

# Unveiling Thymoma Typing through Hyperspectral Imaging and Deep Learning

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## Abstract

:Thymoma, a rare tumor from thymic epithelial cells, presents diagnostic challenges due to the subjective nature of traditional methods, leading to high false-negative rates and long diagnosis times. This study introduces a thymoma classification technique that integrates hyperspectral imaging with deep learning. We initially capture pathological slice images of thymoma using a hyperspectral camera and delineate regions of interest to extract spectral data. This data undergoes reflectance calibration and noise reduction. Subsequently, we transform the spectral data into two-dimensional images via the Gramian Angular Field (GAF) method. A variant residual network is then utilized to extract features and classify these images. Our results demonstrate that this model significantly enhances classification accuracy and efficiency, achieving an average accuracy of 95%. The method proves highly effective in automated thymoma diagnosis, optimizing data utilization and feature representation learning.

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