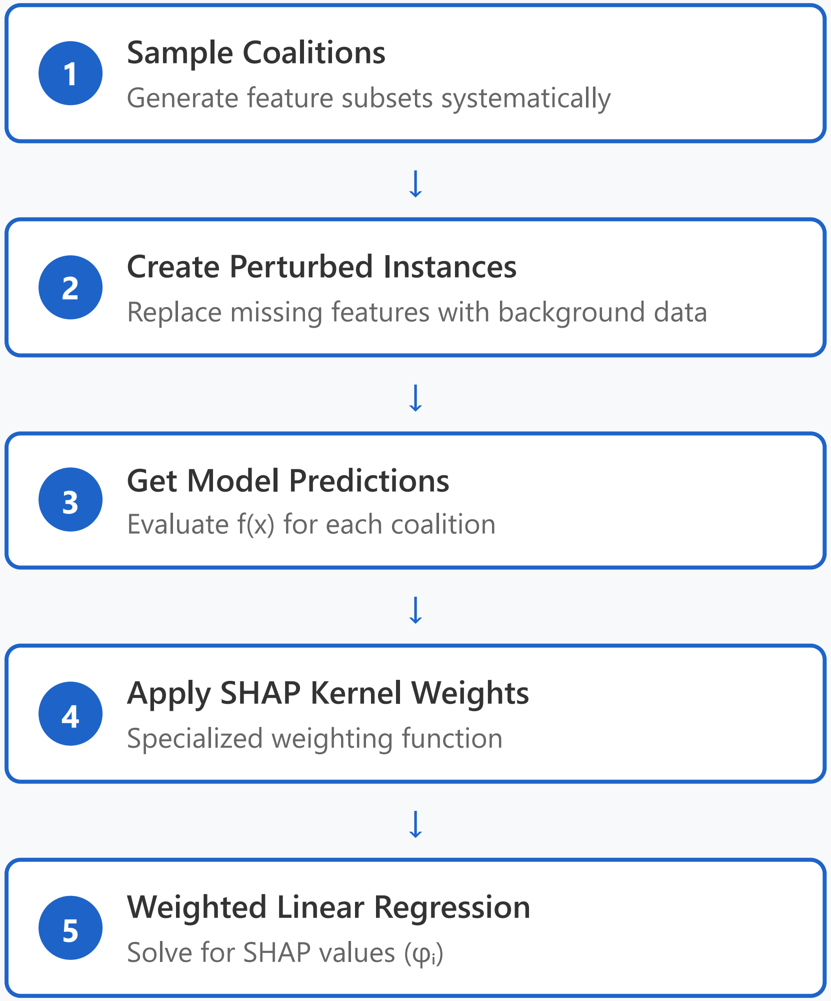
KernelSHAP: Model-Agnostic Approximation

Sampling-based method with weighted linear regression

Algorithm Flowchart



1 **Sample Coalitions**
Generate feature subsets systematically

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2 **Create Perturbed Instances**
Replace missing features with background data

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3 **Get Model Predictions**
Evaluate f(x) for each coalition

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4 **Apply SHAP Kernel Weights**
Specialized weighting function

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5 **Weighted Linear Regression**
Solve for SHAP values (φ_i)

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Key Advantage

Model-Agnostic - Works with any black-box model

- Neural networks
- Ensemble methods
- Custom models

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Trade-off

Computational Cost vs Accuracy

More samples → Better approximation
Fewer samples → Faster computation

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Implementation

```python
import shap

explainer = shap.KernelExplainer(
    model.predict,
    X_train
)
shap_values = explainer.shap_values(X_test)
```