

Super-resolution reconstruction of magnetic resonance images

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Magnetic resonance imaging (MRI) suffers from an inherent trade-off between spatial resolution, acquisition time, and signal-to-noise ratio (SNR). In clinical practice, the direct acquisition of 3-D isotropic high-resolution (HR) images is not feasible since it results either in unacceptably long acquisition times or a poor SNR. As a consequence, most MRI studies settle for either anisotropic or isotropic low resolution (LR) images. Fortunately, recent work has shown that super-resolution reconstruction (SRR) methods are able to improve the trade-off mentioned above. SRR methods reconstruct an HR 3-D isotropic image from a set of multi-slice 3-D anisotropic images with a low through-plane resolution, where each LR image is sampled in a different fashion. Previously, our group (Vision Lab, University of Antwerp) proposed a generic SRR method for anatomical MRI. More recently, this methodology was successfully extended to diffusion MRI and relaxometry. As will be demonstrated in this talk, experimental results show a significant increase in spatial resolution while preserving a high SNR for a fixed acquisition time.