

# OptiReturn

---

Protect Your Investment and Maximize Your Return

**DO LEE, Data Scientist**

# Lending Club: Peer-to-Peer Lending

---

**Borrowers**

**Investors**



# Investor's View

## Browse Loans

[Summary](#) | [Portfolio Builder](#) | **[Browse Loans](#)** | [Alert](#) | [Transfer](#) | [Trading Account](#) | [Automated Investing](#)

Available: \$0.00

Add Funds

Build a Portfolio

Per Loan:

Filter Loans [Save](#) | [Open](#)

Exclude Loans already invested in ▼

☒ Exclude loans invested in

Loan Term ▼

☒ 36-month

☒ 60-month

Interest Rate ▶

Keyword ▶

More Filters »

Update Results

[Minimize All](#) [Reset All](#)

Add to Order

Showing Loans 1 - 15 of 1255

<< < 1 **2** 3 4 5 > >> 15 ▾

<input type="checkbox"/> Investment	Rate	Term	FICO®	Amount	Purpose	% Funded	Amount / Time Left
<input type="checkbox"/> \$0	<b>B 3</b> 9.75%	36	705-709	\$12,000	Credit Card Payoff	<div><div></div></div> 99%	\$25 13 days
<input type="checkbox"/> \$0	<b>E 5</b> 22.45%	36	665-669	\$4,800	Loan Refinancing & Consolidation	<div><div></div></div> 96%	\$150 9 days
<input type="checkbox"/> \$0	<b>B 4</b> 10.75%	36	665-669	\$8,000	Credit Card Payoff	<div><div></div></div> 98%	\$125 9 days
<input type="checkbox"/> \$0	<b>E 3</b> 21.18%	36	670-674	\$14,700	Loan Refinancing & Consolidation	<div><div></div></div> 93%	\$1,025 8 days
<input type="checkbox"/> \$0	<b>D 1</b> 16.29%	36	660-664	\$10,000	Loan Refinancing & Consolidation	<div><div></div></div> 97%	\$225 9 days
<input type="checkbox"/> \$0	<b>F 2</b> 24.11%	60	715-719	\$13,550	Loan Refinancing & Consolidation	<div><div></div></div> 96%	\$450 6 days
<input type="checkbox"/> \$0	<b>F 4</b> 25.88%	36	665-669	\$9,600	Small Business	<div><div></div></div> 85%	\$1,400 8 days
<input type="checkbox"/> \$0	<b>E 2</b> 20.75%	36	665-669	\$6,600	Small Business	<div><div></div></div> 91%	\$550 9 days
<input type="checkbox"/> \$0	<b>C 4</b> 14.46%	60	685-689	\$11,350	Loan Refinancing & Consolidation	<div><div></div></div> 96%	\$450 9 days

# Problem: Minimizing loan default risk

---

- Limited online features to gauge default risk
- Limited relevant metrics to maximize your ROI
- Example: **13% return** - **5% default** - **1% fees** = **7%**
- Goal: Minimize default risk and Maximize ROI

# Solution: **OptiReturn**-Predictive Analytics Platform

---

- Classification Model: Logistic Regression
- Observations: Defaulted & Fully Paid Loans (~100k)
- Number of Features: 144
- Prediction Threshold: 0.50
- Year 2007 - 2014

