1 Program 3dhistog

1.1 Purpose

Program 3dhistog computes a histogram of the voxel intensities in an *AFNI* 3D dataset.

1.2 Usage

The command line format for program 3dhistog is as follows:

3dhistog [editing options] [histogram options] dataset

1.3 Options

The editing options are the same as in program 3dmerge.

The histogram options are:

-nbin # Means to use '#' bins (default = 100).
Special Case: For short or byte dataset bricks, set '#' to zero to have the number of bins set by the brick range.

-thr r Means to count only voxels with the statistics threshold above 'r'.

-dind i Means to take data from sub-brick 'i'.

-tind j Means to take threshold values from sub-brick 'j'.

-omit x Means to omit the value 'x' from the count.

-notit Means to leave the title line off the output.

The report is sent to the standard output device (user's terminal, unless redirected).

1.4 Examples

Example 1. A researcher wishes to compute the histogram of voxel intensities for an *AFNI* 'fift' dataset. Only those voxels whose corresponding F-statistic is above 9.0 are of interest (this provides an overall significance level of $\alpha = 0.05$ for this particular case). The data is stored in file fred.smax+orig.BRIK (and .HEAD). The command line to calculate the histogram using 100 bins is given by:

3dhistog -thr 9.0 fred.smax+orig

The output is sent to the standard output device (usually, the user's terminal):

Magnitude	Freq	Cum_Freq	Thr_Freq	Cum_Thr_Freq
-458.567261	5	5	5	5
-449.316010	3	8	3	8
-440.064728	14	22	14	22
⋮	⋮	⋮	⋮	⋮
-23.757933	245	3060	6	2428
-14.506693	112	3172	0	2428
-5.255426	22434	25606	0	2428
3.995841	141	25747	0	2428
13.247108	356	26103	12	2440
⋮	⋮	⋮	⋮	⋮
429.553894	10	32749	10	8512
438.805145	9	32758	9	8521
448.056427	9	32767	9	8530
457.307678	1	32768	1	8531

The first column is the lower edge of the bin of voxel intensity. The second column is a count of the number of voxels that fall within the bin. The third column is the cumulative count; i.e., the number of voxels whose intensity falls within the bin corresponding to that row or to previous rows. The fourth column is a count of the number of voxels whose intensity falls within the bin for that row, and whose threshold (statistic) exceeds the specified value (9.0, in this particular case). The fifth column is the cumulative count of the voxels exceeding the threshold value. In the above example, 8531 out of a total of 32768 voxels (or 26%) of the voxels showed statistically significant activity.