

A020 · Luxemia: Pan-Leukemic Algorithmic Relapse Prediction via Federated Gradient Boost-ensembles with SHAP-Based Clinical Interpretability

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Relapse is a major determinant of mortality in haematological malignancies. Luxemia is a federated heterogeneous pan-leukemic ensemble integrating XGBoost, LightGBM, CatBoost, Random Forest, HistGradientBoosting etc, with an L2-regularised logistic meta-learner and isotonic PAV calibration. Trained on >10,000 NCI TARGET ALL/AML records using stratified group-aware 5-fold cross-validation, it achieved ALL AUC 0.787 (95% CI 0.702–0.870; Brier 0.126) and AML AUC 0.699±0.016. Harmonised features include cytogenetics, molecular markers, MRD kinetics, and ELN 2022 risk stratification, enabling institution-specific deployment without data restructuring. Federated inference preserves data locality with no patient-level data transfer. External validation (n≈2,500) achieved AUCs of 0.784 and 0.771.