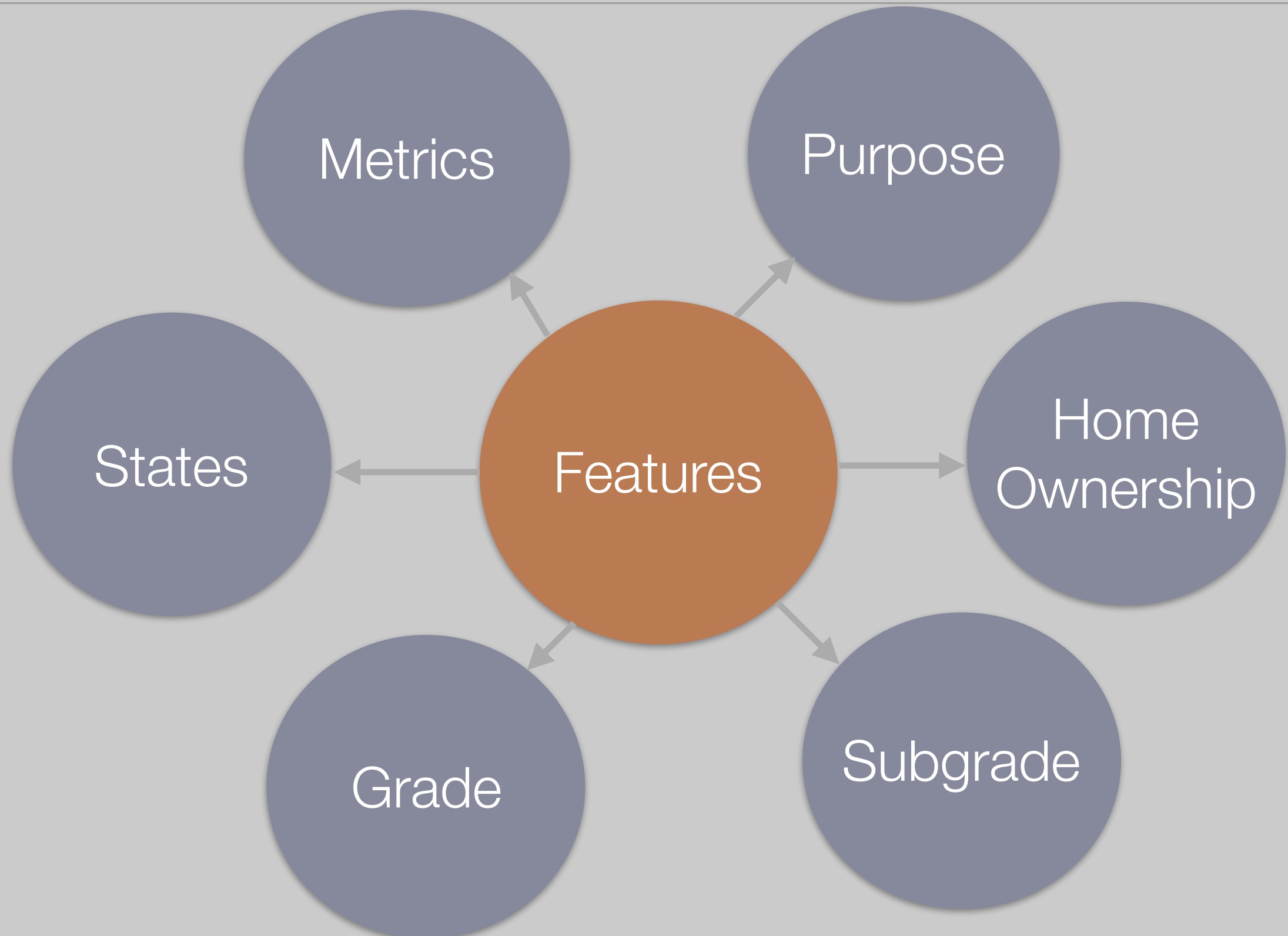
# Predict Probability of Default

---

	Default Probability	Paid Probability	Actual Status
Borrower 1	0.73	0.27	Defaulted
Borrower 2	0.35	0.65	Fully Paid
Borrower 3	0.22	0.78	Fully Paid
Borrower 4	0.81	0.19	Defaulted

