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Iterative Restoration of Motion Blurred Brain Images

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Due to the long duration time of a positron emission tomography (PET) scan, a patient may move. These movements degrade the reconstructed image, especially as the resolution of scanners increases. Removing these degradations through computational post-processing requires solving a large-scale linear inverse problem. The quality of the model, and hence the quality of the post-processing, depends on how accurately the patient motion information can be measured. When imaging a rigid object, such as the brain, the patient movements may be tracked and recorded with fairly high precision. In this talk we describe the model problem, and in particular how the matrix is generated from a series of interpolation matrices based on the given patient motion. We discuss how sparsity changes as we incorporate more motion information, and how to exploit structure of the problem for parallel implementations. Results from simulations as well as real patient data are presented to illustrate the effectiveness of our approach.