Patent Search

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Abstract:

The present invention proposes novel deep neural network architectures for multi-modal image fusion in medical imaging. Traditional methods for integrating informatior different imaging modalities often rely on handcrafted features and heuristic rules, limiting their ability to fully exploit the rich information contained in medical images. In contrast, the proposed architectures leverage the representational power of deep learning to automatically learn hierarchical representations directly from data. By extrac features from multiple modalities and fusing them into a unified representation, the proposed architectures provide enhanced information for clinical decision-making, inc improved lesion detection, segmentation, and classification. The modular design of the architectures allows for flexibility in incorporating different modalities and adapting various medical imaging tasks. Experimental results demonstrate the effectiveness of the proposed approach in improving diagnostic accuracy and facilitating treatment p in clinical settings. Accompanied Drawing [FIGS. 1-2]

Complete Specification

Description:[001] The field of invention pertains to advancements in medical imaging technology, specifically focusing on the development of deep neural network architectures for multi-modal image fusion. Medical imaging plays a pivotal role in diagnosing and monitoring various health conditions by providing insights into anatomical structures and physiological processes. However, each imaging modality, such as MRI, CT, PET, and ultrasound, has its unique strengths and limitations. The proposed invention aims to address this challenge by integrating information from multiple modalities to create comprehensive representations of biological structures pathological conditions.

[002] Multi-modal image fusion involves the combination of data from different imaging modalities to enhance diagnostic accuracy and improve clinical decision-making Traditional methods for image fusion often rely on manual feature extraction and heuristic rules, which may not fully leverage the rich information available in medical images. In contrast, the invention harnesses the power of deep learning to automatically learn hierarchical representations directly from data.

[003] The application of deep neural network architectures in multi-modal image fusion offers several advantages over conventional techniques. By employing convoluti neural networks (CNNs) and other deep learning algorithms, the proposed architectures can effectively extract and fuse features from diverse imaging modalities. This allows for the integration of complementary information while preserving modality-specific characteristics, ultimately leading to more informative and clinically relevant fused images.

[004] Furthermore, the modular design of the deep neural network architectures enables adaptability to various medical imaging tasks, including lesion detection, segmentation, and classification. The fusion process is guided by learnable parameters, allowing the network to adaptively integrate information from different modalitie based on the task at hand. Additionally, feature fusion mechanisms such as attention mechanisms or skip connections facilitate information flow and enhance the netwo

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