

(54) Title of the invention : AI-BASED BIOMEDICAL IMAGE SEGMENTATION SYSTEM AND METHOD FOR DISEASE-SPECIFIC ABNORMALITY DETECTION

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(57) Abstract :

The present invention relates an image segmentation system and method to support medical image diagnosis and treatment planning is disclosed. The system comprises a processor, memory, and multiple modules including an input module, encoder, decoder, and visualization module. The input module receives augmented biomedical images from medical imaging sources. The encoder includes a series of Recurrent Multi-Scale Dilated Convolution (RMSDC) modules (101), each integrating Variable Rate Dilated Convolution (VRDC) modules (102), a Feature Refinement (FR) (103) with Adaptive Slope ReLU (ASReLU) (302), and a Spatial Region Enhancer (SRE) for preserving spatial boundaries. The decoder mirrors the RMSDC structure, progressively recovering spatial resolution while refining features via VRDC (102), FR, and concatenation modules. The decoder outputs are further processed through a convolution layer to produce a segmentation map. The system accurately segments anatomical regions by capturing both local and global contextual features, improving diagnostic precision and adaptability across various biomedical imaging domains. (to be published with figure 1)

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