

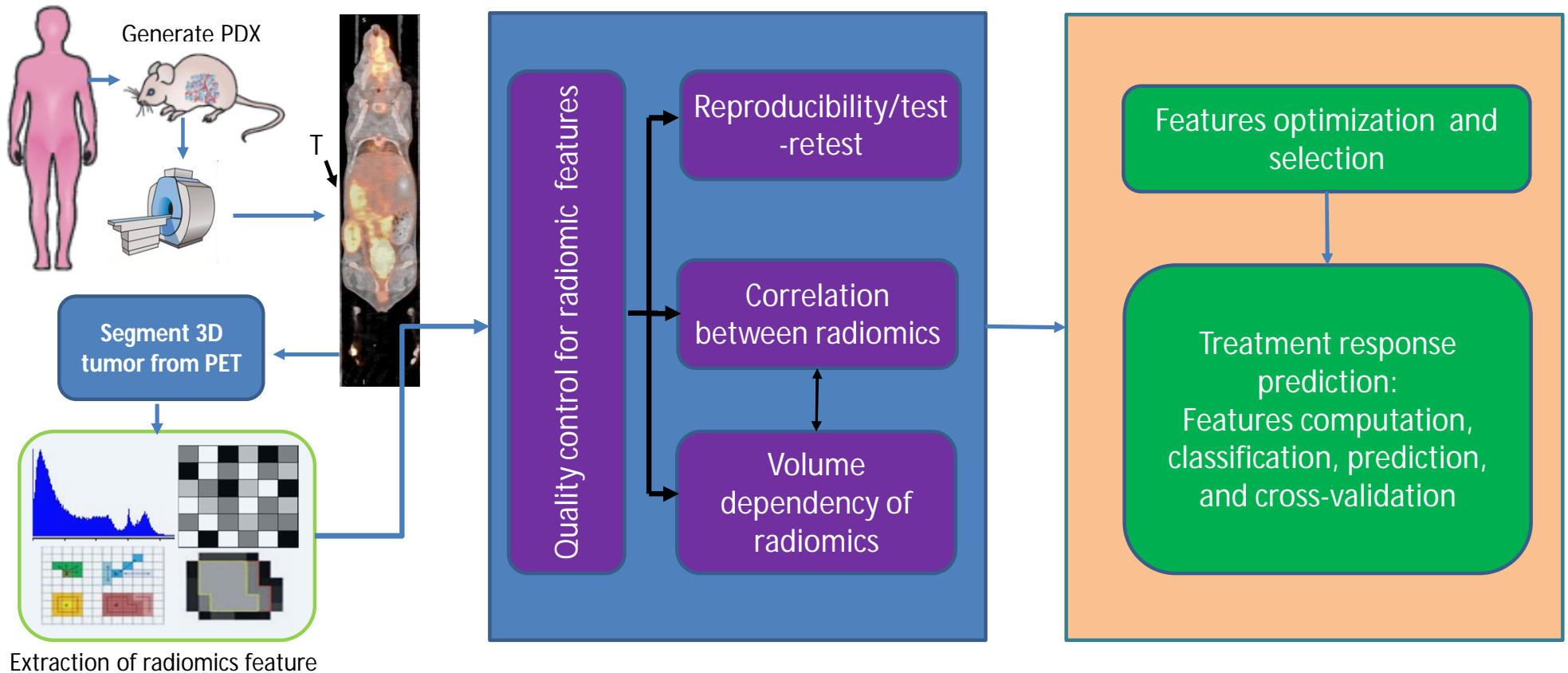
Precision and prediction of response to docetaxel/carboplatin therapy using machine-learning optimized radiomic features in preclinical FDG-PET imaging of TNBC Patient-Derived Tumor Xenografts

