# Video Shot and Scene Segmentation

**Version 1.4 Documentation**

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# 1 Introduction

This is a tool for automatic temporal segmentation of videos into shots and scenes. Shots are sequences of consecutive frames captured without interruption by a single camera. The transition between two successive shots of the video can be abrupt, where one frame belongs to a shot and the following frame belongs to the next shot, or gradual, where, two shots are combined using chromatic, spatial or spatial-chromatic video production effects (e.g., fade in/out, dissolve, wipe), which gradually replace one shot by another. This tool is capable of detecting both types of transitions. Scenes are higher level temporal fragments that correspond to the story-telling parts of the video. They are formed by grouping the detected shots into semantically coherent temporal video fragments. Parallel computing, via multi-threading, is used for making the whole video analysis several times faster than real-time processing.

# 2 Usage instructions

## *2.1 Installing and running the Windows version*

If you received the MS Windows version of the video shot and scene segmentation software, please follow the installation and execution steps below.

**i) Unpack the downloaded tar.gz file.**

**ii) Run the software**

Navigate with the cmd to the video_segmentation directory and run:

```
>video_segmentation <video_name>
```

where `<video_name>` is the name of the video you want to process. For example: `>video_segmentation video.mp4` . Please note that the video should be on the same directory with the executable or else you should provide the FULL path to the video. If you also want to store the shot or scene keyframes you can add the options `[-kf_shot]` and `[-kf_scene]` as in the following example.

```
>video_segmentation <video_name> -kf_shot –kf_scene
```

The above command will perform the analysis and store both shot and scene keyframes.

## 2.2 Software output

After the processing is finished, the folder where the video was placed will contain four newly created results files and folders:

- The file **"<video_name>_shots.txt"** contains information about the automatically detected shots. For each shot the software stores a new line with information about the starting and ending frames of the shot, plus three intermediate frames that can be used as representative keyframes of this shot in other visual analysis tasks (e.g., for video concept detection and video event detection)
- The file **"<video_name>_shots.srt"** contains the automatically detected shots in the format of video's subtitles, enabling the user to check visually the produced output (after renaming the file as the name of the video, and using e.g. the VLC player, or other players)
- The file **"<video_name>_scenes.txt"** contains information about the automatically detected scenes. For each scene the software stores a new line with seven (7) numbers. The first two represent the starting and ending frames of the shot, while the next five numbers are the five most representative keyframes of the scene. If the last two numbers of a scene are zero this means that the scene consists of only one shot, thus we list only three keyframes.
- The file **"<video_name>_scenes.srt"** contains the automatically detected scenes in the format of video's subtitles, enabling the user to check visually the produced output (after renaming the file as the name of the video, and using e.g. the VLC player, or other players).
- If the [-kf_shot] option is selected, the folder **"<video_name>_Shot_Keyframes"** will be created, containing the 3 keyframes of each shot in jpeg image format, named "shotx_y.jpg", where x is the shot number and y is the keyframe number in the shot (1, 2 or 3).
- If the [-kf_scene] option is selected, the folder **"<video_name>_Scene_Keyframes"** will be created, containing the 5 (or 3) keyframes of each scene in jpeg image format, named "scenex_y.jpg", where x is the scene number and y is the keyframe number of the scene (1,2,3,4 or 5).

## 2.3 Software limitations

The software was tested, in terms of compatibility, using various video formats and codecs, including MPEG, MP4, AVI, WMV, MOV, WEBM, FLV. In addition to these, it may work with the other video formats and codecs supported by FFmpeg, although it should be noted that no such testing has been performed.

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