

Title: Harmonization Strategies in Multicenter MRI-Based Radiomics

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Summary: The paper reviews strategies for harmonizing radiomics data from multicenter MRI studies, focusing on reducing variability due to differences in imaging protocols and equipment across different locations. Radiomics is a method that extracts detailed quantitative data from medical images, which can help in diagnosing diseases and predicting patient outcomes. However, variability in image acquisition methods can introduce bias and make it hard to compare data across centers. This review summarizes different techniques for harmonizing MRI data before and after the extraction of radiomics features.

Two main types of harmonization are discussed: **image-based harmonization** (applied to the images before feature extraction) and **feature-based harmonization** (applied to the data after extraction). Techniques like bias field correction, intensity normalization, and image resampling are highlighted as important for reducing scanner-related variations in MRI images. On the feature-based side, methods like ComBat adjust for differences in feature distributions across centers. These techniques aim to ensure that radiomics features are consistent and comparable across studies.

Despite the progress in harmonization, challenges remain. MRI, in particular, has complex variability due to the lack of standard signal intensities, unlike other imaging methods like CT or PET. The review emphasizes the need for more standardized protocols and consistent use of harmonization methods to improve the reliability of radiomics for clinical use.

Overall, harmonization is crucial for making radiomics a reliable tool in clinical diagnostics, especially in multicenter studies. Without these strategies, radiomics data may be inconsistent and less useful for developing predictive models in healthcare.

¹ "et al." is an abbreviation for the Latin phrase "et alia" which translates to "**and others**" in the English language.

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