**Key Highlights of an Interpretable LGBM Model for Noninvasive Diagnosis of Tuberculous Pleural Effusion**

**1.Developed an interpretable machine learning model for noninvasive diagnosis of tuberculous pleural effusion (TPE).**

2. **Combined Light Gradient Boosting Machine (LGBM) with SHAP, heatmap, and PCA to enhance model interpretability.**

**3.Achieved accurate TPE diagnostic performance across a multicenter cohort using routine laboratory data.**

**4.SHAP analysis, supported by heatmap and PCA visualizations, addressed the “black box” issue, improving clinical insight.**

**5.Provides a practical, noninvasive diagnostic tool applicable to resource-limited healthcare settings.**