Using r.neighbors

On a raster image, it is often necessary to "filter" data through a mathematical operation that involves looking at the nearest raster cells-namely, the "neighborhood." The neigborhood operation is applied to each cell within the current region (except those too close to the edge of the map to be filtered) and then moved to the next raster cell. The operations are performed on square areas 1 to 25 cells wide (must be odd).

The "operations" are (from the r.neighbors command)

```
average - average value
median - median value
mode - most frequently occuring value
minimum - lowest value
maximum - highest value
stddev - statistical standard deviation
variance - statistical variance
diversity - number of different values
interspersion - number of values different than center value
```

Let's figure out the relief on the DEM using the filter in a 3 step process:

1. determine the minimum in neigborhood window
2. determine the maximum in neigborhood window
3. subtract 1 from 2 using r.mapcalc

Get into the "demo" location and display the raster map "dem"
d.rast dem
Now try the r.neighbors command using "dem" as the input map, a width of 25 cells, and the "maximum" operator. Make the output map one called "max."

Now make the minimum map in this way.
r.neighbors input=dem output=min method=minimum size=25

Now let's look at the results. To do this side by side you can run a "script" that automatically splits th display screen and prints the two maps. Copy and paste the following command, which goes to look for the script using the full pathname of the file.
/usr/apps/grass/scripts/split.sh dem max

The DEM is on the left and the max map is on the right. Notice the "boxiness" of the output. You can "see" the size of the filter in the new width of the high spots. It has also filled in the "no data" white rime around the dem (you normally don't want this to happen. Now look at the minimum with the dem
/usr/apps/grass/scripts/split.sh dem min

Now it's the valley bottoms that are wide and the peaks are again pointed, but smoothed

Now make and display the relief map by typing
r.mapcalc relief = max - min
/usr/apps/grass/scripts/split.sh dem relief

Notice that the lower relief near the top of Purgatory Mtn (the north edge of the map). Because we used a large windown size (30 m x 25 cells = 750 m) the relief is exaggerated in the area east of Buchanan.

Clear the dual screen by typing
d.frame -e

When you’re done, go back the theTutorial Page

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