World Academy of Science, Engineering and Technology
International Journal of Computer and Systems Engineering
Vol:12, No:07, 2018

# The Clustering of Multiple Sclerosis Subgroups through L2 Norm Multifractal Denoising Technique

**Authors :** Yeliz Karaca, Rana Karabudak

**Abstract :** Multifractal Denoising techniques are used in the identification of significant attributes by removing the noise of the dataset. Magnetic resonance (MR) image technique is the most sensitive method so as to identify chronic disorders of the nervous system such as Multiple Sclerosis. MRI and Expanded Disability Status Scale (EDSS) data belonging to 120 individuals who have one of the subgroups of MS (Relapsing Remitting MS (RRMS), Secondary Progressive MS (SPMS), Primary Progressive MS (PPMS)) as well as 19 healthy individuals in the control group have been used in this study. The study is comprised of the following stages: (i) L2 Norm Multifractal Denoising technique, one of the multifractal technique, has been used with the application on the MS data (MRI and EDSS). In this way, the new dataset has been obtained. (ii) The new MS dataset obtained from the MS dataset and L2 Multifractal Denoising technique has been applied to the K-Means and Fuzzy C Means clustering algorithms which are among the unsupervised methods. Thus, the clustering performances have been compared. (iii) In the identification of significant attributes in the MS dataset through the Multifractal denoising (L2 Norm) technique using K-Means and FCM algorithms on the MS subgroups and control group of healthy individuals, excellent performance outcome has been yielded. According to the clustering results based on the MS subgroups obtained in the study, successful clustering results have been obtained in the K-Means and FCM algorithms by applying the L2 norm of multifractal denoising technique for the MS dataset. Clustering performance has been more successful with the MS Dataset (L2_Norm MS Data Set) K-Means and FCM in which significant attributes are obtained by applying L2 Norm Denoising technique.

**Keywords :** clinical decision support, clustering algorithms, multiple sclerosis, multifractal techniques
**Conference Title :** ICAMCS 2018 : International Conference on Applied Mathematics and Computer Science
**Conference Location :** Stockholm, Sweden
**Conference Dates :** July 12-13, 2018