documentations can be accessed via the help menu (see chapter 3.3). Carnival supports the two XML-based markup languages Sable and SSML. One example per markup language is shown below respectively.

2.1 Sable

Additional information about Sable can also be found in [1]. Now, an example of a Sable file is shown below:

```
<?xml version="1.0"?>
<!DOCTYPE SABLE PUBLIC
      "-//SABLE//DTD SABLE speech mark up//EN"
      "Sable.v0_2.dtd"
[]>
<SABLE>

<SPEAKER NAME="male1">
The boy saw the girl in the park <BREAK/> with the telescope.
The boy saw the girl <BREAK/> in the park with the telescope.

Good morning <BREAK /> My name is Stuart, which is spelled
<RATE SPEED="-40%">
<SAYAS MODE="literal">stuart</SAYAS> </RATE>
though some people pronounce it
<PRON SUB="stoo art">stuart</PRON>.  My telephone number
is <SAYAS MODE="literal">2787</SAYAS>.

</SABLE>
```

By the way: Carnival automatically generates the header and the footer of the Sable file, so that the user has to enter the real content only. In the example above this would have been everything from `<SPEAKER NAME="male1">` up to and including `</SAYAS>`.. The remaining parts are added by Carnival when the file is going to be saved.

2.2 SSML

For additional information about the “Speech Synthesis Markup Language” (SSML) also see [4]. An example of a SSML file:

```
<?xml version="1.0"?>
<SPEAK version="1.0"
```

```
3       xmlns="http://www.w3.org/2001/10/synthesis"
4       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
5       xsi:schemaLocation="http://www.w3.org/2001/10/synthesis
6          http://www.w3.org/TR/speech-synthesis/synthesis.xsd"
7       xml:lang="en-US">
8
9    <s xml:lang="english">
10   <voice name="male1">
11   This is a
12   <emphasis level="moderate">very</emphasis>
13   nice text.
14   </voice>
15   </s>
16
17  </SPEAK>
```

As stated above, Carnival also automatically generates the header and the footer of the Sable file here, so that the user has to enter the real content only. In the example above this would have been everything inside of the `<s [...]>` tags. The remaining parts are added when the file is going to be saved.

3 Program description

In this chapter, a description of the two "operational modes" of Carnival is given along with an overview of the menu structure and the settings options. This is followed by a short section about the log window.

All screenshots have been taken under Windows. The visual appearance of the windows, buttons etc. is probably different under other operating systems.

3.1 The simple mode

Carnival starts up in the simple mode. Under Windows, it may look like this:

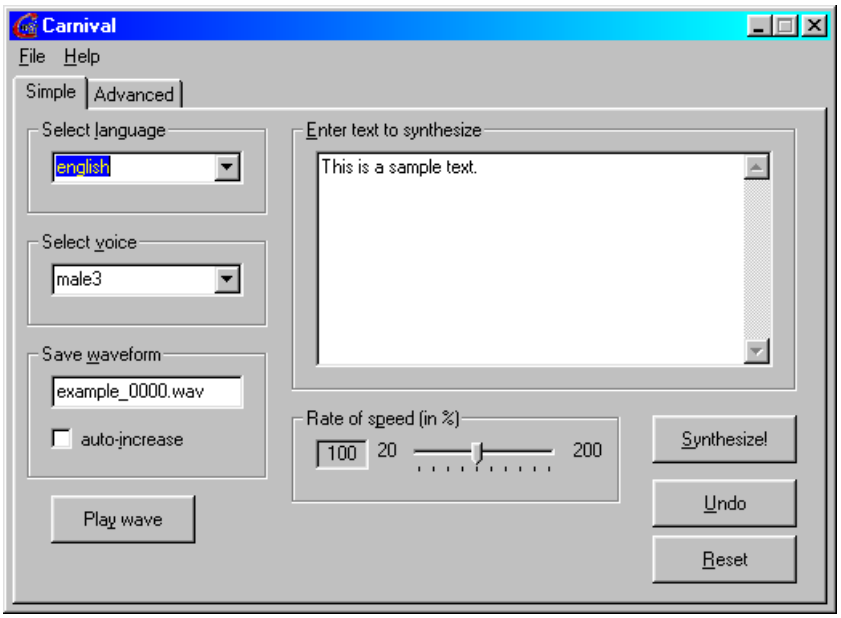

Figure 1: Carnival (simple mode)

The simple mode is intended for synthesizing without using markup languages: the user simply chooses the desired language and voice in the respective combo boxes, enters the desired text into the text control and clicks on "Synthesize". But extra information (like prosody, breaks, ...) cannot be added to the text because markup tags cannot be entered. If all settings are specified correctly (see also the settings dialogue in 3.4) and Festival could respond to the request, a wave file will be written and can be played via the "Play wave" button. Should there occur any errors and the synthesis request is not successful, an error message can be found in the log window (see respective chapter 3.5) which will show some more details upon the occurred error.

