Pnmcolormap User Manual

pnmcolormap

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NAME

pnmcolormap - create quantization color map for a Netpbm image

SYNOPSIS

pnmcolormap [**-center**|**-meancolor**|**-meanpixel**] [**-spreadbrightness**|**-spreadluminosity**] [**-sort**] [**-square**] *ncolors*|**all** [*pnmfile*]

All options can be abbreviated to their shortest unique prefix. You may use two hyphens instead of one to designate an option. You may use either white space or an equals sign between an option name and its value.

DESCRIPTION

This program is part of Netpbm.

pnmcolormap reads a PNM or PAM image as input, chooses *ncolors* colors to best represent the image and writes a PNM color map defining them as output. A PAM image may actually contain tuples of any kind, but **pnmcolormap**'s concept of the tuple values that best represent the ones present in the image may not make sense if the tuple type isn't RGB or GRAYSCALE. The design of the program, and the rest of this manual, assumes the tuples represent colors.

You can use this map as input to **pnmremap** on the same input image to quantize the colors in that image, I.e. produce a similar image with fewer colors. **pnmquant** does both the **pnmcolormap** and **pnmremap** steps for you.

A PNM colormap is a PNM image of any dimensions that contains at least one pixel of each color in the set of colors it represents. The ones **pnmcolormap** generates have exactly one pixel of each color, except where padding is necessary with the **-square** option.

The quantization method is Heckbert's "median cut". See QUANTIZATION METHOD.

The output image is of the same format (PBM, PGM, PPM, PAM) as the input image. Note that a colormap of a PBM image is not very interesting.

The colormap generally has the same maxval as the input image, but **pnmcolormap** may reduce it if there are too many colors in the input, as part of its quantization algorithm.

pnmcolormap works on a multi-image input stream. In that case, it produces one colormap that applies to all of the colors in all of the input images. All the images must have the same format, depth, and maxval (but may have different height and width). This is useful if you need to quantize a bunch of images that will form a movie or otherwise be used together -- you generally want them all to draw from the same palette, whereas computing a colormap separately from each image would make the same color in two images map to different colors. Before Netpbm 10.31 (December 2005), **pnmcolormap** ignored any image after the first.

If you want to create a colormap without basing it on the colors in an input image, **pamseq**, **ppmmake**, and **pnmcat** can be useful.

PARAMETERS

The single parameter, which is required, is the number of colors you want in the output colormap. **pnmcolormap** may produce a color map with slightly fewer colors than that. You may specify **all** to get a colormap of every color in the input image (no quantization).

OPTIONS

-sort This option causes the output colormap to be sorted by the red component intensity, then the green, then the blue in ascending order. This is an insertion sort, so it is not very fast on large colormaps. Sorting is useful because it allows you to compare two sets of colors.

-square By default, **pnmcolormap** produces as the color map a PPM image with one row and one column for each color in the colormap. This option causes **pnmcolormap** instead to produce a PPM image that is within one row or column of being square, with the last pixel duplicated as necessary to create a number of pixels which is such an almost-perfect square.

-verbose This option causes **pnmcolormap** to display messages to Standard Error about the quantization.

-center

-meancolor

-meanpixel

-spreadbrightness

-spreadluminosity These options control the quantization algorithm. See QUANTIZATION METHOD.

QUANTIZATION METHOD

A quantization method is a way to choose which colors, being fewer in number than in the input, you want in the output. **pnmcolormap** uses Heckbert's "median cut" quantization method.

This method involves separating all the colors into "boxes," each holding colors that represent about the same number of pixels. You start with one box and split boxes in two until the number of boxes is the same as the number of colors you want in the output, and choose one color to represent each box.

When you split a box, you do it so that all the colors in one sub-box are "greater" than all the colors in the other. "Greater," for a particular box, means it is brighter in the color component (red, green, blue) which has the largest spread in that box. **pnmcolormap** gives you two ways to define "largest spread.": 1) largest spread of brightness; 2) largest spread of contribution to the luminosity of the color. E.g. red is weighted much more than blue. Select among these with the **-spreadbrightness** and **-spreadluminosity** options. The default is **-spreadbrightness**.

pnmcolormap provides three ways of choosing a color to represent a box: 1) the center color - the color halfway between the greatest and least colors in the box, using the above definition of "greater"; 2) the mean of the colors (each component averaged separately by brightness) in the box; 3) the mean weighted by the number of pixels of a color in the image.

Note that in all three methods, there may be colors in the output which do not appear in the input at all.

Select among these with the **-center**, **-meancolor**, and **-meanpixel** options. The default is **-center**.

REFERENCES

"Color Image Quantization for Frame Buffer Display" by Paul Heckbert, SIGGRAPH '82 Proceedings, page 297.

SEE ALSO

pnmremap, **pnmquant**, **ppmquantall**, **pamdepth**, **ppmdither**, **pamseq**, **ppmmake**, **pnmcat**, **ppm**

HISTORY

Before Netpbm 10.15 (April 2003), **pnmcolormap** used a lot more memory for large images because it kept the entire input image in memory. Now, it processes it a row at a time, but because it sometimes must make multiple passes through the image, it first copies the input into a temporary seekable file if it is not already in a seekable file.

pnmcolormap first appeared in Netpbm 9.23 (January 2002). Before that, its function was available only as part of the function of **pnmquant** (which was derived from the much older **ppmquant**). Color quantization really has two main subfunctions, so Netpbm 9.23 split it out into two separate programs: **pnmcolormap** and **pnmremap** and then Netpbm 9.24 replaced **pnmquant** with a program that simply calls **pnmcolormap** and **pnmremap**.

AUTHOR

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