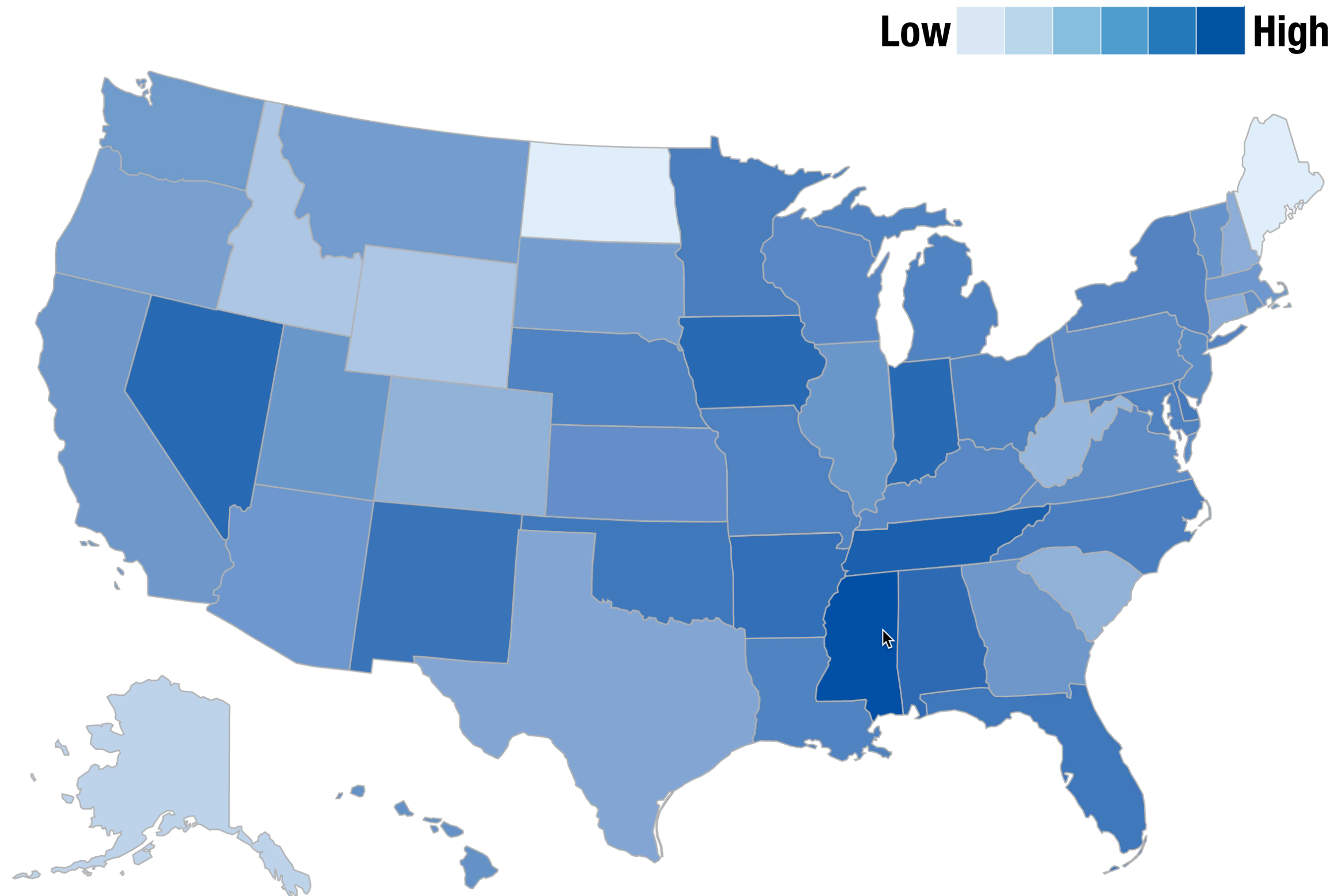
# Feature Groupings

---



# States: D3 Interactive Default Probability Heatmap

---



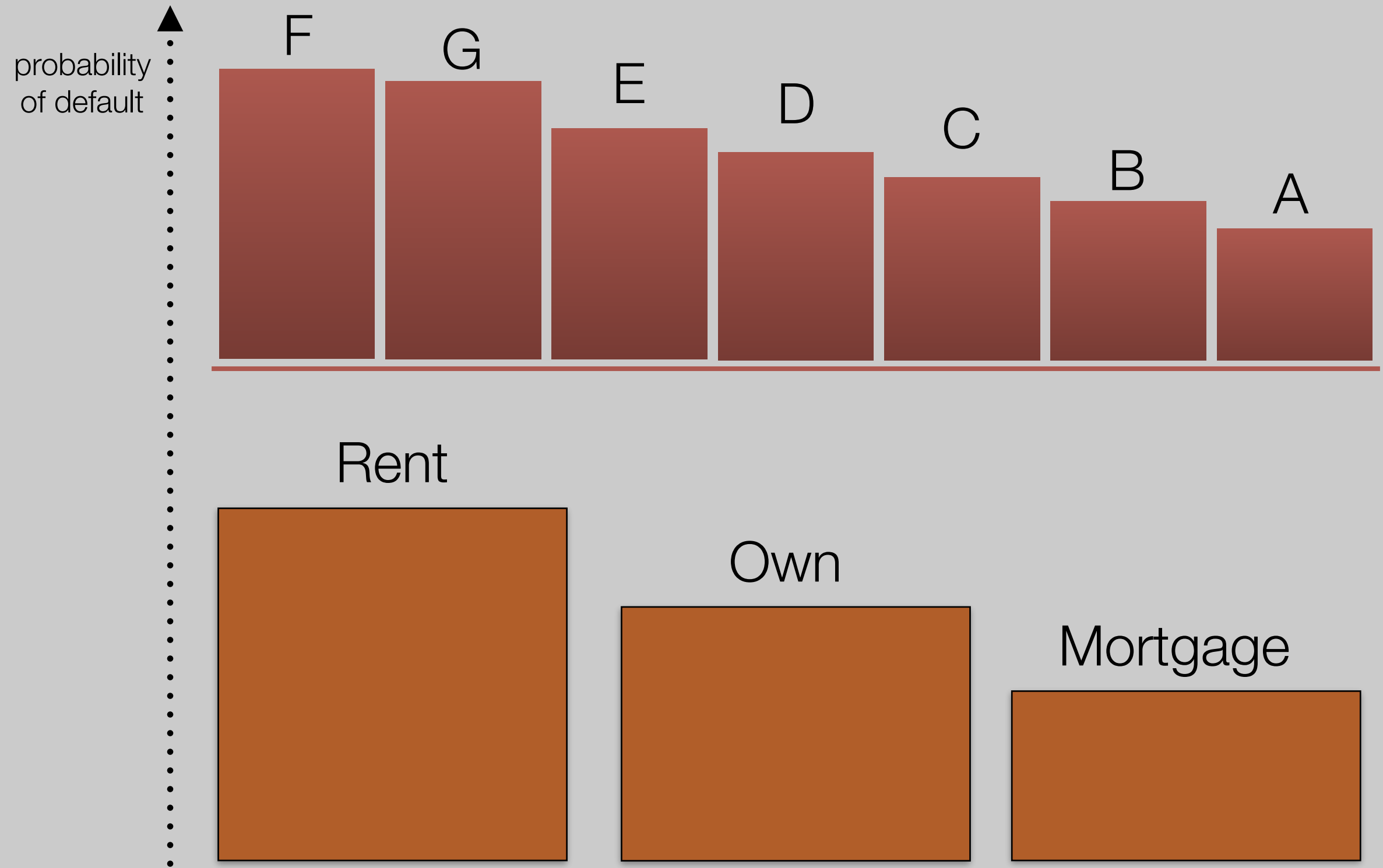


# Metrics: Predictive Relevance to Default Risk

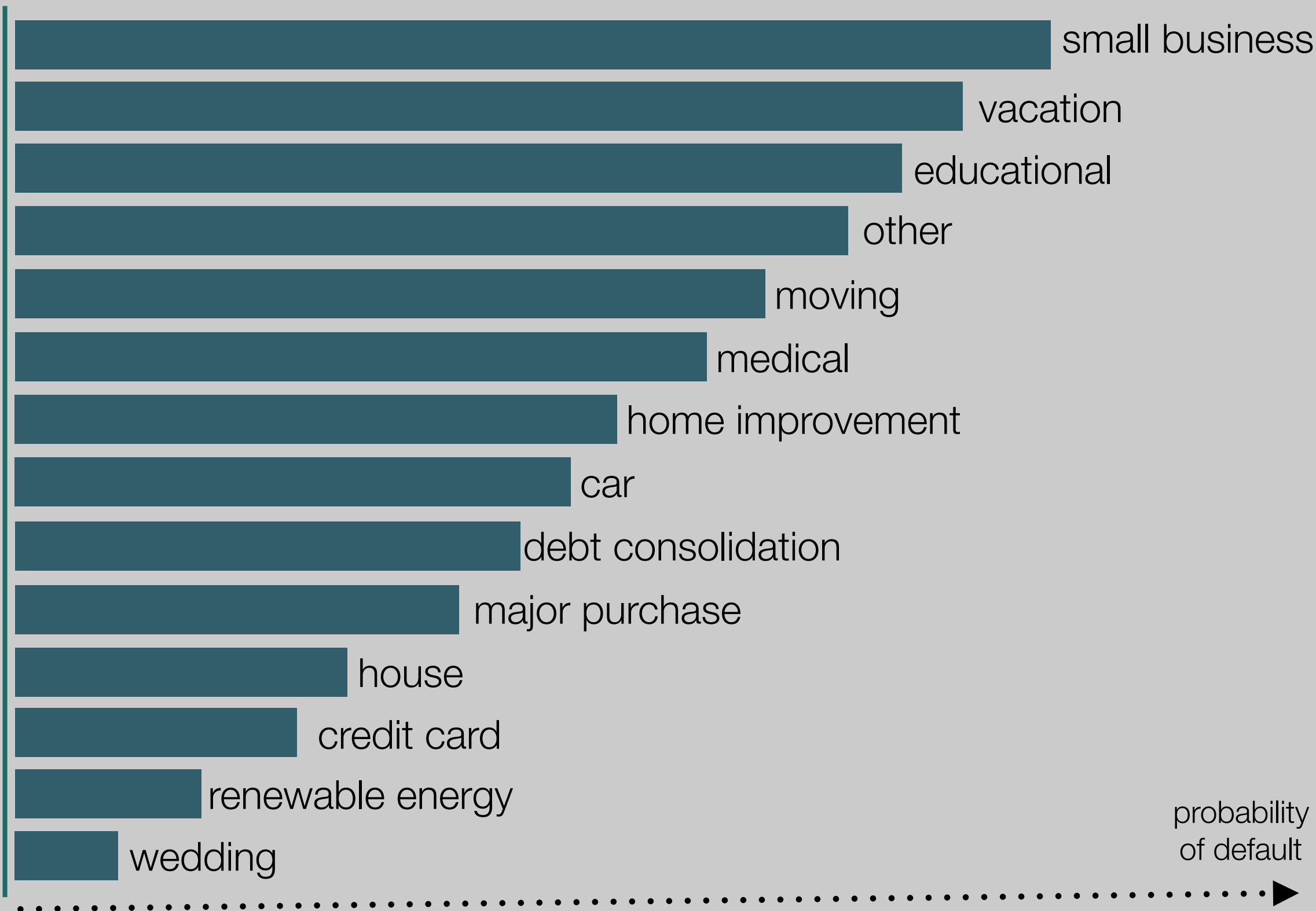
---

- **FICO Score**
- **Ratio: Monthly debt payment / Monthly income**
- **Total fee received to date**
- **Ratio: Loan / Income**
- **Total number of credit lines**
- **% used in revolving credit line**

# Grade & Home Ownership Probability of Default



# Purpose Probability of Default



# Enhance Your Understanding

## Browse Loans

[Summary](#) | [Portfolio Builder](#) | [Browse Loans](#) | [Alert](#) | [Transfer](#) | [Trading Account](#) | [Automated Investing](#)

Available: \$0.00

Add Funds

**Build a Portfolio**  
Per Loan: \$25

**Filter Loans** [Save](#) | [Open](#)  
**Exclude Loans already invested in** ▼  
☒ Exclude loans invested in  
**Loan Term** ▼  
☒ 36-month  
