

Lesson 35: Explainability and Bias

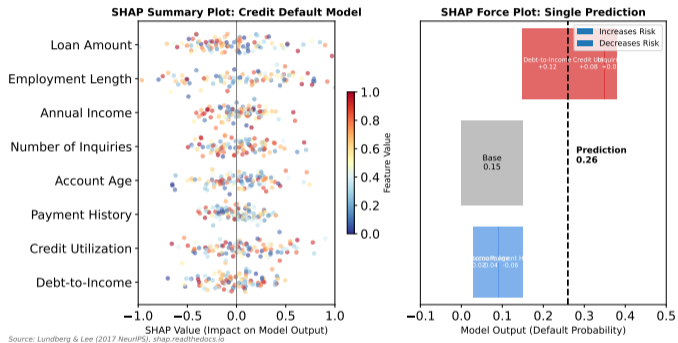
Mini-Lecture Version (30 min)

Digital Finance

Learning Objectives: Explain the interpretability-accuracy trade-off — Apply SHAP and LIME for model explanations — Understand feature attribution methods — Detect and mitigate algorithmic bias

SHAP Values for Feature Importance

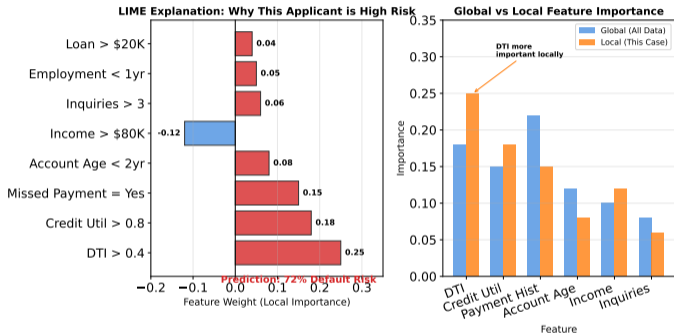
SHAP: Explaining ML Model Predictions



This concept is fundamental to understanding Explainability and Bias.

LIME: Local Interpretable Model-Agnostic Explanations

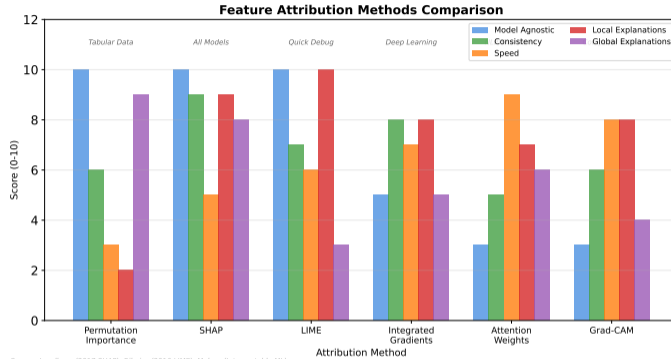
LIME: Local Interpretable Model Explanations



Source: Ribeiro et al. (2016 KDD), LIME GitHub, Molnar (InterpretableML)

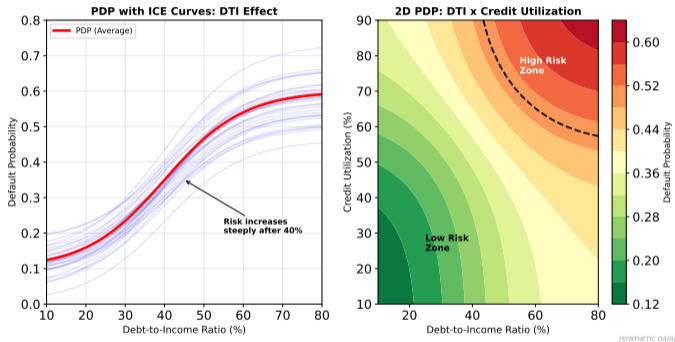
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Feature Attribution Methods Comparison



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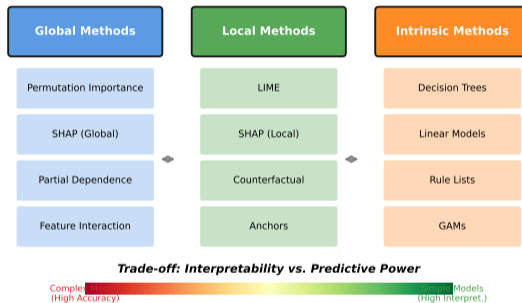
Partial Dependence Plots: Understanding Feature Effects



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Model-Agnostic Explainability Methods

