

Postprocessing approach for efficient and accurate high-dimensional parameter estimation in magnetic resonance fingerprinting

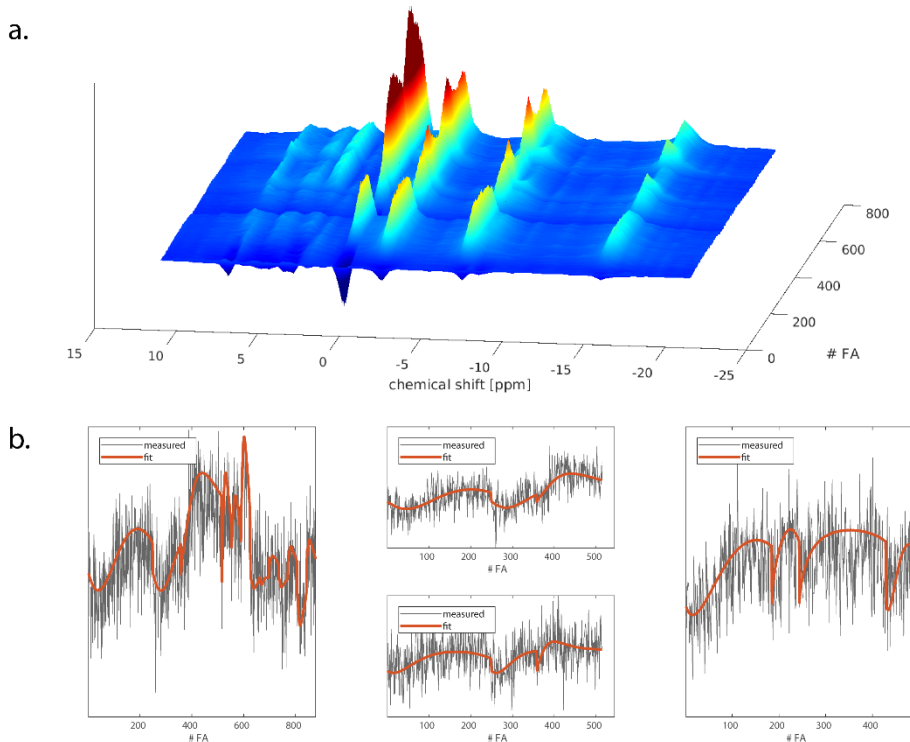


Figure. (a) Group spectra of ³¹P MRF measurements in the human brain. (b) Matching examples of fingerprints with their matched dictionary patterns.

Ref. Nr
 6.2272

Keywords
 Magnetic Resonance Imaging, Magnetic Resonance Spectroscopy, Magnetic Resonance Fingerprinting (MRF), Magnetization Transfer (MT), multi parameter estimation, Dictionary Matching

Intellectual Property
 N/A

Publications
 N/A

Date
 17/06/2022

Description

For parameter estimates in magnetic resonance fingerprinting (MRF), large dictionaries are commonly used, simulated by using the Bloch equation. With increasing the number of parameters, the computational load and memory size is increasing exponentially. Therefore, classical dictionary simulation is becoming unrealistic for higher order parameter estimation and online reconstruction on MRI scanners.

This invention proposes a postprocessing approach to overcome parameter estimations limitations in MRF of high order multi-parameter estimation including e.g. chemical exchange rates, relaxation times and multi-pool systems. Our solving approach is needed to reduce simulation and fitting time, computational requirements for pc and memory size. This will enable the possibility for online reconstruction on MRI scanners.

Advantages

This invention largely reduces the computational time for fast MRF based imaging and spectroscopy in the living organs (brain and body).

This method facilitates the implementation of online reconstruction that could be implemented on all MRI scanners with largely reduced fitting time for clinical applications including diagnose and treatment follow-ups.

Furthermore, the current approach largely increases the accuracy of parameter estimation relative to the traditional approach.

Applications

- MRF based imaging and spectroscopy
- Online reconstruction on all MRI scanners