
Subject: Variable sized bins in histogram, or find a bounding lat/lon box

Posted by [Matt\[2\]](#) on Wed, 11 Apr 2007 14:19:06 GMT

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All, (well, JD mostly, but feel free to jump in.)

I'm trying to solve a problem that seems particularly suited to histogram. The main idea is that I'm trying to find the surrounding 4 corner points of a given sample point within a semi-regular lat-lon grid. (Note: not the 4 nearest-neighbors, they must be the closest 4 points in a rectangle that enclose the target point.)

I'll try to break it down to its most simple. I know that I'll have some number of latitudes and another number of longitudes that represent the centers of grid-cells via their intersections. I don't know that they will be evenly spaced (note: that seemed key in my inability to come up with a fast solution).

```
lats = [10, 20, 25, 30, 40]
lons = [100, 120, 130, 135, 140, 155]
```

I'll also have a set of lat/lon points that do not fall on a regular lat/lon grid.

```
target_lats = [ 10.5, 39.1, 29., ... ]
target_lons = [ 142.3, 130, 152.3, ... ]
```

I'd like to know the lat/lon values of the initial locations that surround my target points.

So for the first target point [10.5, 142.3], I'd hope to return:

```
[20,140] [20,155]
```

```
[10,140] [10,155]
```

Or in fact, since I know the lats and lons are already sorted. Returning, indices [0 & 4] would give me the information I'm after.

I think I can do this with two histograms one in lat one in lon. It's along the lines of ... if I can histogram the initial lats into a histogram with no more than 1 element per bin. And then histogram all of my target_lats with the same histogram min, max, and binsize. I should through the beauty and horror of reverse indices, be able to

back out the indices of the target. But I'm just not quite there in full thought process.

Does anyone have a brilliant idea? I've had a sleep on this already and the more I write and think about this, the more I think this might not be the best way to solve this problem. I'm going to proceed with a "where" solution which may be slow, but I understand it. But as an intellectual puzzle, I'd like to see how someone can bin data into variable sized bins via histogram. In the final breakdown, that's all I'm trying to do right?

```
lats = [10, 20, 25, 30, 40]
```

```
Bins = [[-inf, 15], (15, 22.5], (22.5, 27.5], (27.5, 35], (35, +Inf]]
```

Right?

Any help is appreciated,
Thanks.
Matt

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