NAME

movimenc - MovIm encoder

SYNOPSIS

movimenc [input_options] **-i** *input_file* [encoding_options] [output_options] **-o** *output_file*

movimenc -h

DESCRIPTION

MovIm is a video codec specifically designed for both conservation and restoration of moving images.

The **MovIm** package includes the **libmovim** C library implementing the **MovIm** video codec and its associated **movimenc**, **movimdec** and **movimplay** utilities, as well as the **openmovim** Bash command-line interface allowing to encode, decode, play and analyse virtually any moving images.

movimenc is a **MovIm** encoder.

OPTIONS

GENERAL OPTIONS

-i *input_file*, **--input=***input_file*

All container formats and video codecs supported by FFmpeg should work.

-o *output_file*, **--output=***output_file*

The uncompressed or lossless compressed MovIm data can be used directly as a file (.movim). This format is directly inspired from FFmpeg's NUT container.

INPUT AND OUTPUT OPTIONS

--flip=(*vertical*|*horizontal*)

flip the image on the *vertical* or *horizontal* axis

This option may be repeated.

--rotate=*angle*

angle of counterclockwise rotation in degrees, expressed as an integer or a real number

This option may be repeated.

--lut[**:***channel*]**=***path*

path to an 1D LUT or to a 3D LUT to apply

LUTs can be applied to the input file and/or the output file. Moreover a LUT can be applied to the whole file (default) or only to a single *channel*.

This option may be repeated.

For 1D LUT, which transforms e.g. from floating-point scene linear into camera log or a display-referred space, the maximum allowed size is currently 16'777'216, that is 24-bit precision.

ENCODING OPTIONS

The following list is not exhaustive.

--bit-depth[**:***channel*]**=***bit_depth*

bit_depth can be any positive integer

We have tested mainly with *10*, *12*, *16* (default) or *24* per channel. We suggest to digitise at 16-bit per channel and to use this bit-depth for actual restoration work.

Currently, 24-bit per channel is primarily meant for research purposes on file formats for the future, because it can hardly be transcoded into current formats. Also remember that it is difficult to digitise at a higher bit-depth than 21.

Please remember that many Bayer-filter sensors have a bit-depth of 12-bit per channel.

The bit-depth can vary between the channels because, sometimes, it might be useful to have a different bit-depth for the "alpha" channel (which in restoration workflows it's actually often used as infrared channel).

--xyz-matrix=(*x_0 y_0 z_0 . . . x_n y_n z_n***)**

defines how the *input_file* should be read and/or how the *output_file* should be written

A channel can be not only one of the current R, G, B, Y, Cb, Cr, Co, Cg or alpha, but also a Bayer-filtered channel or any band of a multispectral scan. Any number of channels is supported.

The format of the XYZ matrix is still evolving. An example of the current matrix format (CIE RGB) is:

```
0.7355  0.2645  0.0000
0.2658  0.7243  0.0099
0.1669  0.0085  0.8246
```

--illuminant=(*x y z***)**
defines the illuminant

The current default value is D65, i.e.

```
0.31271  0.32902  0.35827
```

--endian=(*big|little***)**
endianness can be *big* or *little* (default)

--compression=(*no|yes***)**
compression can be *no* (default) or *yes*

A lossless compression can be applied for conservation purposes, in order to reduce the needed storage, typically between one and two thirds, depending on the image content. The wavelet compression used is possibly a wee bit better than HuffYUV, FFV1 or JPEG2000 in terms of both speed and compression rate. Remember that in general a higher resolution means a less good compression, because of the increased noise.

The uncompressed format is always faster for restoration, because any compression would slow down significantly the image processing.

--bayer2rgb=(*bggr|rggb|gbrg|grbg***)**
transform a Bayer-encoded *input_file* into an RGB *output_file* with half of the horizontal and vertical resolution

This option allows to generate a full RGB file at half pixel resolution from the raw stream of almost any current camera. The following four standard filter patterns are implemented:

```
       +-------+-------+          +-------+-------+
       | blue  | green |          |  red  | green |
bggr = +-------+-------+   rggb = +-------+-------+
       | green |  red  |          | green | blue  |
       +-------+-------+          +-------+-------+

       +-------+-------+          +-------+-------+
       | green | blue  |          | green |  red  |
gbrg = +-------+-------+   grbg = +-------+-------+
       |  red  | green |          | blue  | green |
       +-------+-------+          +-------+-------+
```

--demosaic=(*BLI*|*BCI*|*LR*|*VNG*|*SI*|*PG*|*AMZE*|*HQLI*|*AHD*|*DLMMSEE*)
demosaic a Bayer-encoded *input_file* into an RGB *output_file*

This option allows to choose between different demosaicing algorithms, because the results may vary a lot, depending on the image content.

The following algorithms are implemented:
- *BLI* = bilinear interpolation
- *BCI* = bicubic interpolation
- *LR* = Lanczos resampling
- *VNG* = variable number of gradients
- *SI* = spline interpolation
- *PG* = pixel grouping
- *AMZE* = aliasing minimisation and zipper elimination
- *HQLI* = high-quality linear interpolation (Malvar, He and Cutler. IEEE 2004)
- *AHD* = adaptive homogeneity-directed (Hirakawa and Parks. IEEE 2005)
- *DLMMSEE* = directional linear minimum mean square-error estimation (Zhang and Xiaolin. IEEE 2005)

INFORMATIVE OPTIONS

-h, --help
display a help message

--version
display the installed version of **movimenc** in the date-based *YYYY-MM-DD* format and the implemented version of **MovIm** in the semantic *major.minor*[.*patch*] format:

```
movimenc 2025-06-29
MovIm 1.11
```

NOTES

The illuminant's default value may switch from D65 to D60 in future.

SEE ALSO

movimdec(1) and **movimplay**(1); **libmovim**(1); **openmovim**(1).

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