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Binary Image Reconstruction Based on Texture Priors

Abstract

The goal of Binary Tomography is to reconstruct binary images from their projections. In the most common applications of this field, e.g., electron tomography and non-destructive testing, projections can be gathered from just a few directions, since the acquisition process can be expensive or damage the object. Owing to the insufficient amount of available data the binary reconstruction can be extremely ambiguous. A common way to reduce the number of solutions of the reconstruction problem is to exploit prior information (e.g., convexity, connectedness, smoothness, similarity to a model image, etc.) of the image to be reconstructed. In the reconstruction process the prior knowledge is often incorporated into an energy function, thus the reconstruction issue is equivalent to a function minimization problem. We use texture information extracted from sample images as prior knowledge. The effectiveness of the methods is compared on different image classes.