

International Workshop on Signal Processing (IWSP 2018)

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Kish Island

Multiple-template-based segmentation of medical images

by *Dr. Alireza Akhondi-Asl*

Abstract:

Multiple template fusion algorithms are promising segmentation techniques when the structures are complex and manual segmentation is challenging, but they have been limited by imperfections in the alignment of templates to the target, and by template segmentation errors. A number of algorithms sought to improve segmentation performance by combining image intensities and template labels as two independent sources of information, carrying out fusion through local intensity weighted voting schemes. This class of approach is a form of linear opinion pooling, and achieves unsatisfactory performance for this application. We hypothesized that better decision fusion could be achieved by assessing the contribution of each template in comparison to a reference standard segmentation of the target image and developed a novel segmentation framework to enable automatic segmentation of medical images. The developed algorithms achieve high performance by estimating and compensating for both imperfect registration of the templates to the target image and template segmentation inaccuracies.

About the speaker:

Dr. Alireza Akhondi-Asl is an assistant professor at University of Tehran and an instructor at Harvard Medical School and Boston Children's Hospital. He received his PhD and M.Sc. degrees both in Electrical Engineering from the University of Tehran, Iran, in 2009 and 2003, respectively and B.Sc. degree in Electrical Engineering from the Sharif University of Technology, Iran, in 2000. Alireza has more than fifteen years of experience in statistical signal and image processing, machine learning, and pattern recognition for inter-disciplinary applications. In the past fifteen years, He has been working on the development of novel image and signal processing techniques for medical imaging in anatomic neuroimage analysis, image registration, and segmentation. Specifically, He has developed novel automatic brain segmentation and parcellation algorithms, which have been widely used in clinical applications. He has also developed fast myelin imaging and image processing algorithms, which have increased myelin water fraction estimation accuracy as compared to the state-of-the-art methods. In his PhD dissertation, He has investigated structural abnormalities in brain and developed novel segmentation algorithms to enhance the localization of epileptogenic regions.

Location

Workshop venue: Iran Telecommunication Research Center (ITRC), North Kargar st., Tehran, Iran.

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