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Scores for comparing on-tissue digestion methods of formalin-fixed paraffin-embedded tissue in MALDI-MS imaging

Denis A. Sammour

PhD candidate
Institute of Medical Technology (IMT)
Mannheim University of Applied Sciences, Mannheim, Germany
Email: d.abu-sammour@hs-mannheim.de

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Motivation & setup

- The study **aimed** to **assess** the **reproducibility** of the generated **MALDI-MSI data** with respect to **five published FFPE** tissue preparation **methods** -> a **key pre-requisite** for building reliable **classification** models.

- **Two human FFPE tissues** (both judged by an expert pathologist to be **>98%** histologically **homogeneous**), gastrointestinal stromal tumor (GIST) and liver -> **Five** different preparation **methods** with **three** full technical **replicates** each.

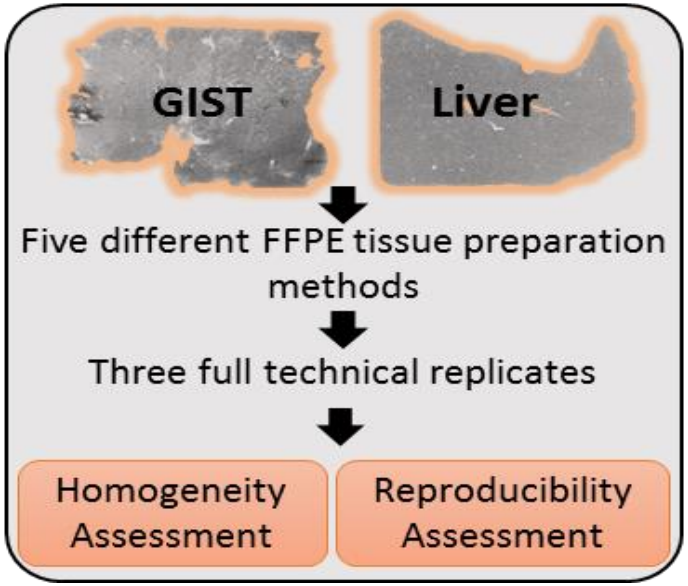

Fig. 1: General Outline of the experimental setup.

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Results at a glance: Pixel-wise comparisons

