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MRI Acquisition Trajectory Optimization based on prior knowledge of image content, sensitivity and k-space statistics

Researchers at Stanford developed a method to improve both the efficiency and the performance of MRI optimal trajectory design. Given a reference k-space information, the proposed method uses stochastic optimization to search through possible undersampling trajectory candidates and uses an improved metric to have a quick estimation of the potential performance if each candidate trajectory is applied with PI+CS reconstruction. Our proposed method shows superior performance and better efficiency. It is more than 100x faster than conventional global trajectory optimization methods (Bayesian based method) and is also faster than previously proposed Greedy solution. Compared against related publication on this topic, current method is around 5~10x faster and has around ~20% performance improvement by using better initialization and better optimization methods.

Applications

- Improve acqusition for MRI and similar tomographic acquisition in medical imaging

Advantages

- Our proposed method shows superior performance and better efficiency. It is more than 100x faster than conventional global trajectory optimization methods (Bayesian based method) and is also faster than previously proposed

Greedy solution. Compared against related publication on this topic, current method is around 5~10x faster and has around ~20% performance improvement by using better initialization and better optimization methods.

Patents

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