

NAME

deva-filter – simulate loss of acuity and contrast sensitivity

SYNOPSIS

deva-filter *preset-option* {*input.hdr* | -} {*output.hdr* | -}

or

deva-filter [*options*] *acuity contrast* {*input.hdr* | -} {*output.hdr* | -}

DESCRIPTION

Filter a RADIANCE picture to simulate the reduced visibility associated with loss of visual acuity and contrast sensitivity, writing the result to a new RADIANCE picture. The input picture must have a VIEW record indicating field of view. It can be in rgbe or xyze pixel format. The input can optionally be "-", indicating that the original picture should be read from standard input. The output picture will be in rgbe pixel format, regardless of the pixel format of input. The output can optionally be "-", indicating that the filtered picture should be written to standard output.

acuity is specified in terms of a Snellen ratio or a logMAR value. *contrast* is specified in terms of either the ratio of the desired Michaelson contrast sensitivity to normal vision contrast sensitivity or as a Pelli-Robson Chart score.

OPTIONS

preset-options: **--mild** | **--moderate** | **--significant** | **--severe**

Specifies use of one of four predefined levels of acuity and contrast deficits, along with a corresponding loss in color sensitivity. A fifth preset is also available, **--legalblind**. This specifies the U.S. "legal blindness" acuity level along with appropriate contrast sensitivity and color sensitivity values. Note that this specifies a level of visual impairment right at the legal blindness cutoff point. It is not some sort of test of legal blindness. When any of the presets are specified, the *acuity* and *contrast* arguments are left off the command line. Only one of these flags can be specified. When used, no additional flags other than **--margin=value** or **--verbose** are allowed.

--Snellen | **--logMAR**

Specifies the format of the *acuity* argument. **--Snellen** is the default. Snellen ratios can be given as a single decimal value or in the common "n/m" (in the U.S., usually "20/m") fractional form. logMAR values are given in the conventional manner as a single number.

--cutoff | **--peak**

Indicates that *acuity* is specified with respect to cutoff or peak contrast sensitivity. **--cutoff** is the default, and corresponds to the values usually reported in clinical eye examinations.

--sensitivity-ratio | **--pelli-robson**

Indicates that *contrast* is specified as a ratio of desired contrast sensitivity to normal vision contrast sensitivity (**--sensitivity-ratio**) or as a Pelli-Robson Chart score (**--pelli-robson**). **--sensitivity-ratio** is the default.

--autoclip | **--clip=level**

Large magnitude input luminance values are reduced to a lower level. This is most useful in reducing filtering artifacts due to small, bright light sources. For **--autoclip**, the level at which values are clipped is chosen automatically. For **--clip**, values larger than *level* are reduced to *level*, with *level* specified in cd/m^2 . Default is no clipping.

--color | **--grayscale** | **--saturation=value**

Indicates amount of desaturation. **--color**: no desaturation. **--grayscale**: full desaturation. **--saturation=value**: partial desaturation, scaled by value in range (0.0 - 1.0), with low values indicating more desaturation. **--color** is the default.

--margin=value

Add a margin around the input file to reduce FFT artifacts due to top-bottom and left-right wrap-around. *value* is a number in the range (0.0 -- 1.0]. It specifies the size of the horizontal and vertical padding as a fraction of the original horizontal and vertical size.

--version

Print version number and then exit. No other flags or arguments are required. (**-v** also works.)

--presets

Print out acuity, contrast sensitivity, and color saturation parameters associated with the presets **--mild**, **--moderate**, **--severe**, and **--profound**. No other flags or arguments are required.

--verbose

Print possibly informative information about a particular run.

EXAMPLES

To simulate moderate loss of acuity, contrast sensitivity, and color sensitivity:

```
deva-filter --moderate in.hdr out.hdr
```

To simulate 20/200 acuity without loss of peak contrast sensitivity:

```
deva-filter 20/200 1 in.hdr out.hdr
```

Equivalently, using logMAR notation for acuity:

```
deva-filter --logMAR 1.0 1 in.hdr out.hdr
```

To do the same filtering but output a grayscale image:

```
deva-filter --grayscale --logMAR 1.0 1 in.hdr out.hdr
```

To simulate a peak frequency sensitivity of 10% of normal vision and a peak contrast sensitivity at that frequency corresponding to 20% of normal vision:

```
deva-filter --Snellen --peak 0.1 0.2 in.hdr out.hdr
```

To simulate 20/400 acuity and a contrast sensitivity indicated by a Pelli-Robson Chart score of 1.0:

```
deva-filter --pelli-robson 20/400 1.0 in.hdr out.hdr
```

AUTHOR

William B. Thompson