

# **Semi-automatic Segmentation of Multiple Sclerosis Lesion Based Active Contours Model and Variational Dirichlet Process**

Derraz, Foued; Peyrodie, Laurent; Pinti, Antonio; Taleb-Ahmed, Abdelmalik; Chikh,  
Azzeddine; Hautecoeur, Patrick

## **Abstract :**

We propose a new semi-automatic segmentation based Active Contour Model and statistic prior knowledge of Multiple Sclerosis (MS) Lesions in Regions Of Interest (RIO) within brain Magnetic Resonance Images(MRI). Reliable segmentation of MS lesion is important for at least three types of practical applications: pharmaceutical trails, making decision for drug treatment, patient follow-up. Manual segmentation of the MS lesions in brain MRI by well qualified experts is usually preferred. However, manual segmentation is hard to reproduce and can be highly cost and time consuming in the presence of large volume of MRI data. In other hand, automated segmentation methods are significantly faster yielding reproducible results. However, these methods generally produced segmentation results that agree only partially with the ground truth segmentation provided by the expert. In this paper, we propose a new semi-automatic segmentation based Active Contour model for MS lesion that combines expert knowledge with a low computational cost to produce more reliable MS segmentation results. In particular, the user selects coarse RIO that encloses potential MS lesions and a sufficient background of the healthy White Matter tissues (WM). Having this two class statistic properties, we propose to extract texture features corresponding to health and MS lesion. The results draw showed a significant improvement of the proposed model.

**Journal Title / Revue** : BULLETIN CMES-COMPUTER MODELING IN ENGINEERING & SCIENCES, ISSN : 1526-1492, Issue : 2, Volume : 67, pp. 95-118, October 2010.