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Leveraging the conjugate gradient method to texture mid-frequency active sonar.

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Texture synthesis is used to replicate and construct larger images from smaller sample images. Leveraging the framework of [1] we texture synthesize MFA sonar returns where the pixel space is taken to be range and bearing. In [1] blocks are tiled in raster scan order so that their edge intersections satisfy an overlap constraint. To accomplish this, a method of evaluating a set of blocks and randomly choosing a block satisfying the overlap constraint is performed. We speed up this process by replacing this method with [2] where the input function to the conjugate gradient method is the overlapping constraint result.

References:

[1] Alexei A. Efros , William T. Freeman, Image quilting for texture synthesis and transfer, Proceedings of the 28th annual conference on Computer graphics and interactive techniques, pp.341-346, August 2001

[2] Fletcher R, Reeves C. Function minimization by conjugate gradients, Computer J.,vol. 7, pp. 149-154,1964