



Abstract: Radiomics Processing Toolkit

Role of Feature Computation on Prediction Performance

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Radiomics focuses on extracting and analyzing quantitative features from medical images. Standardizing radiomics is difficult due to variations across studies and centers, making it challenging to identify optimal techniques for any application. Recent works (WORC, Autoradiomics) [1, 2] are introducing radiomics-based frameworks for automated pipeline optimization. Both approaches span the workflow, enabling consistent, and reproducible radiomics analyses. In contrast, finding the ideal solutions for feature extractor and feature selection components, has received less attention. Therefore, we propose the Radiomics Processing Toolkit (RPTK) [3], which adds comprehensive feature extraction and selection components from PyRadiomics and from the Medical Image Radiomics Processor (MIRP) to the radiomics pipeline. We compared RPTK with results from WORC and Autoradiomics and on six different public benchmark data sets. We demonstrate significant improved performance by incorporating the proposed feature processing and selection techniques across all datasets. Additionally, the choice of the feature extractor significantly enhances prediction performance. Our results provide additional guidance in selecting suitable components for optimized radiomics analyses.

References

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