Increased SNR by Simultaneous Encoded Complex-Valued Slices with Through-Plane Acceleration in FMRI

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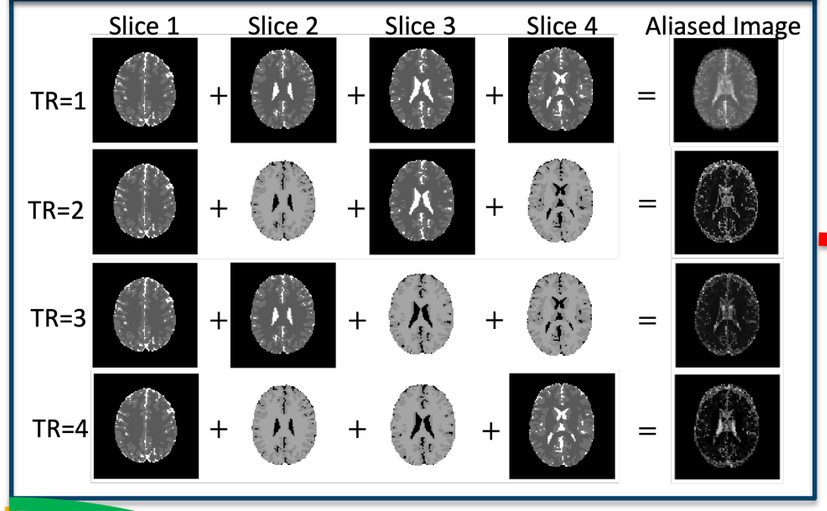
- **What is fMRI?**
  - Functional Magnetic Resonance Imaging (fMRI) study depends on the Blood Oxygen Level Dependent (BOLD) contrast signal.
  - Noninvasive, powerful tool to detect the spatial and temporal changes in brain metabolism.

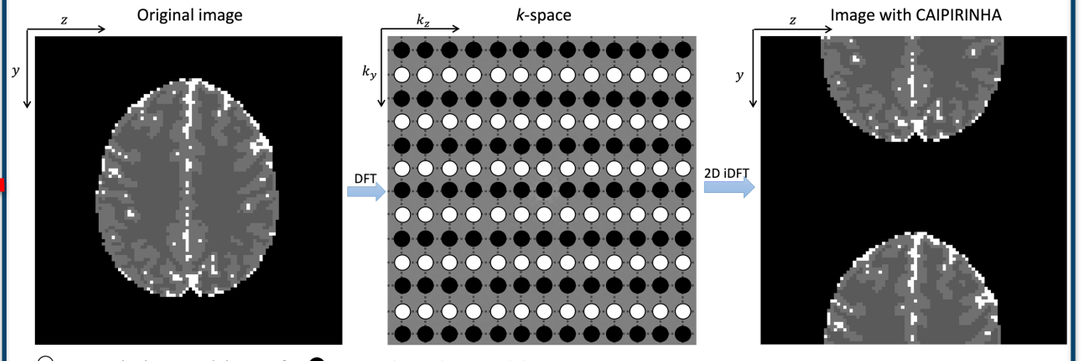
- **What is the problem?**
  - Decrease the time to measure a volume image, or increase the number of images measured per unit time.

- **What has been done?**
  - In-Plane Acceleration: SENSE and GRAPPA
  - Through-Plane Acceleration: SMS

