
Subject: How to represent the spatial distribution of a parameter
Posted by duxiyu@gmail.com on Wed, 10 Dec 2008 09:16:29 GMT
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Dear all,

I have three array X, Y and V.
X and Y represent the position, and they are not distributed uniformly on the X-Y plane.
V represent the parameter values corresponding to their position.

I want to take some 2D figures which can represent the spatial distribution of the parameter values.
Is there any recommended representation?

I find some figures in a paper which is shown in the web link below.
http://lh5.ggpht.com/_NSjLmdFf0ac/ST9_aR0A8zI/AAAAAAAAAFA/8H3m5pkbLO0/1.png
http://lh6.ggpht.com/_NSjLmdFf0ac/ST9_a51bQII/AAAAAAAAAFI/2Z_oP59xdyYw/2.png
He divided the X-Y plane into small grids, and used the mean of the parameter at the points, which are located in each grid, to represent the parameter value in that grid.
I wonder whether there is a simple way to do this in IDL.
For example, I want to use the 0.1*0.1 grid to divide the X-Y plane.
How do I plot the figures like that from X, Y and V?

Best regards,
Du

Subject: Re: How to represent the spatial distribution of a parameter
Posted by [Jean H.](#) on Wed, 10 Dec 2008 13:05:22 GMT
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Hi,

I did something similar a while ago... here is part of it:

```
newX = Xdata / CellSizeX ;Aggregate the data  
newY = Ydata / CellSizeY
```

```
nbCol = ceil((maxX+1.0) / cellSizeX)  
nbRow = ceil((maxY+1.0) / cellSizeY)  
nPoint = n_elements(newX)
```

```
image = lonarr(nbCol, nbRow)  
nbPointsXY = lonarr(nbCol, nbRow)
```

```
for i = 0L, nPoint-1 do begin
```

```
    image[newX[i], newY[i]] += v[i]
    nbPointsXY[newX[i], newY[i]] += 1
endfor
```

image /= nbPointsXY ;do the average

tvsc1, image

Jean

Subject: Re: How to represent the spatial distribution of a parameter
Posted by duxiyu@gmail.com on Wed, 10 Dec 2008 17:37:26 GMT
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Excuse me!

I do not understand your routine.

Could you show me an example? or give me some detailed explanations?

Du

On Dec 10, 9:05 pm, "Jean H." <jghas...@DELTHIS.ucalgary.ANDTHIS.ca>
wrote:

```
> Hi,
>
> I did something similar a while ago... here is part of it:
>
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> endfor
>
> image /= nbPointsXY ;do the average
>
> tvsc1, image
>
```

> Jean

Subject: Re: How to represent the spatial distribution of a parameter

Posted by [Giorgio](#) on Wed, 10 Dec 2008 18:59:27 GMT

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One way is to define a grid from the x and y arrays and then interpolate the values V to match the grid.

Please see David's website: http://www.dfanning.com/code_tips/griddata.html

Giorgio

Subject: Re: How to represent the spatial distribution of a parameter

Posted by [Jean H.](#) on Wed, 10 Dec 2008 21:20:57 GMT

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Hi Du,

ok, so you have a set of X and Y coordinates

You want to plot them in a regular grid, so to know in which cell to plot the corresponding data, you divide the coords by the cell size

ex: X = [1,2,2.5]

cellSizeX = 0.5

NewX = X/cellSizeX

==> 2.00000 4.00000 5.00000

==> on the grid, your point will be in cell 2,4 and 5

grid: 0-0.5-1-1.5-2-2.5-3-3.5-4-4.5-5 etc

Now, you want to know the size of your grid, so you do

$\text{nbCol} = \text{ceil}((\text{maxX}+1.0) / \text{cellSizeX})$

this assume that the 1st cell of the grid is coord 0;0, do maxX-minX if not.

So basically, you take the highest X value and divide by the cell size.

Up-round this, so that you are sure that the new coord is within your grid.

Create a grid (an array) with the number of columns and rows. Create a "count" layer, that you will use for doing the average.

For each point that you have, using the new X and Y coordinate, you

1) add the value V to the image,

2) add 1 to the count layer

then, simply divide the image by the count, and you get the average

value in each pixel.

Jean

```
> Excuse me!  
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>  
> Du  
>  
>  
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>> endfor  
>>  
>> image /= nbPointsXY ;do the average  
>>  
>> tvscl, image  
>>  
>> Jean  
>
```

Subject: Re: How to represent the spatial distribution of a parameter
Posted by [Jeremy Bailin](#) on Thu, 11 Dec 2008 15:34:42 GMT
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On Dec 10, 8:05 am, "Jean H." <jghas...@DELTHIS.ucalgary.ANDTHIS.ca>
wrote:
> Hi,

```

>
> I did something similar a while ago... here is part of it:
>
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> endfor
>
> image /= nbPointsXY ;do the average
>
> tvscl, image
>
> Jean

```

If there are on average lots of points per grid cell, it would be more efficient to use the reverse indices in David's HIST_ND:

```

histimage = hist_nd(transpose([X],[Y]), [binX,binY], $
  min=[minX,minY], max=[maxX,maxY], reverse_indices=hiri)
meanimage = fltarr(size(histimage)/dimen))
for i=0L,n_elements(histimage)-1 do if histimage[i] gt 0 then $
  meanimage[i] = mean(V[hiri[hiri[i]:hiri[i+1]-1]])

```

If performance is still a serious issue, you should go read http://www.dfanning.com/code_tips/drizzling.html (it's effectively the same thing - you just need to divide by histimage at the end). In fact, go read it anyway - it's very illuminating. :-)=

-Jeremy.

Subject: Re: How to represent the spatial distribution of a parameter
 Posted by [Jeremy Bailin](#) on Thu, 11 Dec 2008 15:36:17 GMT
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On Dec 11, 10:34 am, Jeremy Bailin <astroco...@gmail.com> wrote:
 > On Dec 10, 8:05 am, "Jean H." <jghas...@DELTHIS.ucalgary.ANDTHIS.ca>
 > wrote:

```

>
>
>
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>
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>
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>
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> same thing - you just need to divide by histimage at the end). In
> fact, go read it anyway - it's very illuminating. :-)=
>
> -Jeremy.

```

...although, to answer the original poster's question, I'd agree with Giorgio - your easiest option is probably to use GRIDDATA.

-Jeremy.
