Demo: Reconstructing Cartesian DCE data with BART

January 19, 2016

pics: A Tool for Parallel Imaging Compressed Sensing

> bart pics -R*A*:*B*:*C*:*D* -R ... [-t pattern] [-t trj] kspace sens image

- parallel imaging and compressed sensing
- non-Cartesian k-space trajectories and weighted sampling
- multiple regularization terms
- A: different types of regularization:
  ℓ_2, ℓ_1, total variation, ℓ_1-wavelet, (multi-scale) low-rank
- B: transforms along arbitrary dimensions (space, time, etc.)
- C: joint-thresholding along arbitrary dimensions
- D: regularization parameter

Note: Depending on the algorithm additional parameters (step size, number of iterations, etc.) must be set for optimal results.

Example: Cartesian DCE MRI[1]

Compressed sensing parallel imaging with a specific choice of sampling and regularization:

- VDRad sampling[2]
- Butterfly navigators[3]
- Locally low rank regularization[4] (low rank with decimation in space)

```
> bart pics -RL:$(bart bitmask 0 1 2):$(bart bitmask 0 1 2):0.05
-p weights ksp sens out
```


1. Zhang et al., JMRI 2015; 41:460-73.
2. Cheng et al., MRM 2014; 42:407-20.
3. Cheng et al., MRM 2012; 68:1785-97.
4. Trzasko and Manduca, ISMRM 2011; p. 4371