ReadMe – Video Conversion

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# Overview – What is this file about?

This file gives instructions on the preprocessing of raw video files recorded at HIFO. Problematically, thus far the unprocessed files could not be opened by most media players and were occupying lots of disk space (up to 40GB/hour). This README guides streamlines the reparation process to simplify the actual analysis. It is intended for WINDOWS machines at HIFO.

# Fix broken AVI Index

## Problem description:

The video files are saved in Microsoft’s file format .avi. Invented in 1992, avi is a video container format (i.e. it can bundle different underlying file formats together) that has long been a standard but is rather outdated these days. Due to an index error, most of the files won’t open in most media players such as VLC or QuickTime. Roughly, the index keeps track of the proper alignment between (e.g.) audio and image in a video. Although the videos can still be properly accessed by MATLAB (but only on Windows, not on Mac) and Windows Media Player still plays them, we need to repair the broken index, because handling terabytes of video data is cumbersome and no compression algorithm could be found that does not require a repaired index.

## How to repair the broken index:

The index is repaired via the command line tool ffmpeg. To repair a file follow the following steps:

* Open the command line by clicking on START and typing cmd into the search box.
* A new terminal window opens. To see whether the program is available type:

ffmpeg

* If you get an error (“ffmpeg is not recognized”), navigate to the folder where the config files of ffmpeg are saved. If this location is C:\ffmpeg\ type and your current directory is C:\Users\your\_user, type:

cd ..\..\ffmpeg\bin

* Type again ffmpeg to verify.
* To repair the index of a video type:

ffmpeg -i "path\_to\_vid" -c:a copy -preset ultrafast "path\_of\_new\_vid"

e.g.: ffmpeg -i “J:\data\body\broken\_vid.avi” -c:a copy -preset ultrafast “J:\data\body\good\_vid.avi”

* **Make sure that the name of the new video differs from the broken video. Otherwise you may lose the original data.** Then press enter to start repair.
* Be prepared that the repair of a single file can take more than a hour.
* At any time, you can track from the printed commands which frames of the video are currently being repaired.

## The result:

The index error should now be repaired which you can verify by opening it not only in Windows Media Player but also in VLC without throwing the index error message. In addition to the reparation, the resulting file will also be compressed to ca. 100MB/hour.

# Convert AVI to MP4

## Problem description:

Next to the inconvenience of still not being able to open the repaired file in MATLAB on Mac, the framerate sometimes diverged from 20 Hz, which is an explicit assumption in the motion detection GUI (which throws an error otherwise). To ensure the data analysis can be used smoothly on different operating systems we convert the avi files to the standard video format, MP4.

## How to convert:

HandBrake is a free, powerful, established, platform-independent video conversion tool. It can be accessed via a graphical user interface only. Next to file format conversion, it supports spatial cropping, adjusting spatial or temporal resolution, frontend-optimized conversion, grayscale conversion or varying framerates.

After opening the program, just drag your video of interest into the interface and wait until it is loaded.

1. First, navigate to the bottom line of the program and specify the path and name for the MP4 output file.
2. To make sure all videos of the experiment are converted under the same conditions, you should use **presets.** Presets are configuration files that bundle together a set of operations that should be applied to the input file.
3. Load the preset by opening the dropdown in the upper left and select: My Presets -> 20\_Hz\_FR
4. Then click Start (or Add to Queue if you are running another conversion).

**In case the preset is unavailable:** This means you have to set all the operations of the preset by hand:

* We start with a built-in preset. Choose it via the preset dropdown: General -> VeryFast 1080p30 From the menubar select the following options:
* Select: Filters -> Color -> Greyscale
* Select: Dimensions -> Anamorphic -> Custom
* Select: Dimensions -> Storage Size -> Keep Aspect Ratio
* Insert: Dimensions -> Storage Size: 500
* Select: Video -> Framerate (FPS) -> Constant Framerate
* Select: Video -> Framerate (FPS): 30
* Slide: Video -> Encoder Options -> veryfast (all the way)
* Then click Start (or Add to Queue if you are running another conversion).

**Note**: You can convert multiple files at a time *if* they are within the same folder. Just drag the folder into the program, do everything as above and then click Add to Queue -> Add All (Mac: Top menubar -> File -> Add Titles to Queue) and make sure you have all videos selected before you add them to the queue.

# Sanity checks

This is a list of sanity checks that you may execute/verify before you feed the data into the motion detection GUI.

1. **Frame Rate**The frame rate should be constant at 20 Hz across the entire video. Otherwise the motion detection algorithm won’t work properly. If you used the provided HandBrake preset, the frame rate will be 20 Hz. You can verify that in MATLAB:

**vid = VideoReader(path\_to\_your\_video);**

**vid.FrameRate**

1. **Behavioral files**

Normally, the behavioral files are retrieved automatically from the backend. They are currently saved on the “Moritz\_beh” harddrive which you need next to the “Moritz\_body” harddrive for the videos. The backend assumes that the behavioral files are accessible over the H:\ drive. However, in case it can’t retrieve the file automatically, it will ask you to specify the path manually.

1. **File names**

The video file path should have the following structure:   
/date/mouse\_ID/session\_ID/mouse\_ID-session\_ID.mp4

for example: /17-10-24/5212r/230/5212r-s230.mp4

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