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Multimodal Medical Image Fusion based on Deep Learning Neural Network for Clinical Treatment Analysis

B.Rajalingam[1]*, R.Priya[2]

Department of Computer Science and Engineering, Annamalai University, Annamalainagar, Tamilnadu, India

Abstract: Multimodal medical image fusion technique is one of the most significant and useful disease investigative techniques by deriving the complementary information from different multimodality medical images. This research paper, proposed an efficient multimodal medical image fusion approach based on deep learning convolutional neural networks (CNN) for fusion process. Computed Tomography (CT), Magnetic Resonance Imaging (MRI) and Positran Emission Tomography (PET) are the input multimodality medical images used for the experimental work. In the proposed technique, a siamese convolutional network is adopted to create a weight map which integrates the pixel movement information from two or more multimodality medical images. The medical image fusion process is carried out in a multiscale manner via medical image pyramids to be more reliable with human visual insight. In addition, a local comparison based strategy is applied to adaptively correct the fusion mode for the decomposed coefficients. An experimental result of proposed fusion techniques provides the best fused multimodal medical images of highest quality, shortest processing time and best visualization in both visual quality and objective assessment criteria.
Keywords: Multimodal Medical image fusion, deep learning, siamese convolutional network, CNN, CT, MRI and PET.

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