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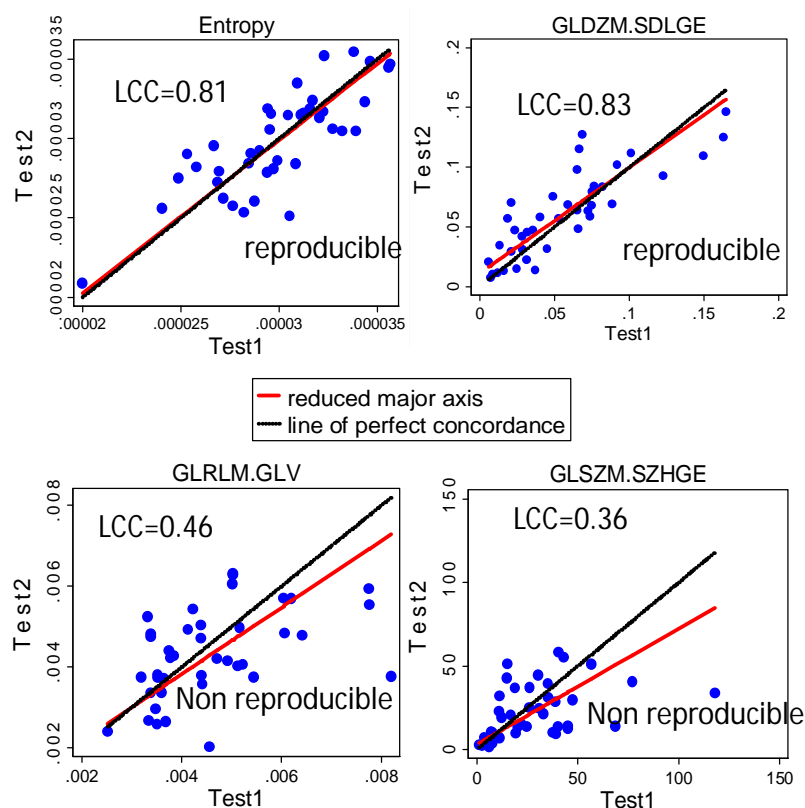