The "rate of speed" slider might be self-explanatory: the speaking rate can be preset with it, where 100% mean normal speech rate, values bigger than 100% mean faster tempo and finally, smaller values mean slower tempo.

A special function hides itself behind the “auto-increase” checkbox: if it’s checked, Carnival creates a new wave file at each synthesis process. As a default the indicated wavefile is overwritten if already existing. If the checkbox is marked, Carnival numbers consecutively all files in addition, by attaching a four-digit number if needed (the default value “example_0000.wav” would become “example_0001.wav”). In this way it’s enough to change the text only and then be able to synthesize several sentences quickly. This function is equally available in the advanced mode.

With the “Undo” button, the last text input can be undone, and with the “reset” button (as the name already implies) all inputs and selections are being reset to default values.

3.2 The advanced mode

The advanced mode is intended for advanced users, who already have some knowledge in one of the two supported markup languages (Sable or SSML). To

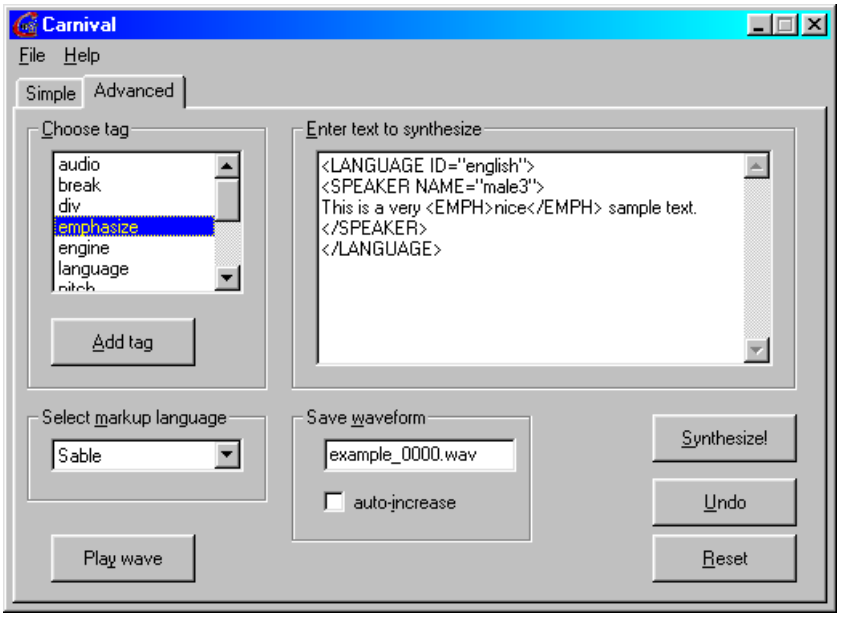

Figure 2: Carnival (advanced mode)

switch to this mode, you simply click on “Advanced”. At first time, a message box is showing up and notifies the user being in advanced mode now. If you switch back to the simple mode, there is also showing up a message box (only once) informing the user that changes being made in advanced mode won’t show up in simple mode. The reason of that is that in the advanced mode, markup notation is used, but in simple mode it’s plain text. This can lead to problems like inconsistent Sable files.

In the advanced mode it's expected that text being entered in the text control is markup language. The desired markup language can be set via the drop down menu in the lower left ("Select markup language"). By the way: the markup language can also be changed while entering text, but then, all the currently entered tags (of the "old" language) will be removed.

The four buttons ("Synthesize", "Undo", "Reset" and "Play wave") have just as the "Save waveform" box exactly the same mode of operation as in the simple mode. That's why it won't be discussed any further here.

The selection field with the tags is new: depending on the selected language, all corresponding tags are included in the list of the drop down menu. If you want to insert a tag into the text, you position the cursor at the desired position in the text field or highlight a certain part of the text. Then, the desired tag can be inserted either by selecting the tag and clicking on the "Add tag" button or by doubleclicking on the tag. In both cases, the start and end tag is being inserted into the text field. If the start tag contains additional options, they will be inserted without value as shown below:

```
<voice name="" gender="" age="" variant="">hello</voice>
```

It's an easy way to insert the corresponding values manually then. If one or more options are not needed, it's best to delete them.

