Subject: Re: Random problem with Delaunay triangulation
Posted by Haje Korth on Tue, 11 Sep 2007 18:59:17 GMT
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Bill,
you just hit a nerve with me. I thought I was the only one having those trouble. I would love to find out where this error comes from and how to prevent it. The problem drove me to going external and using ssrfpack and stripack from netlib to do spherical interpolation. This method is not fool proof either but at least this way I have the source code and can find out why an error occurs and, more important, I can determine what it actually means.

Anyway, this response won't help you much in solving your problem but supports your case for better documentation of the interpolation routines (I previously suggested to ITTVIS to write a tutorial on the subject) or, at the least, more meaningful error messages. (The folks at ITTVIS do read this newsgroup.)

Good luck,
Haje

"Bill Gallery" <wgallery@aer.com> wrote in message
news:1189535983.796705.67590@o80g2000hse.googlegroups.com...
> I am interpolating satellite data (lat, lon, temperature) from a
> irregular grid to a regular lat, lon grid using:
>
> pro get_gridded_temp_image, ...
> .
> .
> .
> grid_lat=findgen(31)*2.0+30.0 ;30 to 90 deg @2 deg
> grid_lon=findgen(181)*2.0 ;0 to 360 deg @2 deg
> qhull, x, y, tri, /delaunay, sphere = s
> temp_grid = griddata(x, y, z, /sphere, /deg, $
> /grid, xout = grid_lon, yout = grid_lat, $
> method = 'NaturalNeighbor', $
> triangles=tri, $
> missing = !values.f_nan)
>
> where x,y are longitude, latitude, and z is temperature (patterned
> after Example 5 in the IDL help for griddata.pro)
>
> Usually this procedure works fine, over thousands of different cases.
> However, today I tried it and got the error message:
>
> GRIDDATA: Triangle 652 not in counterclockwise order.

> Execution halted at: GET_GRIDDED_TEMP_IMAGE 184
>
> The ranges of the input variables are (mve is a routine that prints
> the stats on a variable):
>
> IDL> mve,x
> Variable type mean std dev minimum
> maximum n_elements NaN or I
> Float 178.55 102.79 0.070000
> 358.05 (529) = 529 0
> IDL> mve,y
> Variable type mean std dev minimum
> maximum n_elements NaN or I
> Float 54.660 19.100 20.340
> 82.930 (529) = 529 0
> IDL> mve,z
> Variable type mean std dev minimum
> maximum n_elements NaN or I
> Float 214.63 9.7416 192.56
> 233.31 (529) = 529 0
> IDL> mve, tri
> Variable type mean std dev minimum
> maximum n_elements NaN or Inf
> Longword integer 249.43 149.12 0.00000
> 528.00 (3,966) = 2898 0
>
>
> Note: I tried the routine sph_scat which is also advertised to regrid
> on a sphere. However, the interpolated values are way off scale:
>
> IDL> r=sph_scat(x,y,z,bounds=[0,30.0,360,90],gs=[2,2],bout=bout)
> IDL> mve,r
> Variable type mean std dev minimum
> maximum n_elements NaN or Inf
> Double float 208.09 96.313 -480.31
> 869.93 (181,31) = 5611 0
>
>
> Any suggestions on how to trouble shoot, fix?
>
> Thanks,
>
> Bill Gallery
>

Subject: Re: Random problem with Delaunay triangulation

Bill, here a practical tip: Have you tried to randomly reshuffle your input data? Does this make a difference? H.

"Haje Korth" <haje.korth@nospam.jhuapl.edu> wrote in message news:fc6oi5$ei3$1@aplnetnews.jhuapl.edu...
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>> Any suggestions on how to trouble shoot, fix?
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>> Thanks,
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>> Bill Gallery
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>
>

Subject: Re: Random problem with Delaunay triangulation
Posted by wgallery on Tue, 11 Sep 2007 21:15:58 GMT
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On Sep 11, 3:27 pm, "Haje Korth" <haje.ko...@nospam.jhuapl.edu> wrote:
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>
> news:fc6oi5$ei3$1@aplnetnews.jhuapl.edu...
>
>> Bill,
>> you just hit a nerve with me. I thought I was the only one having those

Haje,

I did not try reshuffling the input data, but did find a fix.
Originally, the input data had a minimum latitude of 30.0 deg N and
the specified regular grid also had a minimum latitude of 30.0. When
I expanded the input data to have a minimum latitude of 20 deg N, the
error message went away. Apparently you need data outside the area of
interest for the interpolation to be robust.

Further experimentation showed that when the minimum latitude of the
input data was 30. deg, the interpolated values at 30 deg for the
cases that did not fail showed large excursions from expected values.
This may be partially due to the nature of the input data, which is
poorly sampled below ~40 deg N (temperature data from the SABER
instrument on the TIMED satellite.)

Does anyone has any experience with the relative merits of the
following routines for interpolation on a sphere?

1. qhull and griddata

2. sph_scat.pro

3. triangulate and trigrid

Bill

Subject: Re: Random problem with Delaunay triangulation
Posted by Kenneth Bowman on Wed, 12 Sep 2007 13:10:19 GMT
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In article <1189545358.026232.78690@i13g2000prf.googlegroups.com>,
 Bill Gallery <wgallery@aer.com> wrote:

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>
> 2. sph_scat.pro
>
> 3. triangulate and trigrid
>
> Bill

Have you considered doing least-squares fitting to spherical harmonics
instead of interpolation?

Ken Bowman

Subject: Re: Random problem with Delaunay triangulation
Posted by wgallery on Thu, 13 Sep 2007 13:44:13 GMT
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On Sep 12, 9:10 am, Kenneth Bowman <k-bow...@tamu.edu> wrote:
> In article <1189545358.026232.78...@i13g2000prf.googlegroups.com>,
> Bill Gallery <wgall...@aer.com> wrote:
>
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>> following routines for interpolation on a sphere?
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>
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>
>> Bill
>
> Have you considered doing least-squares fitting to spherical harmonics
> instead of interpolation?
>
> Ken Bowman

Ken,

No I haven't. I'm not familiar with the technique. Anyway, the problem was solved with the routine grid_input (see post 9). But thanks for the suggestion.

Bill
