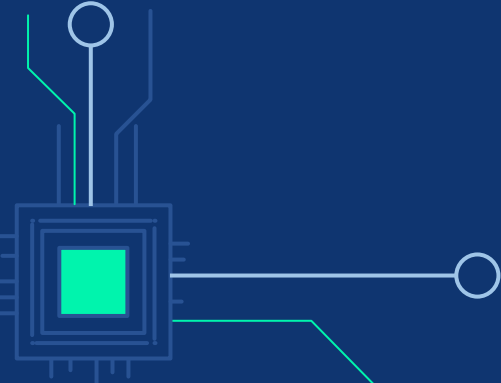




# LOAN DEFAULT CLASSIFICATION

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## NEED

Identify loans in Interested Lending, Inc.'s current loan portfolio that are likely to default.

Use cases:

- Contact borrower
- Incorporate expected defaults into operating plan
- Identify loans to sell to another institution



# DATA AND SCOPE

## DATA

- Snapshot of 887,000+ individual loans.
- Filtered to approximately 250,000 loans.
- 73 columns reduced to 19 features for final model (e.g. annual income, interest rate)

## SCOPE

- Current and closed loans
- Model developed with closed loans (fully paid, charged off, or defaulted).

# METHODOLOGY

PANDAS  
NUMPY

SCIKIT-LEARN

DATA  
EXPLORATION &  
FEATURE  
SELECTION

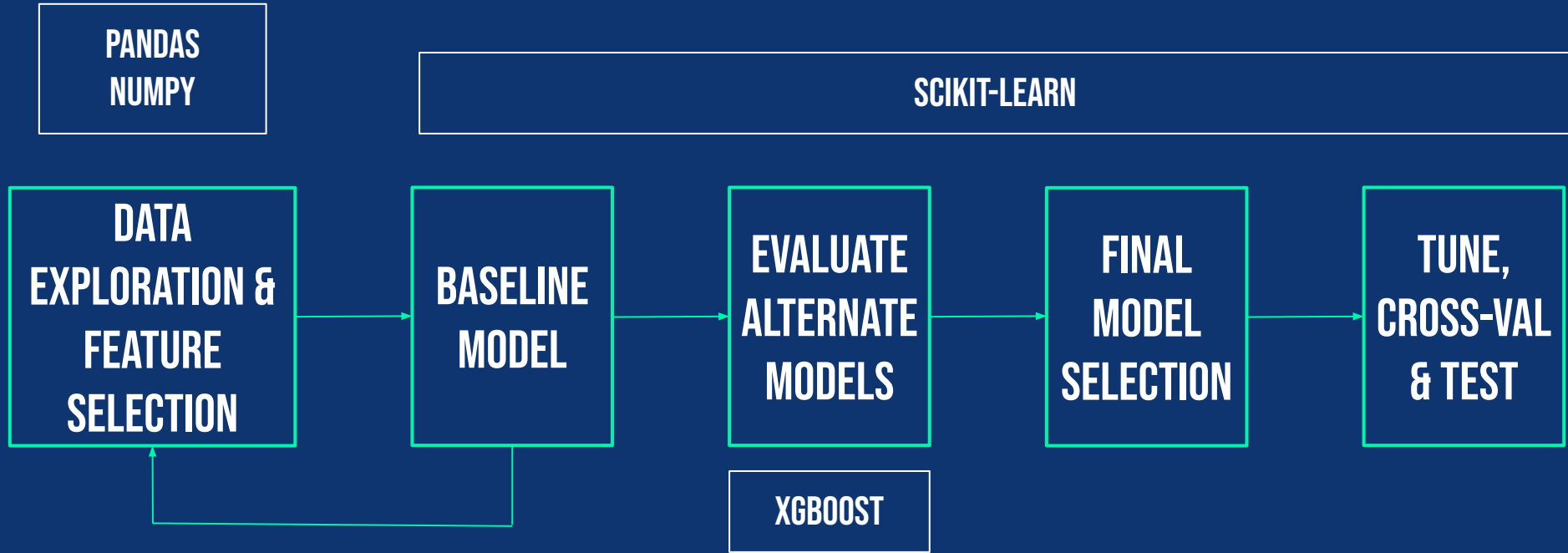
BASELINE  
MODEL

EVALUATE  
ALTERNATE  
MODELS

FINAL  
MODEL  
SELECTION

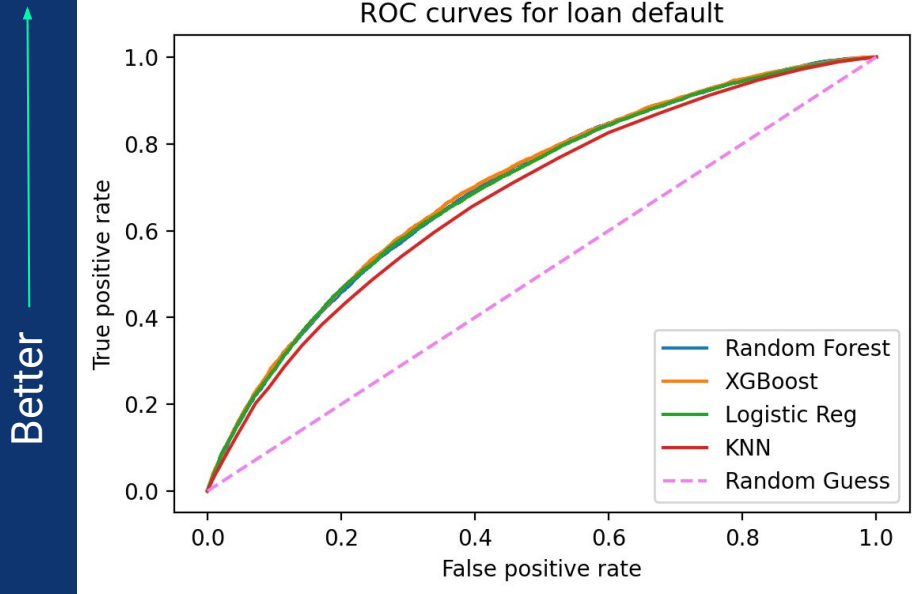
TUNE,  
CROSS-VAL  
& TEST

XGBOOST



# RESULTS

Better



- Logistic regression model, random forest, and XGB had nearly identical performance.
- Logistic regression selected - simpler, more interpretable.

## RESULTS (LOGISTIC REGRESSION)

	Precision	Recall	F1
Paid	0.89	0.63	0.74
Default or Charge Off	0.29	0.66	0.40
Accuracy	0.63		
Macro Average	0.59	0.64	0.57
Weighted Average	0.78	0.63	0.68

# RESULTS

Greater impact ↑

Feature	Coefficient
Interest Rate	0.469
Annual Income	-0.284