Header and footer of the markup files are automatically inserted at the beginning and the end by Carnival while saving the files, as already stated in chapter 2.

3.3 The menu

The menu of Carnival consists of two parts:

- File menu and
- Help menu

Some entries can alternatively be accessed via shortcuts. If that option exists, the shortcut is in brackets after the menu item. But not all operating systems support this (GTK doesn't for instance, Windows does).

The **file menu**:

Clear log (Ctrl-L)

The current text in the log window is being deleted with that menu point.

Settings (F10)

Calls the settings dialogue, with which some settings can be changed (see chapter 3.4 for details).

Toggle Tooltips (Ctrl-T)

The "tooltips" (small help texts, which come up when the cursor stays on certain areas) can be switched on or off with this option.

Exit (Alt-X)

Quite obvious: Carnival exits if this item is chosen and all open sub windows, if any, are also closed automatically (the log window, for instance).

The **help menu**:

Help on program (F1)

This menu item displays a small dialogue window, in which there is shown a short help text about Carnival.

Show Sable documentation

Displays a short Sable tutorial in a new window (see also chapter 2.1). This tutorial can also be viewed with every common browser. The window displays the content of the file `sable.htm`. Carnival searches this file in the directory that is set in the settings dialogue under "Documentation directory". This window can remain open while working with Carnival, it will be closed automatically when the application is closed.

Show SSML documentation

Displays a short SSML tutorial in a new window (see also chapter 2.2). This tutorial can also be viewed with every common browser. The window displays the content of the file `ssml.htm`. Carnival searches this file in the directory that is set in the settings dialogue under "Documentation directory", too. This window can remain open while working with Carnival, it will be closed automatically when the application is closed as well.

About (Alt-A)

With this menu item, an "about box" is displayed where some information about Carnival (like the version number, for instance) is included.

3.4 The settings dialogue

Some global settings of Carnival can be changed in this dialogue window. Most of these parameters can also be set via the command line (see chapter 4 for details).

Called via the menu bar, the opposite dialogue window will come up.

The parameters are divided into two groups due to a better clarity:

Into parameters which control the access modes to Festival and into other parameters, with those it's possible to adjust more settings in addition.

Some parameters have "tooltips" (short help texts) in addition, which come up after a short delay (this depends on the "tooltip delay" setting and they will of course only come up if not switched off via the menu).

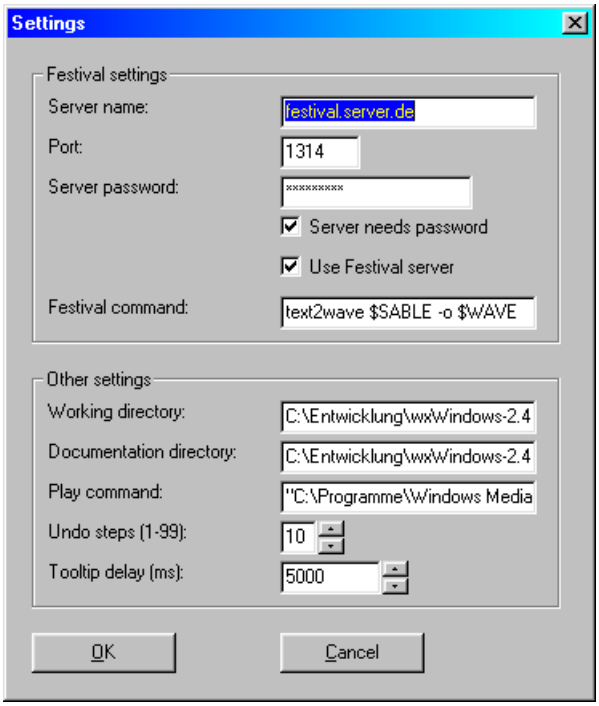

Figure 3: Carnival settings dialogue

The individual parameters in the overview:

Server name:

The default value is *localhost*. The server name is the address of the Festival server and can be either an IP address (123.234.234.123) or an URI (festival.domain.de). This value can be set via command line option, too.

Port:

The default value is *1314* (default value of Festival). This option defines the server port of Festival and has to be a positive whole number. In the same way as the server name, this option can also be set via command line option.

