Subject: In Praise of HISTOGRAM
Posted by David Fanning on Fri, 12 Apr 2002 17:00:43 GMT
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Folks,

I used to think the WHERE function was pretty neat. But lately (I.e., this morning) I have become a convert and sing in praise of the HISTOGRAM function.

I had as a task to compute a density plot from two images. This is a pixel-wise comparison in which the X axis contains the values of image 1 (0 to 255) and the Y axis contains the values of image 2 (0 to 255). The Z direction of the plot contains the number of times these two images have this same pair-wise relationship. In other words, if the pixel value of image 1 is 10 and the pixel value of image 2 is 20, how many pixels are there that have 10 in image 1 and 20 in image 2.

Because I had never done this before, I proceeded in my usual plodding way. My first attempt (which I thought was pretty slick) computed histograms of the two images and used reverse indices to obtain the indices of the images that contained a particular value. Then I did a set intersection between the two vectors of indices to find out how many were in common. This method took only 48 minutes on these rather large (2199 x 2380) images. :-(

Oh, dear. I heard that ENVI did this sort of think almost instantaneously. Didn't *anyone* download that SAVE file cracker of Craig's!?

My colleague, Dave Burridge, and I put our heads together. There must be a trick to be discovered here.

Hang on a minute! What if we create an integer array, put one image in the low bits and the other image in the high bits. Won't each pixel have a unique number value? Then, what if we take a histogram of that? Won't that give us a vector of 2^16-1 values? And what if we reform that into the 256 by 256 array we are looking for?

Wham, bam. Less than 0.3 seconds later there was the result! If that first time through hadn't have taken 48 minutes I wouldn't have believed it.

I don't know if I've ever said this before, but I LOVE IDL!

Cheers,

David

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