Missing data restoration of sinogram in limited-angle computed tomography

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Abstract: We present in this work the limited-angle computed tomography, which is an ill-posed inversion problem. This case often exists in the industry to allow faster non-destructive testing during production phase. However, the inspection is difficult to achieve due to the shape and size of the inspected parts. During the last decade, various approaches were proposed for case of limited-angle. These methods were developed for medical application use and do not take into account physical limitations specific to industrial materials. The aim of this work is to propose a method, which permits to recover the missing data in the acquisition of projections using minimizing a function. We tested our method with sinogram obtained from Shepp-Logan phantom containing missing projections. The reconstruction image of inpainted sinogram achieved using FBP method and Iterative cimmino method. The results clearly show that the proposed method can retrieve accurate information that leads to a better-reconstructed image.

Keywords: image reconstruction, FBP, Cimmino, Inpainting, Missing projections