Server password:

No default value (empty string). The password for a protected Festival server can be set with this option. But the password will only be used if the

following checkbox is marked. This value can also be set via command line option.

“Server needs password” (checkbox):

The default value depends on the given command line options. If the checkbox is marked, the application assumes that the Festival server is password-protected. The current password will then be sent to the server after a connection is established. If a password is given via command line, this checkbox will be marked automatically - otherwise not. This checkbox has no function in the local mode and will therefore be ignored.

“Use Festival server” (checkbox):

This checkbox is marked as a default, which means that Carnival is running in the server mode. Carnival is running in the local mode if the checkbox is not marked.

Festival command:

The default command line is: *text2wave $SABLE -o $WAVE*. With the help of this option a Festival command line will be entered with which Festival can be executed in the local mode. The two variables $SABLE (the Sable or SSML file) and $WAVE (the wave file) are important here: they must be given within the command line in order to be able to insert the two files correctly into the command string. The complete path to the command must be given (or the directory must be included into the PATH). Differently expressed: the command string must be executable on a console as entered. This value can be set by command line option, too.

Working directory:

The working directory can be adjusted here. In this directory, all temporary files of Carnival and all wave files are being stored. On startup, the current directory is automatically assumed as working directory. This value can also be set by command line option.

Play command:

The default value depends on the operating system. This is the command string with which wave files are being played within the application. The current file name of the wave file to be played will be appended at the end of the string. This value can be set by command line option, too.

Undo steps:

The maximum number of undo steps can be specified here. The default value is *10*. Values from 1 up to (and including) 99 are permitted.

Tooltip delay:

This value is preset on *5000* and indicates the delay (in milliseconds), until a tooltip comes up. Valid values are within the range of 50 to 9999 (always including). This value is considered only if the menu option “Toggle tooltips” in the file menu is switched on.

3.5 The log window

If Carnival is started, one additional window besides the main window is visible – this is the log window:

All status or error messages which appear during the runtime of Carnival are written into this window. In normal operation, it’s not necessarily required to constantly monitor the resulting messages. But if an error occurs, the detailed error messages usually give a description (or at least a containment) of the problem. Apart from that, status messages telling the user what’s done right now are constantly provided during the synthesis procedure. The possible error messages are specified in the chapter 5.

A special feature of this window should be still mentioned: it can**not** be closed by the user. It’s closed automatically by the application on exit. The reason for this behaviour is that Carnival would proceed to send all status or error messages to the log window – which then would no longer exist, however. Accesses to or interactions with nonexisting objects often lead to fatal errors in the program flow and can cause crashes.

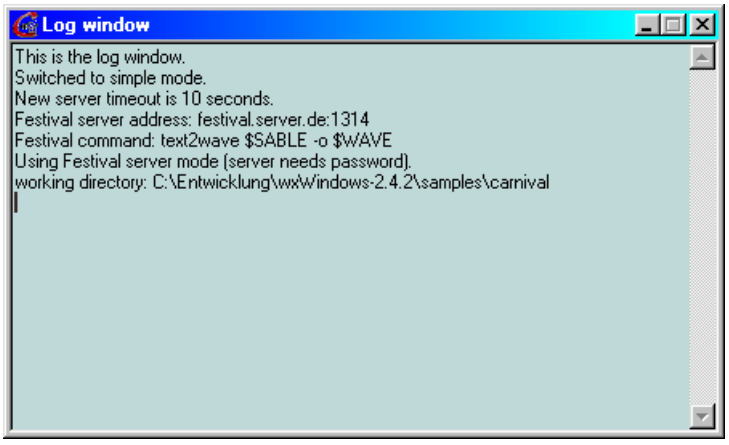

Figure 4: Carnival log window

3.6 Enhancements

During the implementation and also during first tests some suggestions have been made for possible enhancements:

- *Support of multiple languages*: At the moment, Carnival supports only English as "GUI language". The possibility to integrate multiple languages is considered in later versions.
- *Loading markup tags from files*: This would allow a faster and more flexible adjustment to the standards of the markup languages.
- *Configuration files*: The current settings of Carnival could be saved (and loaded) easily with it.
- *Better syntax check of the markup languages*: Thus typing or syntax errors could be intercepted before the synthesis request. The implementation of such a parser is quite complex, however.

It should be referred to the project homepage of Carnival on sourceforge.net [2] once again here, where the current development status is available and feature requests can be made, too.

