

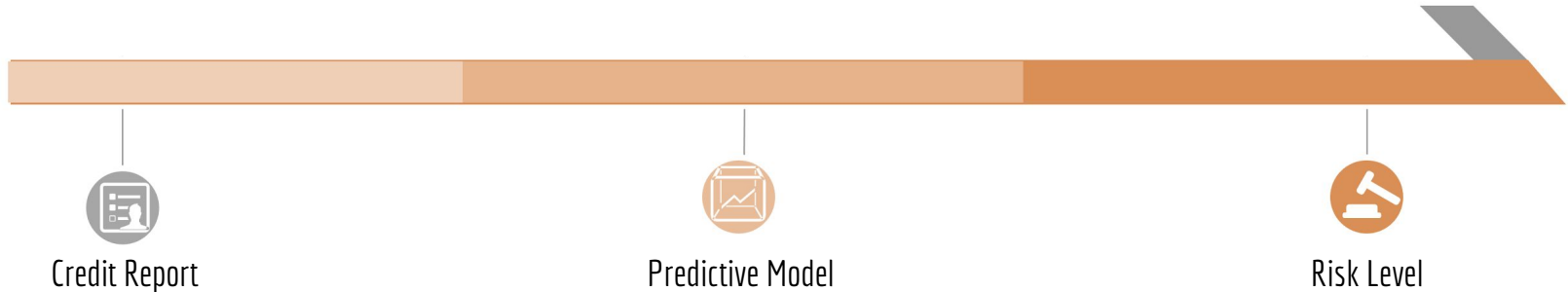
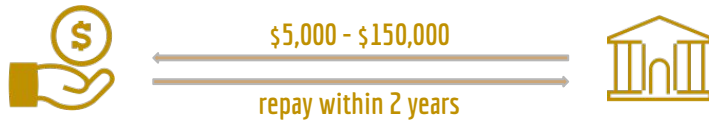
# Risk Assessment For HELOC Application

Ruiyuan Sun, Xue Wang, Zixuan Yan,  
Daniyal Kamal, Collin Tracy



3/4/20

# Home Equity Line of Credit



# Data overview



- 23 features
- 10,000+ Observations
- Each feature attempting to explain potential risk to banks
- Some strange values such as -9,-8,-7 which are arbitrary placeholders
- Used pipeline to eliminate -9, and change all values of -8 and -7 to the mean of their respective feature

	ExternalRiskEstimate	MSinceOldestTradeOpen
count	10459.000000	10459.000000
mean	67.425758	184.205373
std	21.121621	109.683816
min	-9.000000	-9.000000
25%	63.000000	118.000000
50%	71.000000	178.000000
75%	79.000000	249.500000
max	94.000000	803.000000

