ACCELERATED WATER-FAT MRI

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What is MRI?

Magnetic Resonance Imaging typically images ^{1}H distribution in the body

brain

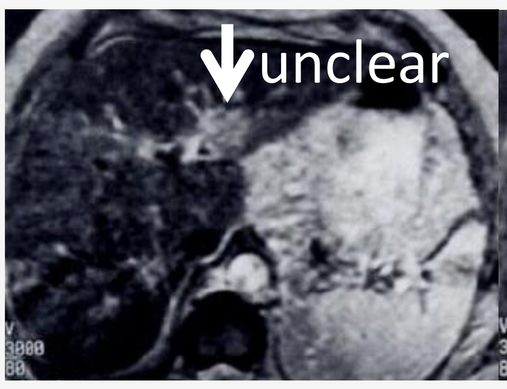
knee

What is water-fat MRI?

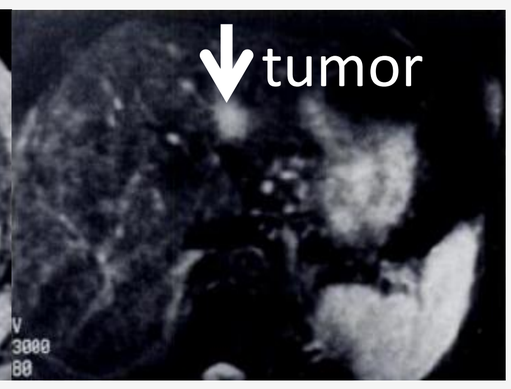
technique to separate and/or quantitate water & fat using MRI

specimen

water fat



water & fat[1]

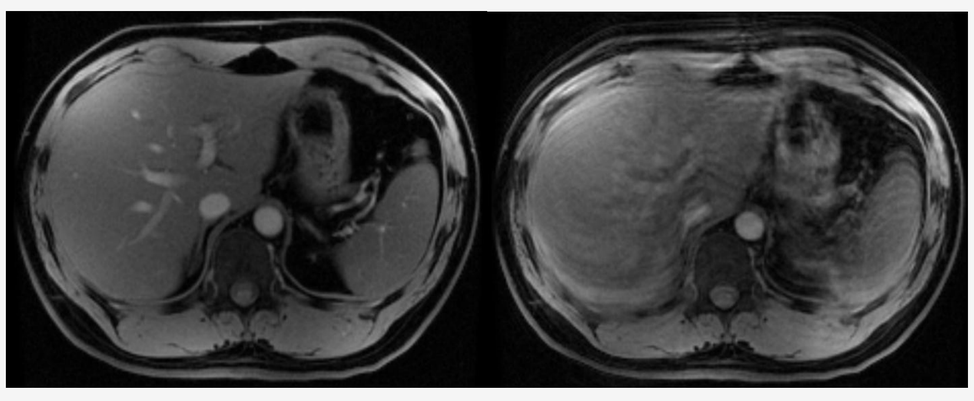


water only[1]

Current limitations

reliable water-fat MRI comes at a cost of long scan times, which:

