



Abstract: Enhanced Diagnostic Fidelity in Pathology Whole Slide Image Compression via Deep Learning

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Accurate diagnosis of disease often depends on the exhaustive examination of whole slide images (WSI) at microscopic resolution. Efficient handling of these data-intensive images requires lossy compression techniques. This paper investigates the limitations of the widely-used JPEG algorithm, the current clinical standard, and reveals severe image artifacts impacting diagnostic fidelity. To overcome these challenges, we introduce a novel deep-learning (DL)-based compression method tailored for pathology images. By enforcing feature similarity of deep features between the original and compressed images, our approach achieves superior Peak Signal-to-Noise Ratio (PSNR), Multi-Scale Structural Similarity Index (MS-SSIM), and Learned Perceptual Image Patch Similarity (LPIPS) scores compared to JPEG-XL, Webp, and other DL compression methods. Our method increases the PSNR value from 39 (JPEG80) to 41, indicating improved image fidelity and diagnostic accuracy. This work was published on the International Workshop on Machine Learning in Medical Imaging [1].

References

1. Fischer M, Neher P, Schüffler P, Xiao S, Ulrich C, Muckenhuber A et al. Enhanced diagnostic fidelity in pathology whole slide image compression via deep learning. *Mach Learn Med Imaging*. 2023.

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