Using Video
with
Subjective Training and Evaluation Program (STEP)

Version 2.01

A computer-controlled system for audio presentation and subjective evaluation

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June, 2016

Contents

1 Overview

STEP now permits you to show test subjects a video signal associated with the audio signals under test. Only the audio systems are evaluated, so that STEP supports one video signal per Trial.

2 Adding Video to STEP session file

Adding video to a STEP session file is easy: just add the heading line:

```
video_session=video_720.txt
```

In this line, `video_session` is an attribute that indicates that there is an associated video session file, and `video_720.txt` is the pathname of the video session file.

For example, this is a MUSHRA STEP session file with video signals:

```
Session=MUSHRA
video_session=video_720.txt
# Signal_1
test1_audio/sig1_orig.wav  OR
test1_audio/sig1_orig.wav  HR
test1_audio/sig1_lp70.wav  LP70
test1_audio/sig1_lp35.wav  LP35
test1_audio/sig1_sys1.wav  Sys1
test1_audio/sig1_sys2.wav  Sys2
test1_audio/sig1_sys3.wav  Sys3
# Signal_2
test1_audio/sig2_orig.wav  OR
test1_audio/sig2_orig.wav  HR
test1_audio/sig2_lp70.wav  LP70
test1_audio/sig2_lp35.wav  LP35
test1_audio/sig2_sys1.wav  Sys1
test1_audio/sig2_sys2.wav  Sys2
test1_audio/sig2_sys3.wav  Sys3
# Signal_3
test1_audio/sig3_orig.wav  OR
test1_audio/sig3_orig.wav  HR
test1_audio/sig3_lp70.wav  LP70
test1_audio/sig3_lp35.wav  LP35
test1_audio/sig3_sys1.wav  Sys1
test1_audio/sig3_sys2.wav  Sys2
test1_audio/sig3_sys3.wav  Sys3
```

The video session file `video_720.txt` is

```
session=video
format=yuv
width=1280
height=720
fps=24
# Video_Files
test1_video/video_720_1.yuv       Video_1
test1_video/video_720_2.yuv       Video_2
test1_video/video_720_3.yuv       Video_3
```

There is only one video signal file per Trial. The MUSHRA session file shows 3 Trials (Signals 1, 2 and 3) and so the video session file has three video signal files (Video 1, 2, and 3).

3 Details of Video Session File

3.1 Session Header

The video session file has these attribute/value pairs:

Attribute	Possible Values	Mandatory/Optional	Description
session	video	Optional	Indicates that this is a STEP video session file
format	bmp	Mandatory	Video file is RGB with a windows DIB header.
	yuv		Video file is YUV 420 format with no header.
width	nnn	Mandatory if YUV	Width of video, in pixels
height	nnn	Mandatory if YUV	Height of video, in pixels
fps	nnn	Mandatory	Indicates the number of frames per second at which to show the video.

A description of each attribute follows:

session If present, this header line is `session=video`. It is optional and just used to indicate that this is a STEP video session file.

format The video file format can be either Device Independent Bitmap (DIB) with a DIB header, or a YUV format file with no header.

width Specifies the width of a video frame, in pixels. If video file is DIB, then this should not be present since the value is read from the DIB header.

height Specifies the height of a video frame, in pixels. If video file is DIB, then this should not be present since the value is read from the DIB header.

fps Specifies the speed at which to present video

3.2 Session Body

The session body is separated from the session header by the line

```
# Video_Files
```

Actually, only the # character must be present as the first character in the line.

The remaining lines in the session body are the relative path to the video signal file for a trial, followed by a label for the video signal. There must be exactly one video signal file for each trial in the STEP session file.

4 Video Files

4.1 Overview

DIB files consist of a DIB header followed by a sequence of bitmap images. Note that most DIB viewers will assume the file is an image file and show only the first video frame.

YUV files are actually YCbCr files that are in 4:2:0 format. This format uses one byte of luminance per pixel and one byte of Cb and Cr chrominance per 2x2 pixel region. The advantage of YUV format is that the file size is one-half the size of the equivalent signal file in the DIB format.

4.2 Limits on Video Files

STEP has been tested on 1920 x 1080 video files presented at 24 fps. Video frames are always displayed at the correct time with respect to the audio signal. If you experience video frame dropouts, try presenting a lower resolution video frame, e.g. 1280 x 720 pixels.

4.3 Creating YUV Video Files

One way to create video files is to use the ffmpeg program [1]. This is an extremely flexible program, and an example command line to create YUV format files is:

```
ffmpeg -i ifile.mov ofile.yuv
```

Note that ffmpeg supports many other input video formats besides `mov`
.

If you wish a video frame size smaller than the original movie frame size, use the `vf` option, for example:

```
ffmpeg -i ifile.mov -vf scale=-1:720 ofile.yuv
```

where the second argument to `scale` indicates that the frame height should be 720 pixels, and the first scale argument (`-1`) indicates to maintain the form factor of the original video.

5 Dual Monitor Use

The video and audio mode in STEP is particularly well suited for dual monitor use. Both the video window and the STEP test panel will be placed on the main display, but the administrator can move the video window to a second presentation monitor and leave the test panel window on the main monitor (or vice-versa).

6 References

[1]. FFmpeg. See ffmpeg.org for downloadable executables.