Subject: Re: polyfillv and the boundary pixels
Posted by JD Smith on Sat, 17 Jan 2004 16:36:09 GMT
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On Thu, 15 Jan 2004 13:39:13 -0700, Bruce Bowler wrote:

> Situation, I want to find the pixels within AND on the boundry of a
> polygon defined by an array of vertices. polyfillv does the "inside"
> and some of the pixels on the border (see the reference guide for a
> brief description of how they decide and a pointer to a more exhaustive
> treatise on the subject).
>
> Simplistic example
>
> array = fltarr(30,30)
> x = [19,20,20,19]
> y = [19,19,20,20]
> z = polyfillv(x,y,30,30)
>
> z ends up with only 1 pixel in it, 589, which is (if I did the math
> right :-) [19,19]. What I'd like to find in z is [589,590,619,620].
>
> Obviously, my polygons are a little more complex than the above, some
> with 100 or more vertices.
>
> Any options I missed in polyfillv? Any routine I missed that will give
> just the border? Any other thoughts on how to meet my goals?
>
> IDL 5.6, in case it matters.

This is called "clipping", and is used quite a bit in computer graphics. It's also related to the "anti-aliasing" of fonts. For scientific applications, read the article on dfanning.com regarding "drizzling". There are a variety of polygon clippers with different strengths and weaknesses (e.g. only convex simple polygons, etc.), but one of the simplest is called the "Sutherland-Hodgeman" clipping algorithm, and can be explained in 3 simple (and easy to find) steps. Unfortunately, this type of algorithm is difficult to optimize in IDL, and my best efforts have led to poorly-performing implementations. I have resorted to calling C code, which still isn't as speedy as I'd like, thanks to CALL_EXTERNAL's overhead. I have put in a feature request at RSI for a vectorized native polygon clipper, with usage similar to POLYFILLV, but which can clip any number of polygons at once. I also requested a vectorized clipper for clipping arbitrary polygons against eachother. If you're interested, let RSI know and maybe we'll see it in the next release.

JD