
Subject: Assign data point to n-Dimensional grid
Posted by [antar3s86](#) on Fri, 22 Jun 2012 14:46:35 GMT
[View Forum Message](#) <> [Reply to Message](#)

Hi

I face a serious problem in the development of my algorithm. In principle it is very simple:

I have a data point in a 9-dimensional parameter space (say, $x_1, x_2, x_3, y_1, y_2, y_3, z_1, z_2, z_3$) with x, y, z being physical quantities with different units. Furthermore, I have an unequally spaced 9-dimensional reference grid and all I have to do is to compute which grid point is closest to my data point with respect to all 9 dimensions.

I have to do this several billion times, so I really want to make sure to do it as fast as possible.

Any help with that?

cheers

Subject: Re: Assign data point to n-Dimensional grid
Posted by [antar3s86](#) on Tue, 26 Jun 2012 07:43:43 GMT
[View Forum Message](#) <> [Reply to Message](#)

Hi

I have managed to find the nearest neighbor for one parameter using something like that

```
ii = VALUE_LOCATE(grid, x)
wh = WHERE((grid[ii+1] - x) LT (x-grid[ii]), ct)
if ct GT 0 then ii[wh] = ii[wh]+1
nn = grid(ii)
```

but I discovered that not all of my parameters are independent. So I split the problem up and located the independent parameters with the procedure above and the dependent ones with a 2-D search using `nearestn` (<http://www.ifa.hawaii.edu/~beaumont/code/nearestn.html>). This is a pure coincidence and if I ever have to face a problem with more dependent parameters I will have to think of something else.

Now I face a different problem which I want to describe with an example:

Suppose my grid consists of three parameters, so e.g. $grid_x = [2, 5, 10]$, $grid_y = [10, 40, 50]$, and $grid_z = [100, 101, 102]$. I need to fit my data point to the first two which can be done with the nearest neighbor method I solved for now. So for two test data points, say, $x = [3, 11]$, $y = [8, 47]$ they will snap to $x_s = [2, 10]$, $y_s = [10, 50]$ which is the 0th and 2nd position in the grid. From that I want to know which z -value and the third grid is assigned to them.

Any ideas how to solve that, meaning how to know at which position the test data points lie in the

grid?