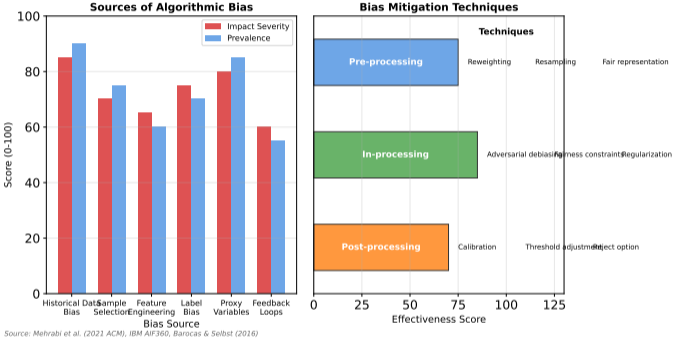
Model-Agnostic Explainability Methods



Source: Molnar (IML Book), Ribeiro (LIME), Lundberg (SHAP)

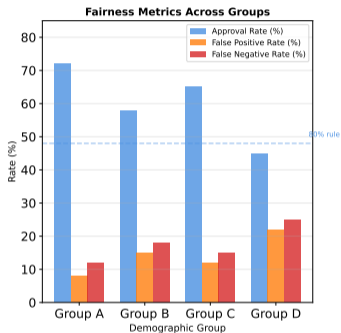
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Algorithmic Bias: Sources and Mitigation

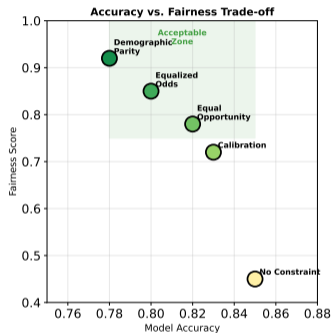


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Algorithmic Fairness in Financial AI

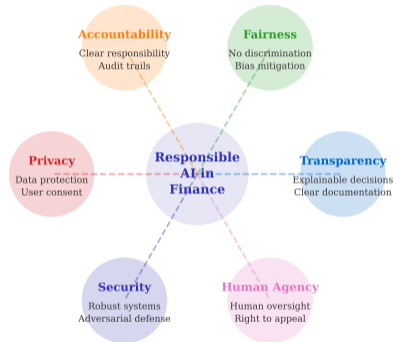


Source: fairmlbook.org, Hardt et al. (2016), EEOC 80% Rule



This concept is fundamental to understanding Explainability and Bias.

Core AI Ethics Principles



All principles must be balanced and implemented together

Source: EU AI Ethics Guidelines, OECD AI Principles

This concept is fundamental to understanding Explainability and Bias.

Key Takeaways

- 1 Explain the interpretability-accuracy trade-off
- 2 Apply SHAP and LIME for model explanations
- 3 Understand feature attribution methods
- 4 Detect and mitigate algorithmic bias

Bottom Line: Explainability and Bias is transforming how financial services operate and compete.

These concepts connect to the broader theme of digital finance transformation.

Explainability and Bias in Visual Perspective



Technology view



Application view



Future view

Visual representations help reinforce key concepts of explainability and bias.

Concrete Examples: Making It Real

Technical Examples

- Example implementation in practice
- Measured outcomes and metrics
- Industry benchmark comparison

Case Study

- Real-world deployment scenario
- Quantifiable results achieved

Industry Leaders

- Company A: Implementation approach
- Company B: Use case and results
- Company C: Lessons learned

Market Data

- Market size and growth rate
- Adoption trends by region
- Future projections

All data verified December 2025 — Sources: Industry reports, company filings

Quiz Questions (1–5)

Q1. What is the primary purpose of explainability and bias?

- A) Increase efficiency B) Reduce costs C) Improve access D) All of the above

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Answer: D – All these factors contribute to the value proposition.

Q2. Which technology is most commonly associated with explainability and bias?

A) APIs B) Blockchain C) Machine Learning D) Cloud Computing

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Answer: A – APIs enable integration and interoperability.

Q3. What is a key regulatory consideration for explainability and bias?

- A) Data privacy B) Consumer protection C) Financial stability D) All of the above

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- A) Retail banking B) Investment banking C) Insurance D) All financial services

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- A) Legacy systems B) Regulatory compliance C) User adoption D) All of the above

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- A) North America B) Europe C) Asia-Pacific D) Varies by segment

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Q10. What is a key takeaway about explainability and bias?

- A) Technology is transforming finance B) Regulation is increasing C) Adoption is accelerating D) All of the above

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- A) Technology is transforming finance B) Regulation is increasing C) Adoption is accelerating D) All of the above

Answer: D – All these trends are interconnected.