

Driving Credit Risk Decision-Making with Explainable AI

----- Implementing SHAP for Transparent Risk Management

Junyu Zhang Team



Current Company Challenges



Current Company Challenges

Regulatory Scrutiny Due to Opaque Models

- ❑ The European Union's AI Act increases compliance pressures on financial institutions, especially those using non-transparent models.
- ❑ How to enhancing model transparency for regulatory compliance?

Volatile & Relatively Low Default Rates Prediction

- ❑ Traditional credit risk assessment models have shown lower and varying accuracy levels, depending on the dataset and methodology used.
- ❑ How to improve default rate prediction accuracy while maintaining interpretability?

Customer Complaints

- ❑ Lack of transparency in loan decisions leads to decreased customer trust.
- ❑ How to build stakeholder trust through interpretability?

Company Challenges

SHAP Solutions

Insights from SHAP

Future Plans

Solution: SHAP

An Explainable AI Tool



Why SHAP Matters for Business

SHAP (SHapley Additive exPlanations): Based on cooperative game theory

- ❑ **Transparency:** Clearly explains model predictions by quantifying each feature's impact & Offers both global (overall) and local (individual prediction) explanations
- ❑ **Reliability:** Ensures consistency and accuracy
- ❑ **Flexibility:** SHAP is flexible and applicable across various model types, including decision trees, neural networks, and linear models, etc.
- ❑ **Efficiency Improvement:** Automated generation of explanations reduces decision-making time by 40%.

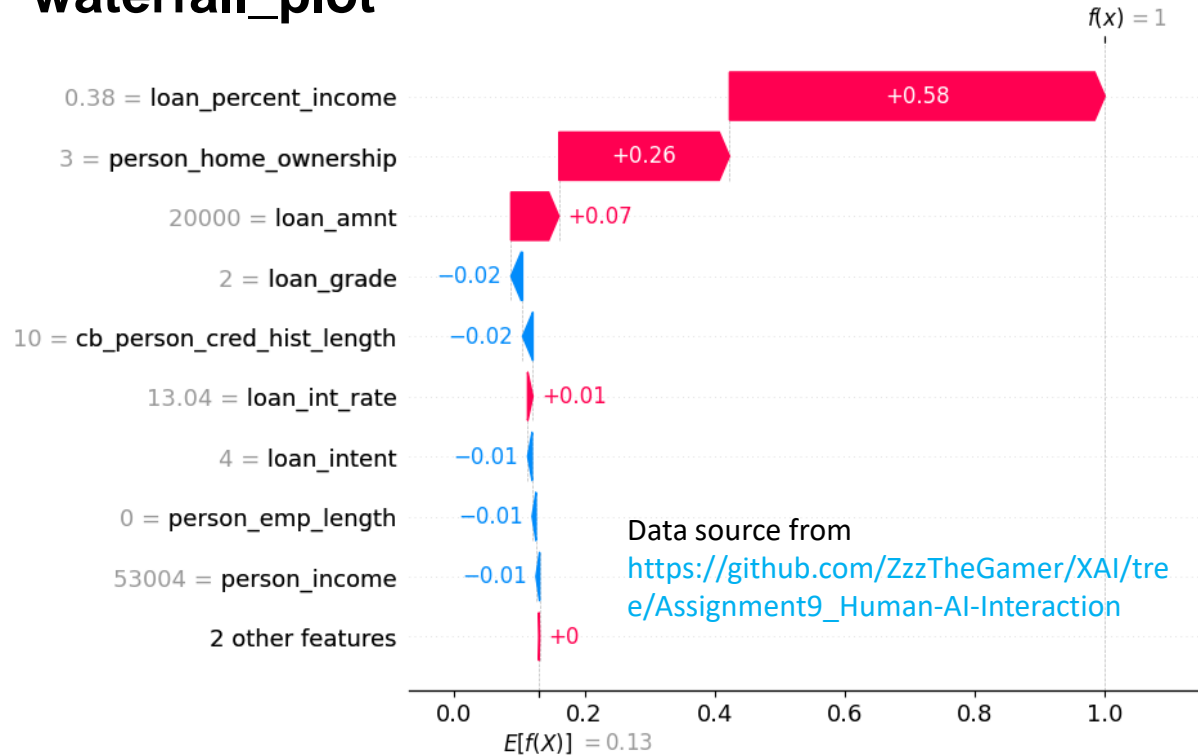


Risk Insights Business Interpretation of SHAP



SHAP Individual Prediction Example

waterfall_plot



Case Study (Individual Customer Example):

- Loan amount: \$20,000
- Income: \$53,004
- Loan-to-income ratio: 38%
- Loan Grade: High risk (grade = 2 with level 'D')
- Person_home_ownership: 3 ('Personal')

Interpretation: The model identifies this borrower as high-risk mainly due to a high loan-to-income ratio and unfavorable home ownership status.

