

Signal processing: Exercise 3

How I installed ffmpeg and ffprobe on my machine

My machine specifications: Mac OS 12.5 with Intel CPU

In order to install ffmpeg and ffprobe I followed the instructions of the following comment <https://superuser.com/a/624562> which suggest the following process:

- 1) Download static builds for ffmpeg and ffprobe from ffmpeg's downloads page
- 2) Once downloaded I moved the files to /usr/local/bin/ffmpeg and /usr/local/bin/ffprobe directories
- 3) Added the path: "/usr/local/bin" to my PATH env var on ~/.bash_profile
- 4) In order to be able to execute ffmpeg and ffprobe commands from the terminal I need to give permission to both since they come from an unidentified developer and Mac OS blocks the apps when I try to start them. To do this I opened the directory /usr/local/bin on Finder and then followed these instructions: <https://support.apple.com/en-sg/guide/mac-help/mh40616/mac>. I only need to do this once and after apps would perfectly work from the terminal.

Analysis of my application

My application can be divided into 3 main parts:

1- Video analysis and report generation

The main steps here are the following: Given a list of video filenames run ffprobe command for each of it, parses its output, compare extracted fields with a dictionary of expected fields and add the result in a human readable way to a list of text lines which will be written to the final txt report. Also generates a list of tuples with each tuple being, (filename, list of changes required) which will be used in the next step to convert each input video based on the changes specified in the list.

2- Video conversion

Given the list of transformations per filename generated in the analysis phase, call ffmpeg with the required flags to perform the transformations and store the new video in the output folder.

3 Extra step: validation

I generate the report from the analysis phase again over output videos to validate that it finds no issues with the new videos.

Description of terms

Video format(container): File structure where video data is stored, the actual video data does not change between one container or the other.

Video codec: How video data is represented and stored. Each codec compresses and represents video in a different way, quality and file size varies depending on codec

Audio codec: The way audio data is compressed and represented

Frame rate: How many images(frames) per second the video has, more make for a smoother video but bigger in size.

Aspect ratio: Ratio between width and height of video image

Resolution: Size of each frame: width and height, the bigger represents a clearer image but bigger in file size, it also alters aspect ratio(width/height).

Video bitrate: Amount of memory required to represent a second of video data. The higher the better the quality of video since when lowering it we must compress video, compression depends on codec, some codecs may provide better image quality at smaller bit rates than others.

Audio bitrate: Amount of data required to represent a second of audio data. When higher audio is more clear, audio quality also depends on how efficient the codec is in representing the data.

Audio channels: Number of dedicated signals of audio we have, eg: with 2 channels we can have different sounds coming from right vs left speaker VS in 1 channel which can only represent one audio signal at a time(all speakers must play the same sound).