4 Command line options

Carnival provides some command line options, in order to hand over different parameters to the application on startup already. Because it's not possible with Carnival at the moment to save the current configuration before the application has been closed, the default values set must be adjusted at any new start. It's therefore a good idea to start Carnival via script (Unix) or shortcut (Windows) and to hand over the necessary parameters to the application immediately.

All parameters with the exception of the timeout can also be changed by the settings dialogue of the application at any time. Each parameter has a short and a long syntax and may only occur once in the command line. Examples:

```
carnival /s festival.domain.de /p 8503 /t 10
```

or

```
carnival --command=festival195 --playback=na_play
```

The possible options are:

/h oder **--help**:

With this option, a short help is displayed that lists all command line options along with a short description. After that, Carnival will be terminated. Additional options (no matter whether before or after it) are ignored.

/s oder **--server=<string>**:

Default value: *localhost*. The given string is the address of the Festival server and can either be an IP address (123.234.234.123) or an URI (festival.domain.de).

/p oder **--port=<number>**:

Default value: *1314*. This option indicates the server port and must be a positive whole number.

/c oder **--command=<string>**:

Default value: *text2wave $SABLE - o $WAVE*. With this option, the Festival command line will be specified with which Festival will be executed in the local mode. The two variables $SABLE (the Sable or SSML file) and $WAVE (the wave file) are important here: they must be given within the command line in order to be able to insert the two files correctly into the command string.

/pw oder **--password=<string>**:

No default value (empty string). The Festival server can be protected with a

password, which can be set here. Carnival normally starts in the normal server mode. Now if a password is handed over via this option, Carnival starts in the “protected” server mode and will send the password to the server on each synthesis request. In the settings dialogue, there is a check box (“server needs password”), with which can be toggled between both modes.

/t oder **--timeout=<number>**:

Default value: *15*. The server timeout can be changed with this option. The indicated value must be a whole positive number and is interpreted as a value in seconds. The value cannot be changed anymore later in the application.

/wd oder **--workingdir=<string>**:

The default value is the current directory. The string entered here specifies the working directory, in which Carnival saves the markup and wave files. The working directory can also be changed in the application at any time.

/dd oder **--docdir=<string>**:

The default value is the working directory. Carnival searches for *sable.htm* and *ssml.htm* in this directory – the two documentations for the markup languages. This directory can be changed in the application at any time, too.

/pb oder **--playback=<string>**:

The default value depends on the selected operating system and specifies the command string, with which wave files should be played within the application. The current filename of the wave file to be played will be appended at the end of the string. This value can be edited in the application, too.

5 Error messages

All error messages defined in the source code of Carnival are listed here. If possible, the problems and solutions are described. It may happen that error messages come up which are not specified here. The reason of that is that some of the wxWidgets classes used can produce their own error messages.

Error messages while running Carnival:

Another instance of Carnival is already running, aborting!

This message appears if an instance of Carnival is running and the user is trying to start Carnival once again. Only one instance per user is permitted, in order to avoid interferences (with the audio output, for instance).

Syntax error detected, aborting!

A wrong command line option was given or a syntax error in a command line option was discovered.

Low remaining disk space! [. . .]

On the current hard disk drive is less than 1 MB of free disk space. This message is meant to be a warning message, because wave files may need quite much disk space depending on the length of the synthesized text.

Working directory does not exist!

The working directory doesn't exist or the access rights are not set properly.

Documentation directory does not exist!

The directory given in the command line option, in which Carnival searches for the documentation files for the markup languages, does not exist.

Sable documentation not found <file>!
SSML documentation not found <file>!

The indicated file(s) couldn't be found in the "documentation" directory. If these files are missing, Carnival cannot show the two tutorials for the markup languages.

Low free memory: [...]

There is less than 1 MB of free memory. Due to the fact that Carnival buffers the data received from the server in memory while in server mode, it

may cause problems with very little free memory available. This message is only a warning message.

Listbox has no selections anymore!

This error message comes up if a drop-down menu is empty. That shouldn't be possible in the present configuration.

Invalid port! Use default port.

The newly entered port is invalid. The port number must be a whole number, greater than zero and less than 65535. The default port is *1314* and will be used instead.

Working directory invalid! No change.

The newly entered working directory is invalid, doesn't exist or the access rights are not set properly. For this reason, the working directory previously set is reused.

Error messages during the synthesis request:

[. . .] access failure!

The markup file cannot be opened for writing (missing access rights?).

[. . .] write error!

