



# New Approach for Classification of Autistic vs. Typically Developing Brain Using White Matter Volumes

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## Abstract:

Autism is a complex developmental disability, characterized by deficits in social interaction, communication skills, range of interests, and occasionally the presence of stereotyped behaviors. Several studies show that changes in brain weight and volume over aging follow a unique trajectory in those affected by the condition (Redcay E, Courchesne E. When is the brain enlarged in autism? A meta-analysis of all brain size reports. *Biol Psychiatry* 58(1):1-9, 2005). In this work, we develop a robust technique for evaluating the volume of white matter (WM), and use it as the main classification criteria. We perform MRI-based analysis on the brains of 14 autistic and 28 control subjects, male and female between aged 7 to 38 years. The proposed framework consists of several stages. First the entire T1-weighted MRI scans are filtered out from noise using anisotropic diffusion filter. Then, the white matter (WM) is segmented from the skull. The segmentation framework is the search for maximum-a-posterior configurations in a Markov Gibbs Random Field (MGRF) model. After that, a 3D mesh is generated from the segmented WM. Finally, the volume of the 3D mesh is computed using a new algorithm. The experiments show accurate classification results of the proposed framework.

## Keywords:

Autism, white matter, MGRF-based segmentation

## Published In:

IEEE Computer Society: Proceedings of the Ninth Conference on Computer and Robot Vision , , 284-289