Overall Overview of Methodology

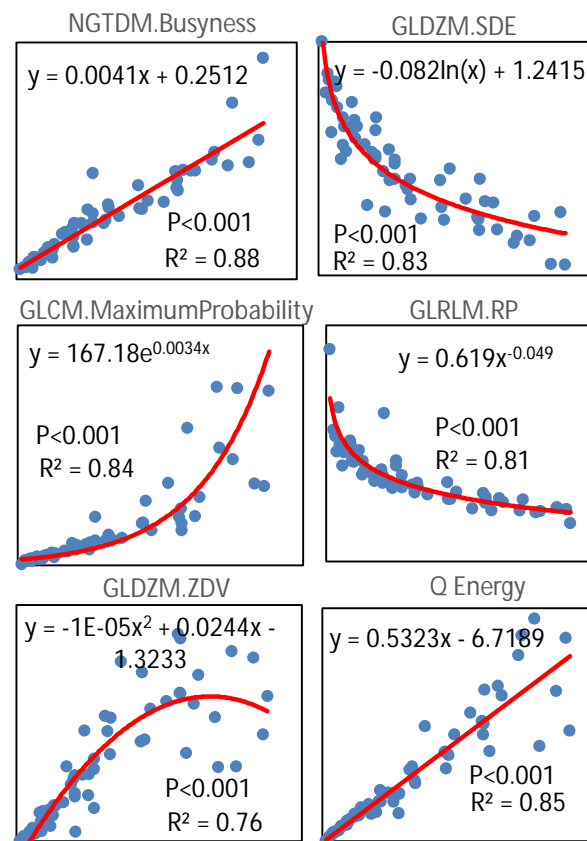


Radiomics features extraction and Quality control

Two reproducible (Top) and two non reproducible (bottom) features



Volume dependent radiomics



Total repeatable features = 89

Treatment response prediction

Decision classification tree

Decision regression tree

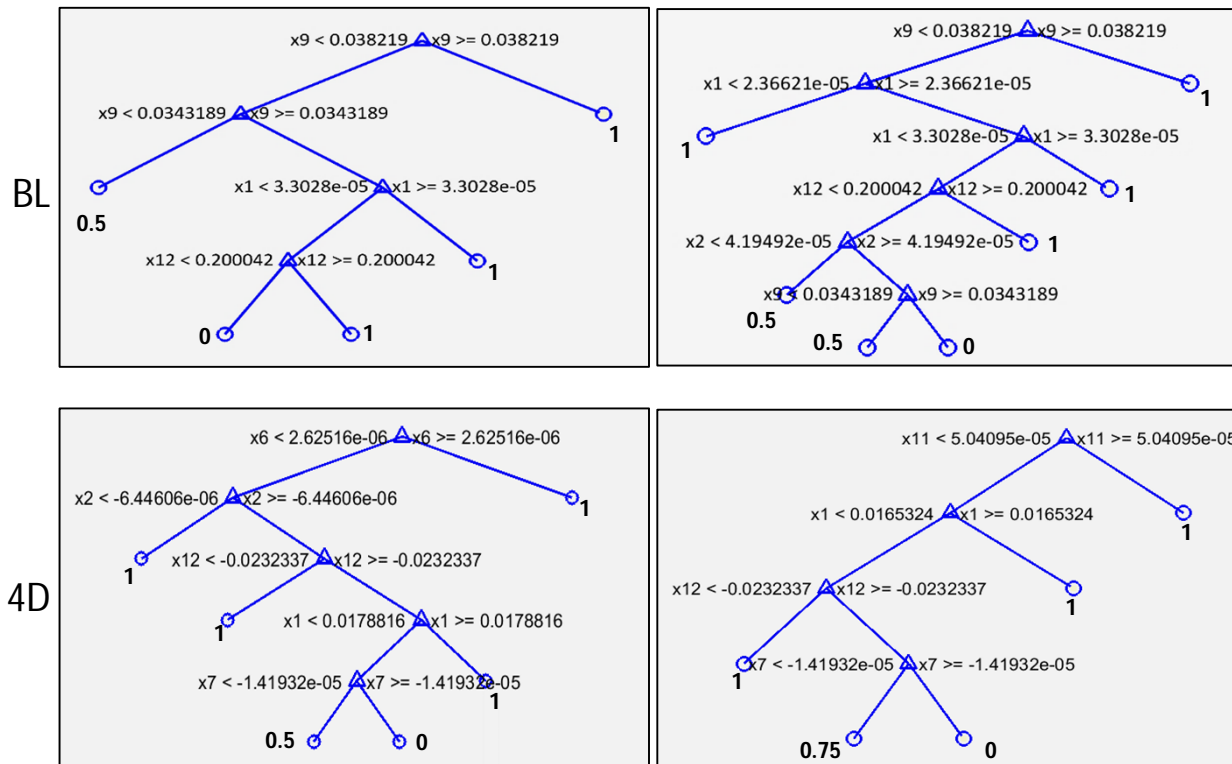


Table 1: Error metric for machine learning algorithms

Methods	Baseline (BL)		Difference(4D-BL)	
	Radiomics	SUV ₂₅	Radiomics	SUV ₂₅
Decision tree (Classification)	0.27	0.48	0.30	0.38
Decision tree (Regression)	0.19	0.29	0.21	0.35
Support vector machine (SVM)	0.21	0.34	0.17	0.26
Naive Bayes	0.18	0.43	0.21	0.29
Ensemble of learners	0.32	0.35	0.29	0.34

* Error was calculated from the ratio between total number of false positive (FP) and false negative (FN) to the total number (N). Accuracy can be calculated from (1-Error).

Conclusions

- We identified unique, volume-independent, and reproducible radiomic feature to assess response to therapy.
- MLA was implemented to predict response to therapy with high-accuracy of >80% using only BL radiomic features as well from difference between (4D-BL).
- MLA was cross-validated to ensure applicability for TNBC PDX.
- Additional biomarkers can be used to further enhance prediction of response to therapy.