An error occurred while writing to the markup file. There is usually not enough disk space available if this message appears.

Sable tag error!

The syntax in the Sable file is incorrect. That means that the synthesis procedure is aborted, because Festival would likewise return an error message with an incorrect markup file.

Failed! Unable to connect. Please check your settings.

It's not possible to establish a connection to the Festival server. With this error message, a "Socket error" is additionally shown which will specify the occurred problem.

Socket error: No error found on client side. Server denies access?

Socket error: Invalid operation.

Socket error: Input/Output error.

Socket error: Invalid address passed to socket.

Socket error: Invalid socket (uninitialized).

Socket error: No corresponding host.

Socket error: Invalid port.

Socket error: The socket is non-blocking and the operation would block.

Socket error: The timeout for this operation expired.

Socket error: Memory exhausted.

This is a list of all provided Socket error messages of the wxWidgets class *wxSocketBase*. Since there can be lots of reasons for a not-working network communication (on client as on server side), it won't go into detail with that here. It's recommended in any case to examine the server settings again and to also make sure that the server to be connected to is working correctly (and online).

Server error: Couldn't send data (completely) to server.

This error message comes up if the number of bytes actually sent to the server is less than the number of bytes to be sent – thus not all (or no) data could be sent. That can have many causes, such as an unstable connection, for instance.

Server error: Couldn't send password to server.

Basically the same error as above – the password couldn't be sent (completely) to the server. In both cases the connection to the server is aborted.

Server error: Password wrong or not accepted.

The password sent to the server is either wrong or the server doesn't accept a password (server isn't password-protected). This error message maybe doesn't come up if the server has a slow response behaviour, because Carnival waits only a short time for the server response after sending the password. The reason of this is that the synthesis requests would last much longer each time, since the server doesn't know a "password OK" reply.

Server error: Returned data no waveform or unknown.

The Festival server indicated that it would return audio data, but Carnival cannot recognise them as these, however. Carnival can recognise NIST and RIFF data, one of these two is normally preset in Festival.

Server error: s-expression received.

The server response consists only of one s-expression, that normally means that there was an error while processing the synthesis request or that the server found (syntax) errors in the data sent. Unfortunately, the Festival server doesn't return detailed status or error messages in such cases, with which it would be possible to narrow down the cause.

Server error: No data returned.

The server didn't return any data. Sometimes, the matter of this can be a timeout adjusted too shortly.

WARNING! Memory allocation error while copying waveform data!

If this error occurs, no more memory can be allocated for the received audio data. That normally means that there is not enough free memory available.

Error while trying to delete wave file <wave file>!

The attempt to delete the specified wave file failed. Usually, missing access rights are mostly the reason for that.

Error while opening wave file <wave file>!

The specified wave file cannot be opened or created for writing. Missing access rights are the most likely reason here, too.

<wave file> couldn't be saved! No disk space left?

Data couldn't be written to the specified wave file. A very common reason for this is that there is no free disk space left.

Transfer error (Code <num>)!

This error message will only appear in the server mode. If the synthesis request won't be successful, this message is given along with an internal error code. The more detailed description of the error is resulting from the "Socket error: [...]" or "Server error: [...]" error message, which is shown before in this case.

Festival terminated with exit code <num>.

This error message only comes up in the local mode. If the return value (exit code) of the external application (usually Festival) is not equal to zero, this message is shown along with the returned error code.

Error messages while playing wave files:

Play command terminated with exit code <num>.

Should there be an error while playing the wave files (the external audio program doesn't return zero as exit code), this message is shown along with the returned error code (exit code).

References

[1] Alan W. Black, Paul Taylor, and Richard Caley. *The Festival speech synthesis system (documentation version 1.4)*. CSTR Edinburgh, 1999. [http://www.cstr.ed.ac.uk/projects/festival/manualfestival_toc.html].

[2] Carnival. A graphical user interface for Festival (sourceforge.net project). [http://sourceforge.net/projects/carnival], 2005.

[3] MIT / GNU Scheme. The Scheme development and project homepage. [http://www.gnu.org/software/mit-scheme/index.html], 1986–2005.

[4] World Wide Web Consortium (W3C). SSML – the Speech Synthesis Markup Language, version 1.0 (W3C Recommendation 9/2004). [http://www.w3.org/TR/speech-synthesis/], 1999–2004.

[5] wxWidgets. The open source, cross-platform native UI framework for C++. [http://www.wxwidgets.org], 1992–2005.