Subject: Re: Least Cost Path using Dijkstra's Algorithm
Posted by James[2] on Tue, 26 Oct 2010 00:19:06 GMT

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I recently programmed the Fast Marching Method (
http://math.berkeley.edu/~sethian/2006/Explanations/fast_mar ching_explain.html
) as an external C program for IDL. The Fast Marching Method is the continuous version of Dijkstra's algorithm: it simulates a boundary moving through space monotonically with speed as a function of position. The pixel/voxel grid is considered a sampling of the continuous speed function.

You can find least cost paths by initializing the boundary at a single point and then backtracking from the destination(s) through the arrival time field using gradient descent. This will give you interpolated points that might not be at exact grid points (pixels), but it sounds like that's what you want. The algorithm is O(n lg n) where N is the number of pixels, just like Dijkstra's.

Anyway, if this sounds interesting to you, I can send you the C code and the IDL wrapper function. You can compile it with MAKE_DLL. I optimized my implementation for sparse data sets (where the speed is 0 in most places), so if you want to travel through the entire 20000*20000 array, it will be slow. I might be persuaded to write a non-sparse version if your application is interesting enough ;-)