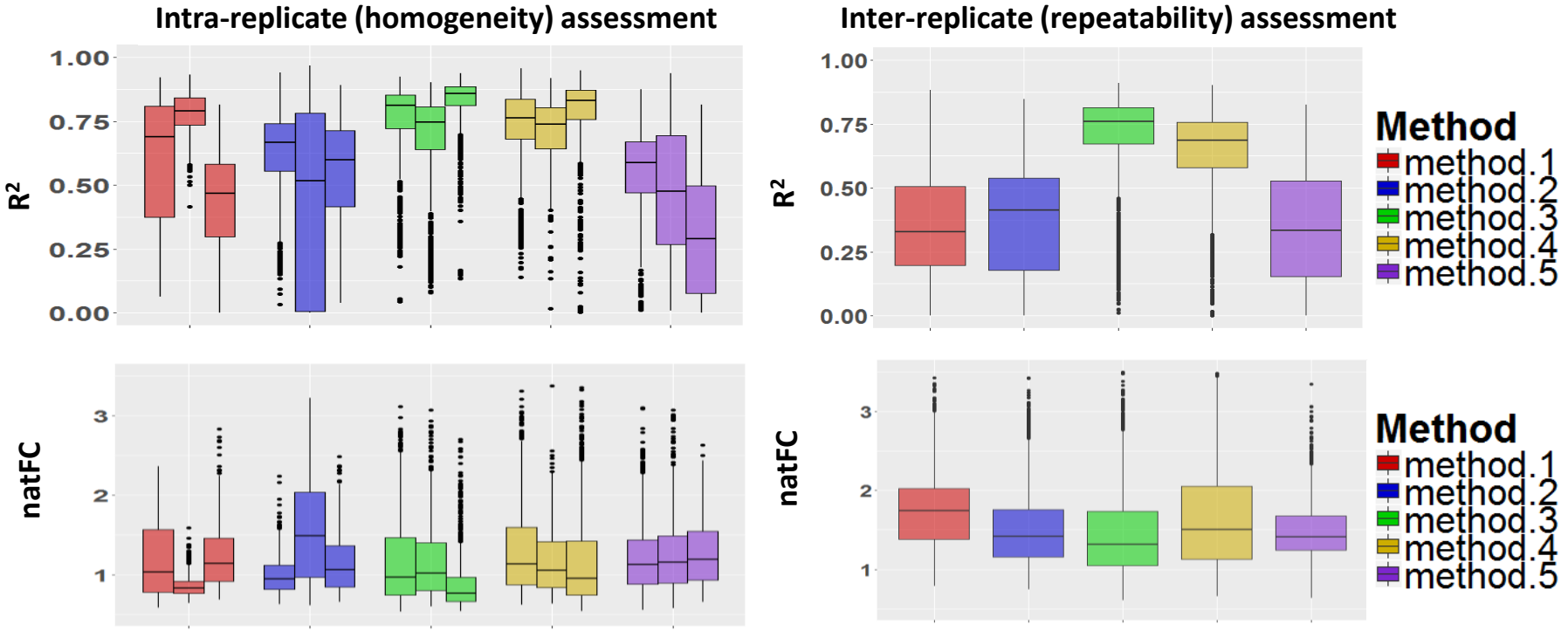

Fig. 2: Pixel-wise **coefficient of determination (R^2)** and **natural fold change ($natFC = \max(|5^{th}FC\ percentile|, |95^{th}FC\ percentile|)$** scores were computed for intra- and inter-replicate comparisons for the evaluation of tissue processing homogeneity and method repeatability, respectively.

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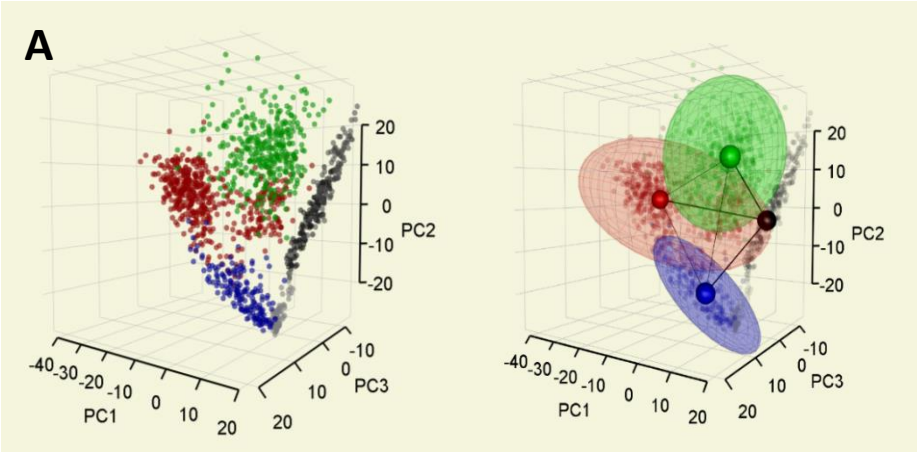
Results at a glance: PCA-based scatter scores



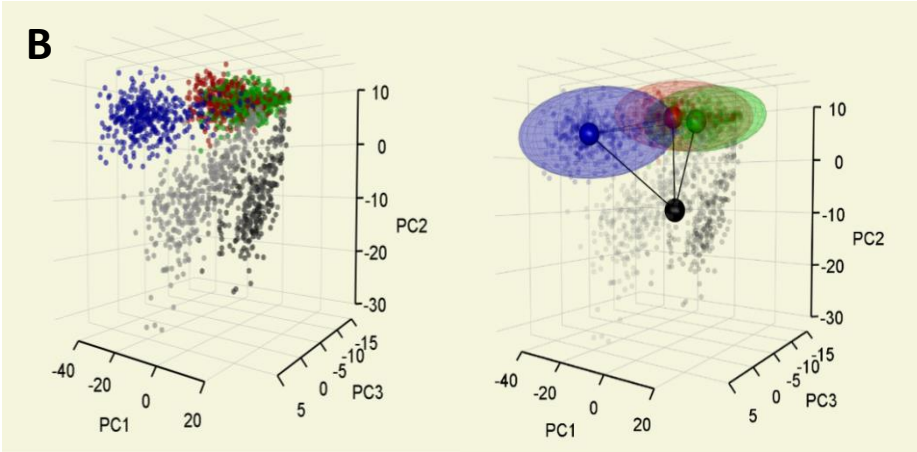


Fig. 3: PCA space for two representative **GIST** datasets, **method 1 (A)** and **method 3 (B)** before and after applying PCA-based scatter scores. The **spread** of the data points is **measured by the mean absolute deviation (** MAD**)** represented by an **ellipsoid**. The **replicates overlap** is approximated by $\boldsymbol{J_{overlap}} = |W_s|/|B_s|$ representing the **ratio** of the determinants of **within to between class scatter** matrices.

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Thank you for your attention

Reference:

K. Erich et al., "**Scores for standardization of on-tissue digestion of formalin-fixed paraffin-embedded tissue in MALDI-MS imaging**." *Biochimica et Biophysica Acta (BBA) - Proteins and Proteomics* (2016). doi: 10.1016/j.bbapap.2016.08.020

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