1) increases likelihood of artifacts from patient motion



without motion with motion

2) limits spatial resolution and/or volumetric coverage

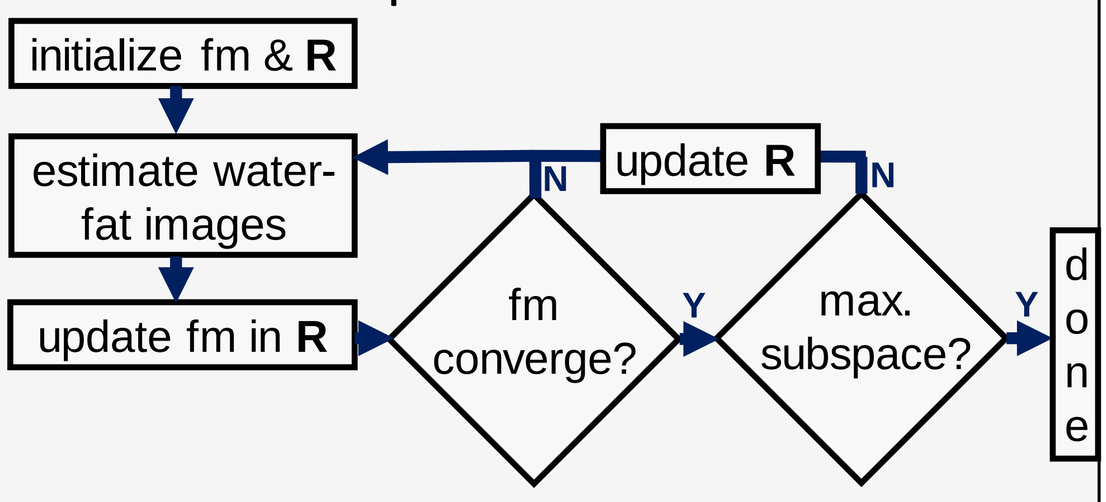
Our work

Goal: reduce the scan time of water-fat MRI acquisitions to decrease the possibility of image artifacts and increase resolution/ coverage

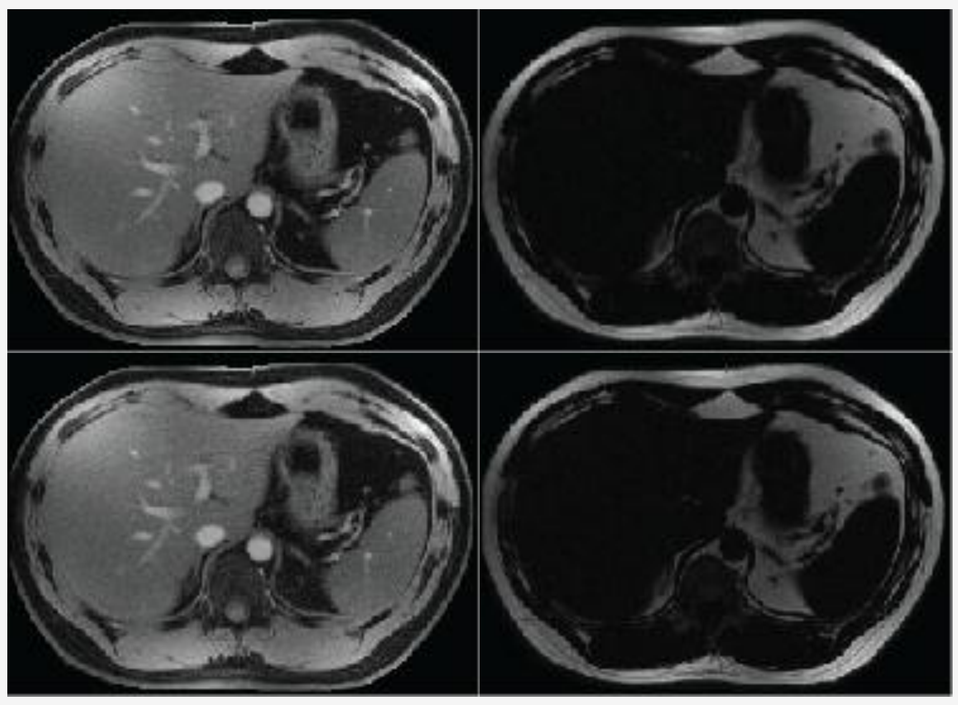
Approach: exploit spatial correlation of images to compensate for missing measurements

water-fat images: apply recently-developed theory of compressed sensing[2-4]

field map (fm) image: estimate in a restricted subspace **R**



Results: liver imaging



water fat

References:

1) Lu D. et al. American Journal of Roentgenology 1994;162(5):1095.
2) Candes E. et al. IEEE Transactions on Information Theory 2006;52(2):489-509.
3) Donoho D. IEEE Transactions on Information Theory 2006;52(4):1289-1306.
4) Lustig M. et al. Magnetic Resonance in Medicine 2007;58(6):1182-1195.