

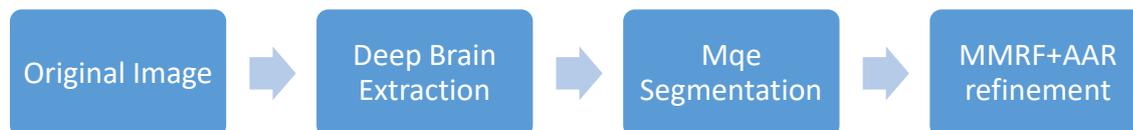
# Tsallis-Entropy Segmentation through MRF and Alzheimer anatomic reference for Brain Magnetic Resonance Parcellation

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We propose and then evaluate an automatic segmentation method based on modified q-entropy (Mqe) through a modified Markov random field (MMRF) enhanced by Alzheimer anatomic reference (AAR) to provide a high accuracy brain tissues parcellation approach (Mqe-MMRF).

This article will be accessible as soon as possible. In addition, the proposed method will be available as an extension for the 3DSlicer software through Slicer Extension Manager, with the source-code available at GitHub.

- This method could be completely automatic or change some parameters to get better results.
- In this approach only T1-weighted scan was used (0.958mm x 0.958mm x 3.0mm)
- Pipeline as follow
- Till now, the algorithm, will be able to segment MRI brain to three main tissue. Other modalities and specific usage are in progress. We are trying to modify it to detect lesions as well.
- This algorithm was tested by simulation data with different percentage of noise and bias effect. Results shows the robustness of the algorithm against artifacts.
- CPU usage times were averagely 6 to 7 minutes per iteration using a Core i7 (4 cores, 8 threads, 3.20 GHz) and 8 Gigabyte RAM. Totally we set it for 3 iterations for border refinement step (around 21 min).



## How to use

In a folder contain Dockerfile and python folder, run these code in command terminal:

```
docker build -t mrbrains18/csim .  
docker run --network none -dit -v output:/output:rw -v [TEST-PRE]:/input --name mqe_mmrf_atlas mrbrains18/csim  
docker exec mqe_mmrf_atlas python3 /mrbrains18_csim/mqe_mmrf_atlas.py  
docker cp mqe_mmrf_atlas:/output [RESULT-LOCATION]  
docker rm -v mqe_mmrf_atlas
```

if you want to use the code please cite the article above.