

PET Image Resolution Enhancement

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Abstract : PET is widely applied scanning procedure in medical imaging based research. It delivers measurements of functioning in distinct areas of the human brain while the patient is comfortable, conscious and alert. This article presents the new compression sensing based super-resolution algorithm for improving the image resolution in clinical Positron Emission Tomography (PET) scanners. The issue of motion artifacts is well known in Positron Emission Tomography (PET) studies as its side effect. The PET images are being acquired over a limited period of time. As the patients cannot hold breath during the PET data gathering, spatial blurring and motion artefacts are the usual result. These may lead to wrong diagnosis. It is shown that the presented approach improves PET spatial resolution in cases when Compressed Sensing (CS) sequences are used. Compressed Sensing (CS) aims at signal and images reconstructing from significantly fewer measurements than were traditionally thought necessary. The application of CS to PET has the potential for significant scan time reductions, with visible benefits for patients and health care economics. In this study the goal is to combine super-resolution image enhancement algorithm with CS framework to achieve high resolution PET output. Both methods emphasize on maximizing image sparsity on known sparse transform domain and minimizing fidelity.

Keywords : PET, super-resolution, image reconstruction, pattern recognition

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