Total Number of Accounts	-0.187
Term of 60 months (vs. 36)	0.176
Debt to Income Ratio	0.174

# INTERACTIVE STREAMLIT APP

## Loan Default Classification

Enter information below. Default prediction will be displayed at the bottom of the screen.

Annual income (USD)

0

Number of accounts in collections within past 12 months (excluding medical)

5

Number of delinquencies over 30 days in the last two years

29

Debt to income ratio

29

Credit inquiries in the last 6 months

5

Interest rate (%)

29.00

Number of open credit lines in borrower's file

46

Number of derogatory public records

5

Revolving debt utilization (%)

62

Total number of credit lines in borrower's file (open or closed)

16

Total number of accounts currently delinquent

5

Loan Term (months)

60

Loan Grade

G

Installment (USD)

1215

**Loan is expected to default!**




# CONCLUSIONS

- Model offers predictive capability for approved loans that may go into default
- Most impactful features can inform loan screening process
- Possible actions for loans likely to default:
  - Borrower outreach
  - Identify loans to sell to other institutions
  - Account for expected loan defaults in operating plan



# FUTURE WORK

- Additional feature engineering
  - Model stacking
  - Develop separate model to evaluate whether high risk loans should be sold
- 

# THANKS!



Do you have any  
questions?

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# APPENDIX

