SHAP vs LIME: Side-by-Side Comparison

LIME

🎯 **Approach:**
Local linear approximation

🔄 **Sampling:**
Perturbed samples around data point

⚡ **Speed:**
Fast computation

📊 **Consistency:**
No theoretical guarantees

🎲 **Results:**
May vary between runs

SHAP

🎯 **Approach:**
Game-theoretic framework

🔄 **Sampling:**
Coalitional sampling (exact solutions)

⚡ **Speed:**
More computationally intensive

📊 **Consistency:**
Fairness axioms satisfied

🎲 **Results:**
Globally consistent, deterministic

When to Choose?

Use LIME

→ Need quick explanations
→ Prototyping phase
→ Simple interpretability

Use SHAP

→ Critical decisions (healthcare, finance)
→ Need theoretical guarantees
→ Comparing feature importance

→ Resource constraints

→ Regulatory compliance