SparseVM: Fast Learning-based Registration of Sparse Clinical Images

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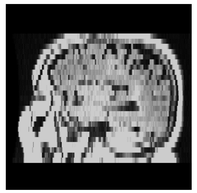
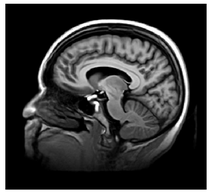
CVPR LONG BEACH CALIFORNIA June 16-20, 2019

Clinical Image Registration

Existing registration methods optimized for research-quality images



Clinical Image



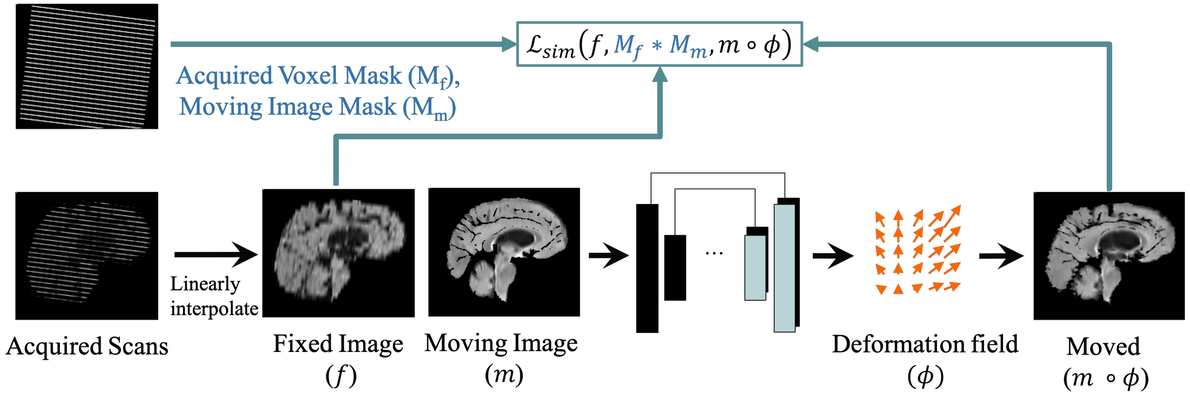
Research-quality image

Clinical images have ~15% of the number of slices in research-quality images

Faster and more accurate registration for clinical MR images.

- **100x** faster on a CPU
- More accurate on **>86%** of the test images

SparseVM



Experiments and Results

Baselines

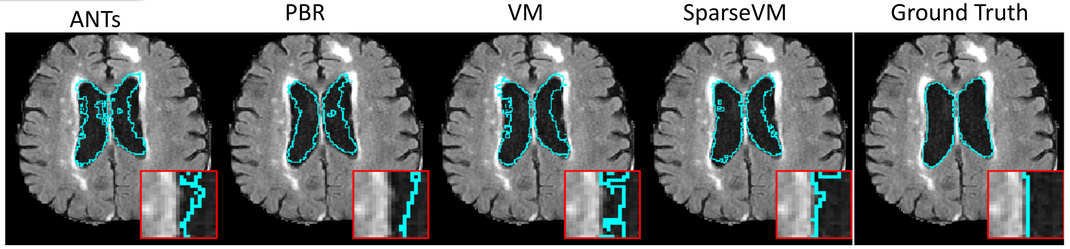
ANTs : most commonly used

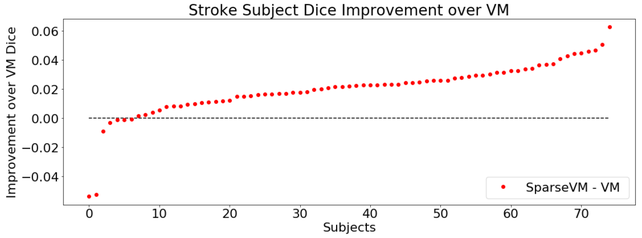
PBR : most consistently accurate

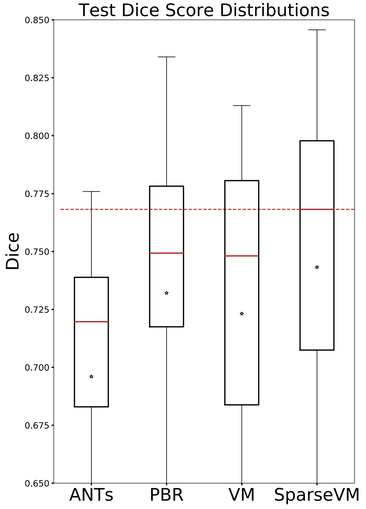
VoxelMorph (VM) : fastest

Dataset

3D T2-FLAIR MR stroke scans from MGH







Method	Average Dice	GPU seconds	CPU seconds
ANTs	0.722 (0.031)	-	9059 (2023)
PBR	0.752 (0.037)	-	9269 (5134)
VoxelMorph	0.756 (0.037)	0.313 (0.046)	**40 (0.693)**
SparseVM CC (ours)	**0.778 (0.038)**	**0.303 (0.047)**	41 (0.584)