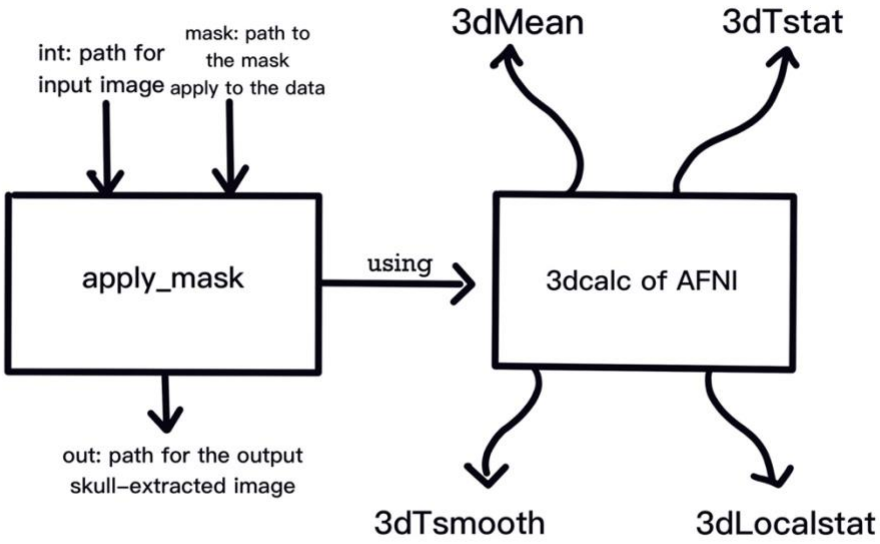
Research on 3dcalc of AFNI



1. Aim:

This program does voxel-by-voxel arithmetic on 3D datasets. (only limited inter-voxel computations are possible).

2. Assumption:

The voxel-by-voxel computations are being performed on datasets that occupy the same space and have the same orientations.

3. Functions:

(1) For simple voxel-wise averaging of datasets: 3dMean
(2) For averaging along the time axis: 3dTstat
(3) For smoothing in time: 3dTsmooth
(4) For statistics from a region around each voxel: 3dLocalstat

4. Usage:

```
3dcalc -a dsetA [-b dsetB...] \
          -expr EXPRESSION      \
```

[options]

5. Arguments

(1) must be included in the command line:

-a dname = Read dataset 'dname' and call the voxel values 'a' in the expression (-expr) that is input below.
expr = Apply the expression - within quotes - to the input datasets (dnames), one voxel at time, to produce the output dataset.

(2) optional:

Arguments	Usage
-help	Show help instructions
-verbose	Makes the program print out various information as it progresses
-datum type	Coerce the output data to be stored as the given type, which may be byte, short, or float. [default = datum of first input dataset]
-float/short/byte	Alternative options to specify output data format.
-fscale	Force scaling of the output to the maximum integer range. This only has effect if the output datum is byte or short (either forced or defaulted). This option is often necessary to eliminate unpleasant truncation artifacts.
-gscale	Same as '-fscale', but also forces each output sub-brick to get the same scaling factor. This may be desirable for 3D+time datasets, for example.
-nscale	Don't do any scaling on output to byte or short datasets. This may be especially useful when operating on mask datasets whose output values are only 0's and 1's.
-prefix pn	Use 'pname' for the output dataset prefix name. [default='calc']

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-session dir	Use 'dir' for the output dataset session directory. [default='./'=current working directory] You can also include the output directory in the 'pname' parameter to the -prefix option.
-usetemp	With this option, a temporary file will be created to hold intermediate results. This will make the program run slower, but can be useful when creating huge datasets that won't all fit in memory at once.
-dt tstep	Use 'tstep' as the TR for "manufactured" 3D+time datasets.
-taxis N	If only 3D datasets are input (no 3D+time or .1D files), then normally only a 3D dataset is calculated.
-rgbfac	For RGB input datasets, the 3 channels (r,g,b) are collapsed to one for the purposes of 3dcalc, using the formula value = A*r + B*g + C*b
-cx2r	For complex input datasets, the 2 channels must be converted to 1 real number for calculation. The methods available are: REAL IMAG ABS PHASE
-sort	Sort each output brick separately, before output: 'sort' ==> increasing order, 'SORT' ==> decreasing.