8 rows × 23 columns

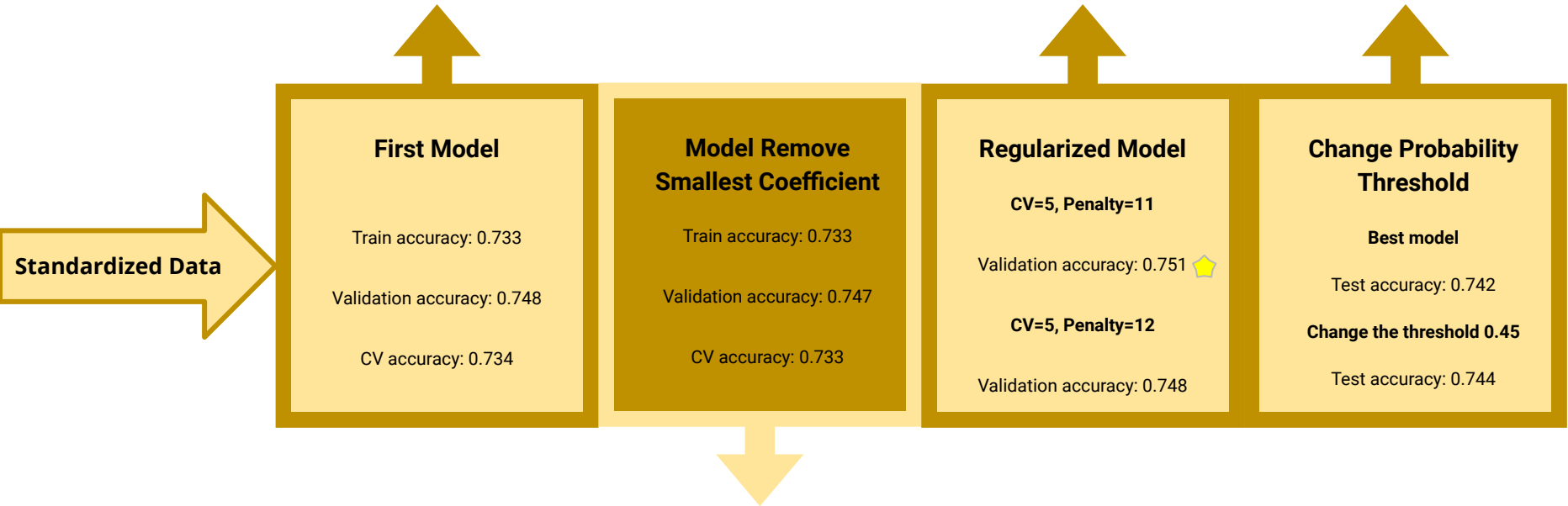
# Models We Tried



- K-Nearest Neighbors
  - Hyperparameters: n\_neighbors, weights, algorithm, leaf\_size, p
- Decision Tree
  - max\_depth, min\_samples\_leaf, max\_leaf\_nodes
- Random Forests
  - n\_estimators, max\_depth, min\_samples\_leaf, max\_leaf\_nodes
- AdaBoost
  - n\_estimators, random\_state, learning\_rate
- Logistic Regression
  - cs, cv, random\_state, penalty, solver
- SVC
  - max\_iter, random\_state

Model Names	Training Accuracy	Validation Accuracy	Test Accuracy
SVC	0.67	0.696	0.584
K-Nearest Neighbors	0.723	0.721	0.705
Decision Tree	0.72	0.72	0.707
AdaBoost	0.746	0.751	0.717
Random Forest	0.75	0.734	0.719
Logistic Regression	0.751	0.748	0.742

# Our Best Model - Logistic Regression



# Assessment System

- An interactive interface.
- Sales representatives in a bank/credit card company can use to decide on accepting or rejecting applications.
- Users only need to master basic technical or computer skills.
- Users can easily interpret the predictions made by the model.

Input the value of Percent Trades Never Delinquent

- +

Max Delq/Public Records Last 12 Months

3

09

0 - derogatory comment  
1 - 120+ days delinquent  
2 - 90 days delinquent  
3 - 60 days delinquent  
4 - 30 days delinquent  
5,6 - unknown delinquency  
7 - current and never delinquent  
8,9 - all other

Max delinquency ever, see tab MaxDelq for each category

5

09

## Our Best Model.

Apply the model on new data!

Note: The system will automatically standardize your input data to obtain accurate prediction.

Predict

PercentInstallTrades	-1.4385
MSinceMostRecentInqexcl7days	0.6020
NumInqLast6M	1.6482
NumInqLast6Mexcl7days	3.1230
NetFractionRevolvingBurden	-0.5911
NetFractionInstallBurden	-3.7969
NumRevolvingTradesWBalance	-0.7048
NumInstallTradesWBalance	7.2334
NumBank2NatlTradesWHighUtilization	-6.0500
PercentTradesWBalance	-3.3934
MSinceMostRecentDelns=7	0

We are really sorry to say but it seems like your Risk Performance is Bad.

We can't accept your application.



Thanks

