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発表題目（※学会発表の場合のみ記載）	FVM-UNet: FFT-enhanced VM-UNet for Medical Image Segmentation
発表の概要と成果（抄録を公開している URL がある場合、「概要・成果」を記載した上で、URL を末尾に記してください。また、抄録 PDF は別途ご提出ください。なお、抄録 PDF は Web 上には公開されません。） Within medical imaging's segmentation domain, VM-UNet with state space models (SSMs) has shown promising results because of its linear computational complexity and efficient sequence modeling capabilities. However, its ability in capturing comprehensive image features, especially in boundary delineation and fine-grained details, remains limited. While recent studies have explored various architectural enhancements, the potential of frequency domain analysis in complementing state space models has remained largely unexplored. In this paper, we propose FVM-UNet, a framework that integrates the Fast Fourier Transform (FFT) with VM-UNet to enhance medical image segmentation. Our approach maintains the computational efficiency of state space models while incorporating frequency domain features to improve feature representation and boundary detection. With carefully designed FFT modules and feature fusion mechanisms, FVM-UNet effectively combines spatial and frequency domain information to achieve superior segmentation accuracy. Extensive evaluation performed on the ISIC2017 and ISIC2018 datasets reveal that FVM-UNet consistently outperforms existing methods, achieving mIoU improvements of approximately 0.58% on ISIC2017 and 0.13% on ISIC2018 over VM-UNet. Ablation studies further validate the effectiveness of our frequency domain integration. Our work establishes a new direction for integrating the Fast Fourier Transform in state space model-based medical image segmentation.	

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