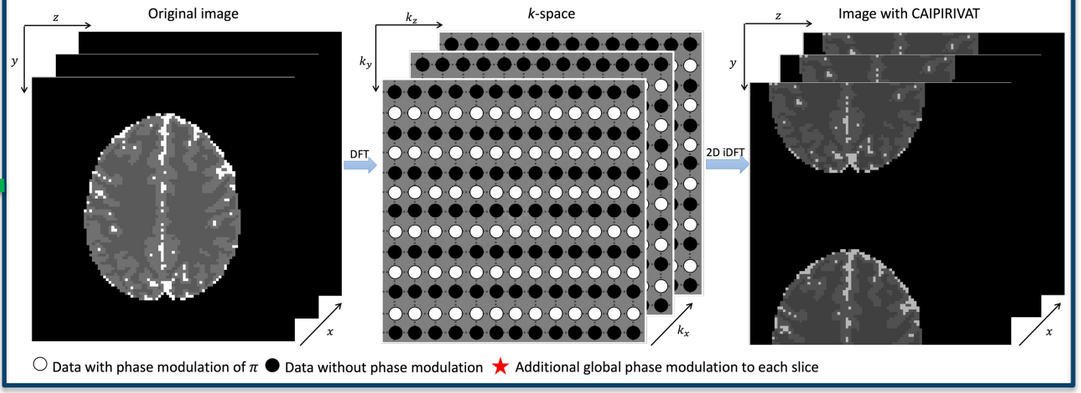
Hadamard Phase Encoding



CAIPIRINHA



CAIPIVAT

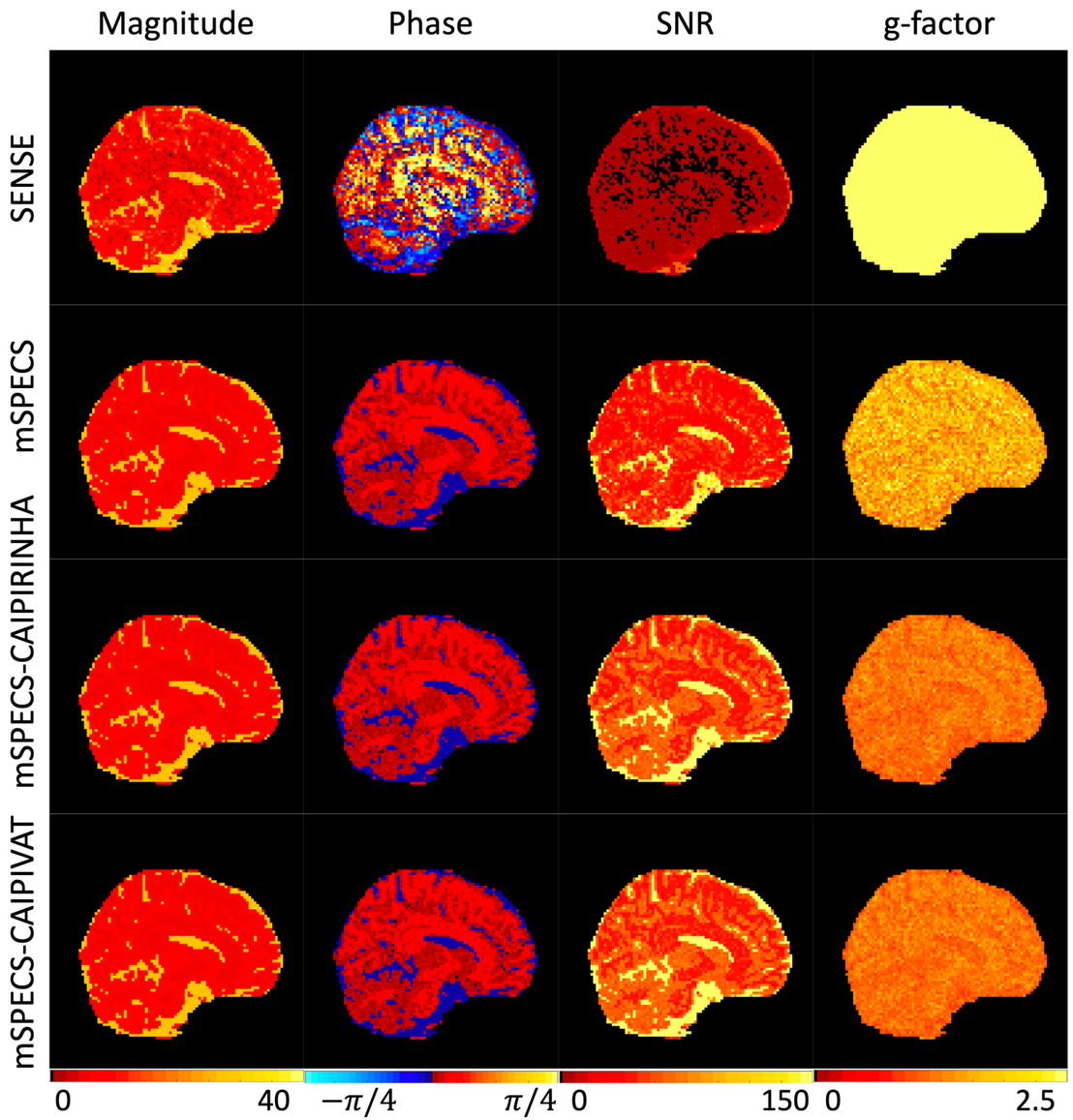


mSPECS

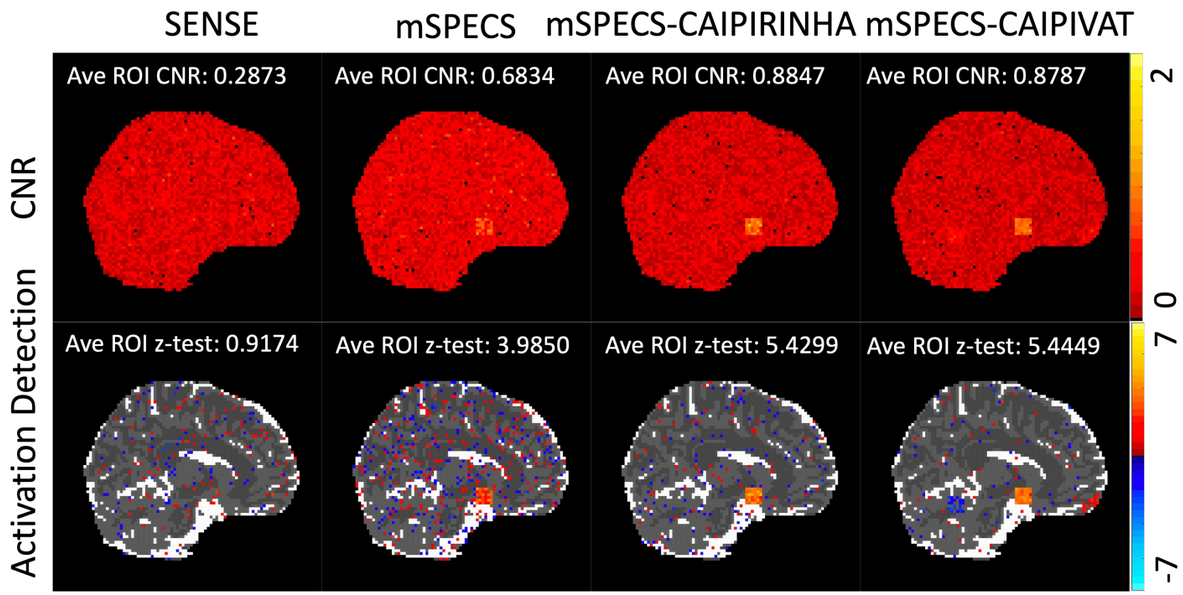
mSPECS-CAIPIRINHA

mSPECS-CAIPIVAT

Resting State Simulated Results



Activation Simulated Results



➢ What is NEXT?

- To further decrease the scan time, combining through-plane acceleration technique with in-plane acceleration technique.
- 2D Hadamard Phase Encoding technique.
- Image shifts technique, CAIPIRINHA and CAIPIVAT, will also included into the new model.

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