NAME

openmsmi − Command−line interface to encode, decode, play and analyse multispectral moving images

SYNOPSIS

openmsmi (**−e** | **−d** | **−p** | **−a** | **−m**) **−i** *input_file* [**−o** *output_file*]

openmsmi −h | **−v**

DESCRIPTION

MSMI is a video codec for handling multispectral moving images, specifically designed for conservation and restoration purposes.

libmsmi is a C library implementing the **MSMI** video codec.

openmsmi is a Bash command−line interface to **libmsmi** allowing to encode, decode, play and analyse multispectral moving images.

The **openMSMI** package includes the **libmsmi** library and its **openmsmi** command−line interface.

OPTIONS

−h, −−help
> display a help message

−v, −−version
> display the running version

GENERAL OPTIONS

Select the mode:

−e, −−encode
> encoding mode: encode an *input_file* to an *output_file*

−d, −−decode
> decoding mode: decode an *input_file* to an *output_file*

−p, −−play
> playing mode: play an *input_file*
>
> This mode is highly experimental! Please remember that, depending on the number of spectral bands and the available computing power, the moving images may play very slowly, far below real time.
>
> The **−−select** option and the **−−ignore** option allow to play only some spectral *band*s, or even only some *bit_plane*s of spectral *band*s.
>
> The author is indebted to Fabrice Bellard (and his **bpgview**) for the inspiration given.

−a, −−analyse, −−analyze
> analysing mode: analyse the validity of an MSMI encoded *input_file* and generate a report to an *output_file* if specified or to the Terminal otherwise

−m, −−metadata
> metadata mode: extract the technical metadata of an MSMI encoded *input_file* without analysing its validity (including the wavelength vector), and generate a report to an *output_file* if specified or to the Terminal otherwise

Select the file(s):

−i *input_file*, **−−input=**input_file
> In encoding mode, all container formats supported by FFmpeg should work. A **−−match−vector** can be used to force the interpretation of the provided data.
>
> In decoding, analysing or metadata mode, the container formats NUT (.nut) and Matroska (.mkv) have been tested as wrappers for the MSMI video codec.

−o *output_file*, **−−output=**output_file
> In encoding mode, the container formats NUT (.nut) and Matroska (.mkv) have been tested as wrappers for the MSMI video codec. Please note that such a file will work only with **libmsmi** and

currently it will not play at all with VLC.

In decoding mode, all container formats supported by FFmpeg should work.

In analysing and metadata mode, the output file format can be plain text (.txt), JSON (.json) or XML (.xml).

ENCODING OPTIONS

The following list is not exhaustive.

−−wavelength−vector=(*wavelength_0 . . . wavelength_n***)**

Each spectral band is defined by its medium *wavelength*. The *wavelength* is expressed in nm and decimals are not allowed.

For readability, we suggest to order the spectral bands by increasing wavelength.

In theory, any number of spectral bands is possible. Currently, we suggest to work with a multiple of 3.

−−match−vector=(*band_0 . . . band_n***)**

defines how *input_files* other than MSMI files should be read and how *output_files* other than MSMI files should be written

The format of the match vector is still evolving.

−−bit−depth={*16*|*24*}

bit−depth can be *16* (default) or *24* per spectral band

Currently, the 24−bit per band flavour is primarily meant for research purposes on file formats for the future, because it can hardly be transcoded into current formats.

−−compression={*no*|*yes*}

compression can be *no* (default) or *yes*

A lossless compression can be applied. However, please remember that this makes sense only for conservation purposes, because during the restoration process "raw" is always faster and any compression would slow down significantly the image processing.

The compression rate is typically between one and two thirds, depending on the image content.

OTHER OPTIONS

The following list is not exhaustive.

−−report−fmt={*json*|*plain*|*xml*}

report format can be *json*, *plain* text (default) or *xml*

−−select=*band*[=*bit_plane*]

In play mode, allows to select only one spectral *band*, or even only one single *bit_plane* of a spectral *band*.

This option may be repeated.

−−ignore=*band*[=*bit_plane*]

In play mode, allows to ignore a full spectral *band*, or even only one single *bit_plane* of a spectral *band*.

This option may be repeated.

NOTES

The video codec **MSMI** has been superseded on 2019−01−19 by its generalisation **MovIm**.

At the moment, if the number of spectral bands is a multiple of 3, then the processing of the file is faster. (The majority of our tests are done with 15 bands.)

The application programming interface of **libmsmi** is not stable yet, therefore its current **openmsmi** command−line interface should be considered a work in progress.

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