

Authors : Martin, Phil, Vincent, Roger, Henning, Adrien, Alex

TITLE : Radiomics Analysis Using The Image Biomarker Standardization Initiative (IBSI) Benchmarks And Guidelines

***Teaching points:**

Radiomic studies still suffer from severe reproducibility problems that prevent the routine use of these methods in clinical practice. For example, it was previously shown that differences in feature definitions and implementation workflows (e.g., interpolation) can lead to coefficients of variation as high as 150% for some texture features. To overcome these challenges, about 75 researchers from 25 institutions in 8 countries have now participated in the Image Biomarker Standardization Initiative (IBSI). For better reproducibility of high-throughput medical image analysis, the IBSI seeks to provide a standardized computation workflow for radiomics, as well as benchmark datasets and values. To achieve compliance with the IBSI standards, research teams have the possibility to calibrate their computation pipeline by performing benchmark tests designed by the IBSI team and described in comprehensive reference manuals. This presentation aims to facilitate this calibration process by explaining in detail the radiomics computation workflow of the IBSI.

***Table of Contents/Outline:**

(1) IBSI tools: documentation, datasets and website; (2) Radiomics computation workflow of the IBSI; (3) IBSI benchmark tests explained; (3a) IBSI 1 – Phase 1: computing radiomics features without image processing; (3b) IBSI 1 – Phase 2: computing radiomics features with image processing; (3c) IBSI 2 – Phase 1: computing imaging filters; (3d) IBSI 2 – Phase 2: computing radiomics features from filtered response maps.

- (1) IBSI tools: documentation, datasets and website;
- (2) Radiomics computation workflow of the IBSI;
- (3) IBSI benchmark tests explained;
 - a. IBSI 1 – Phase 1: computing radiomics features without image processing;
 - b. IBSI 1 – Phase 2: computing radiomics features with image processing;
 - c. IBSI 2 – Phase 1: computing imaging filters;
 - d. IBSI 2 – Phase 2: computing radiomics features from filtered response maps.