☒ 60-month  
**Interest Rate** ▶  
**Keyword** ▶  
[More Filters »](#)  

Update Results

[Minimize All](#) [Reset All](#)

Add to Order

Showing Loans 1 - 15 of 1255  
<< < 1 **2** 3 4 5 > >> 15 ▾

<input type="checkbox"/> Investment	Rate	Term	FICO®	Amount	Purpose	% Funded	Amount / Time Left
<input type="checkbox"/> \$0	<b>B 3</b> 9.75%	36	705-709	\$12,000	Credit Card Payoff	<div><div></div></div> 99%	\$25 13 days
<input type="checkbox"/> \$0	<b>E 5</b> 22.45%	36	665-669	\$4,800	Loan Refinancing & Consolidation	<div><div></div></div> 96%	\$150 9 days
<input type="checkbox"/> \$0	<b>B 4</b> 10.75%	36	665-669	\$8,000	Credit Card Payoff	<div><div></div></div> 98%	\$125 9 days
<input type="checkbox"/> \$0	<b>E 3</b> 21.18%	36	670-674	\$14,700	Loan Refinancing & Consolidation	<div><div></div></div> 93%	\$1,025 8 days
<input type="checkbox"/> \$0	<b>D 1</b> 16.29%	36	660-664	\$10,000	Loan Refinancing & Consolidation	<div><div></div></div> 97%	\$225 9 days
<input type="checkbox"/> \$0	<b>F 2</b> 24.11%	60	715-719	\$13,550	Loan Refinancing & Consolidation	<div><div></div></div> 96%	\$450 6 days
<input type="checkbox"/> \$0	<b>F 4</b> 25.88%	36	665-669	\$9,600	Small Business	<div><div></div></div> 85%	\$1,400 8 days
<input type="checkbox"/> \$0	<b>E 2</b> 20.75%	36	665-669	\$6,600	Small Business	<div><div></div></div> 91%	\$550 9 days
<input type="checkbox"/> \$0	<b>C 4</b> 14.46%	60	685-689	\$11,350	Loan Refinancing & Consolidation	<div><div></div></div> 96%	\$450 9 days





## Next Steps

---

- Custom feature engineering
- TF-IDF using borrowers' description as well as employment title
- Develop a web app to predict live using trained logistic regression algorithm
- Other applications:
  - Credit cards
  - Corporate bonds
  - Defaults on other financial instruments





[www.github.com/doman1248/optireturn](https://www.github.com/doman1248/optireturn)

# APPENDIX

# ROC Curve

