**Objective**  
Provide an early‑warning signal for firm bankruptcy using financial ratios to support credit/risk decisions.

**Technologies**  
Python, pandas, scikit‑learn; SMOTE, PCA, model comparison (LR / Random Forest / XGBoost), matplotlib.

**Role / Contributions**

* Engineered **train‑only** PCA/SMOTE variants; audited features for multicollinearity, leakage, and stability across folds.
* Built and compared interpretable and ensemble models; documented assumptions and hyperparameters.

**Outcomes / Results**

* Selected **XGBoost** as the final model (≈**96% accuracy** with improved precision/recall vs. baseline).
* Delivered decision‑ready artifacts that enable transparent review and reuse.