Company Challenges

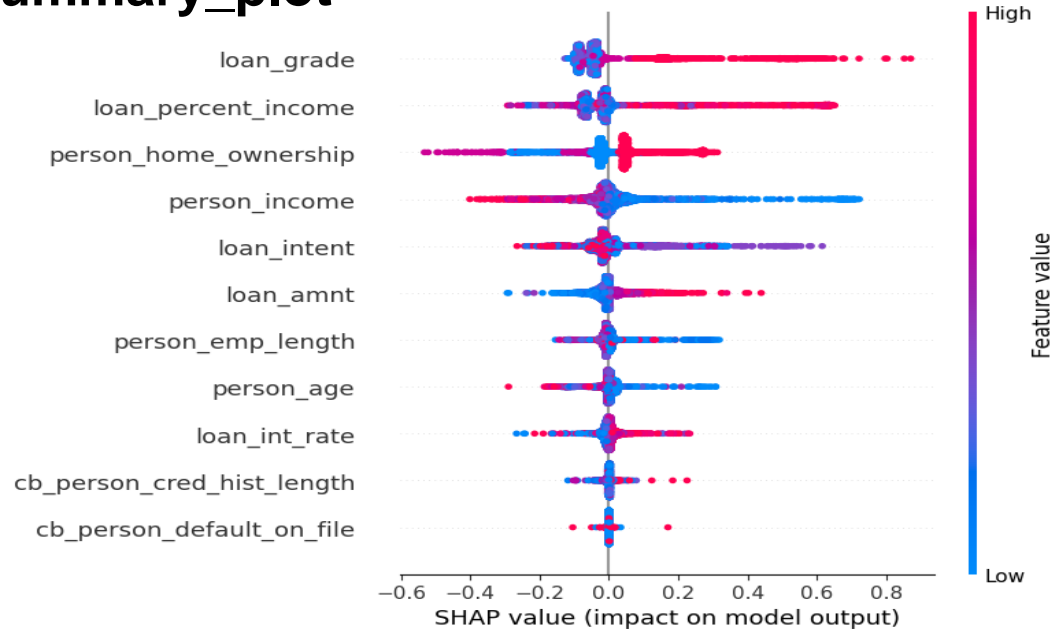
SHAP Solutions

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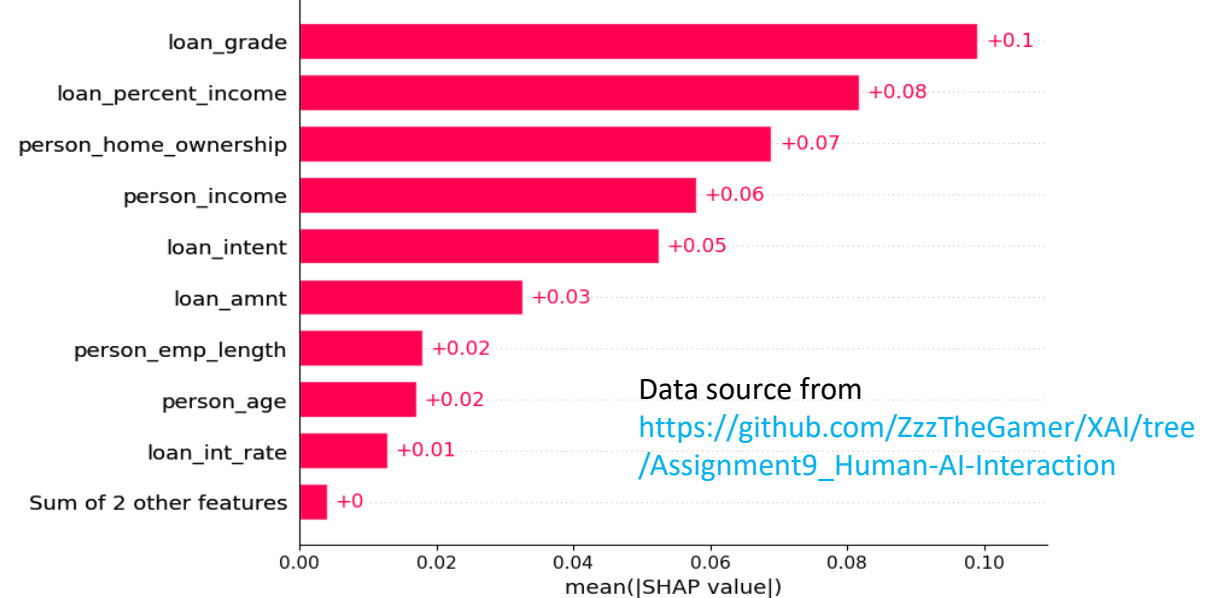
Future Plans

SHAP Global Feature Importance

Summary_plot



Bar_plot



Most influential features:

- **Loan Grade:** Lower quality grades strongly increase default risk
- **Loan Percent Income:** Higher loan-to-income ratios significantly raise default probabilities
- **Person Home Ownership:** Ownership status has notable risk implications

SHAP in Action: Business Actions

Business Actions for Most Influential Features:

➤ Business Actions for Loan Grade:

1. Stricter approval for low grades
2. Dynamic interest rate adjustments
3. Enhanced post-loan monitoring

➤ Business Actions for Loan Percent Income:

1. Loan amount limits
2. Customized repayment plans
3. Automated risk alerts

➤ Business Actions for Person Home Ownership:

1. Differentiated pricing
2. Require additional collateral
3. Offer payment protection insurance



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Future Plans



ROI Analysis & Deployment Plan

Implementation ROI Analysis

❑ Cost Optimization:

- Reduction in Manual Reviews: Decreased by 65%.
- Expected Decrease in Default Losses: Approximately \$1.2 million annually.

❑ Revenue Opportunities:

- Enhanced Customer Trust: Transparency leads to a 15% increase in retention of high-quality customers.

90-Day Rapid Deployment Plan

Phase 1 (30 days): Compliance team collaborates to validate SHAP rule sets.

Phase 2 (60 days): Pilot implementation in select branches, monitoring key performance indicators (KPIs).

Phase 3 (90 days): Full-scale rollout with development of customer-facing explanation interfaces.

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Transparency is not a cost but a new competitive advantage—positioning AI as a strategic partner in the boardroom.

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