# Predictive Modeling Prototype

## On Risk of Home Equity Line of Credit (HELOC)

Presented By Zizhuo Chen, Songyang Ma, Yuqi Su, Yancheng Xiang

# Contents

- Reasoning for Log. Reg.
- Model design
- Interface demonstration
- Limitations on interface
- Limitations on Model

# Reason for Log. Reg.

- High accuracy
- High interpretability
- Longer time but within a reasonable range
- Easy to understand and flexible
- Low variance

# Model Design - Accuracy

Log. Reg and LDA
Linear SVC and Naïve Bayes
Tree and KNN

```
Train accuracy
Log. Reg. accuracy: 0.741
Linear SVC accuracy: 0.728
Naive Bayes accuracy: 0.676
LDA accuracy: 0.741
Tree accuracy: 1.000
KNN accuracy: 0.775

Validation accuracy
Log. Reg. accuracy: 0.74406
Linear SVC accuracy: 0.72939
Naive Bayes accuracy: 0.67881
LDA accuracy: 0.74355
Tree accuracy: 0.63784
KNN accuracy: 0.67931

Test accuracy
Log. Reg. accuracy: 0.72211
Linear SVC accuracy: 0.70522
Naive Bayes accuracy: 0.65302
LDA accuracy: 0.72723
Tree accuracy: 0.63153
KNN accuracy: 0.67349
```

# Model Design – Processing Time

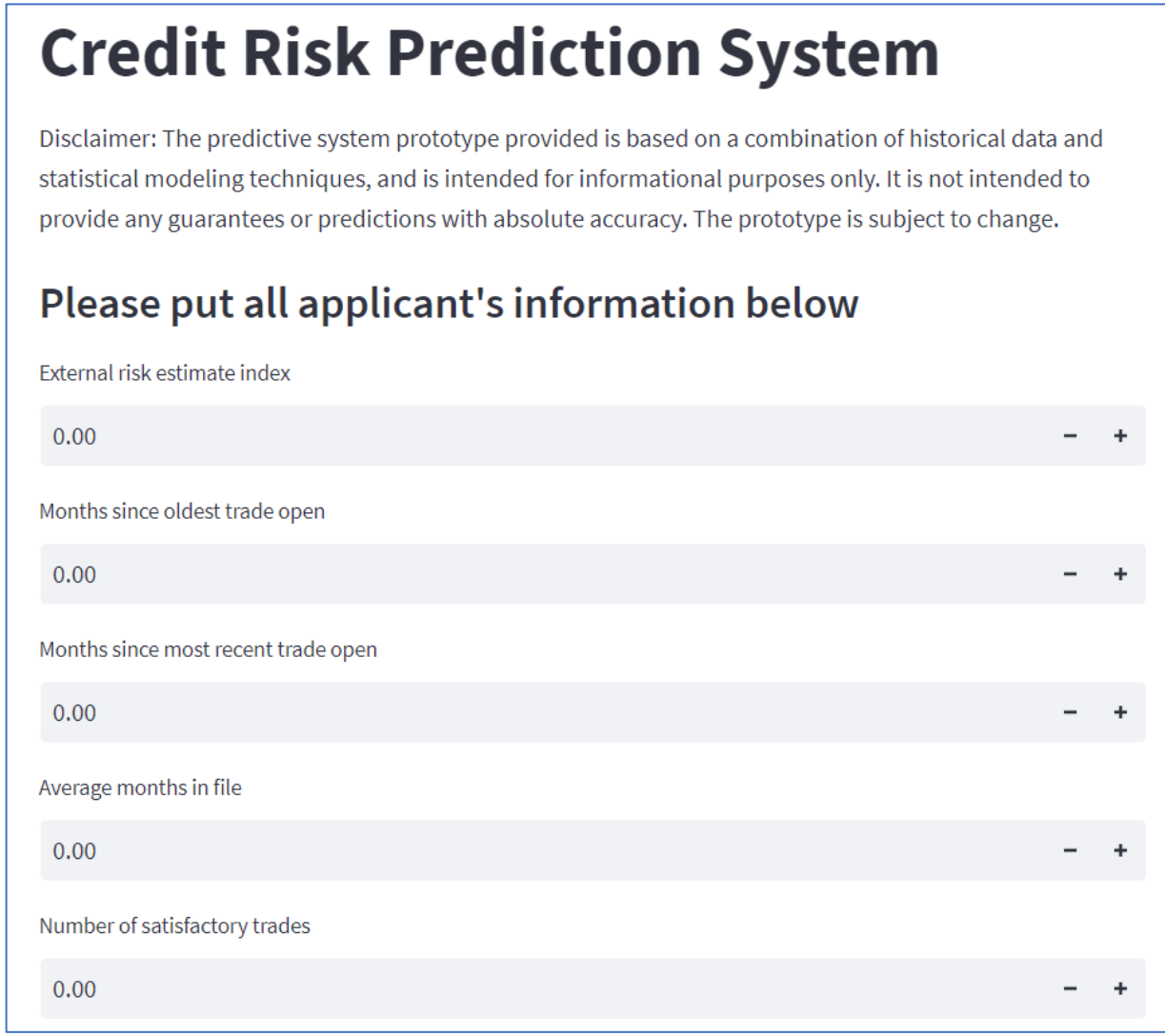
```
Logistic Regression Processing Time: 1.7161731719970703
Linear SVC Processing Time: 0.03702974319458008
Naive Bayes Processing Time: 0.005909442901611328
LDA Processing Time: 0.020890235900878906
Decision Tree Processing Time: 0.031910419464111133
KNN Processing Time: 0.003125429153442383
```

# Model Design - Interpretability

- Easiest: Log Reg, Naïve Bayes
- Medium: LDA, Linear SVC
- Difficult: Tree and KNN

# Interface Design

- Export the prediction model
- Detailed feature input
- Low tech proficiency required
- Generate probability



# Interface Demonstration

- 32 features
- 74.33% training accuracy,
- 74.41% validation accuracy
- 72.31% test accuracy
- 2.489 seconds running time for test data

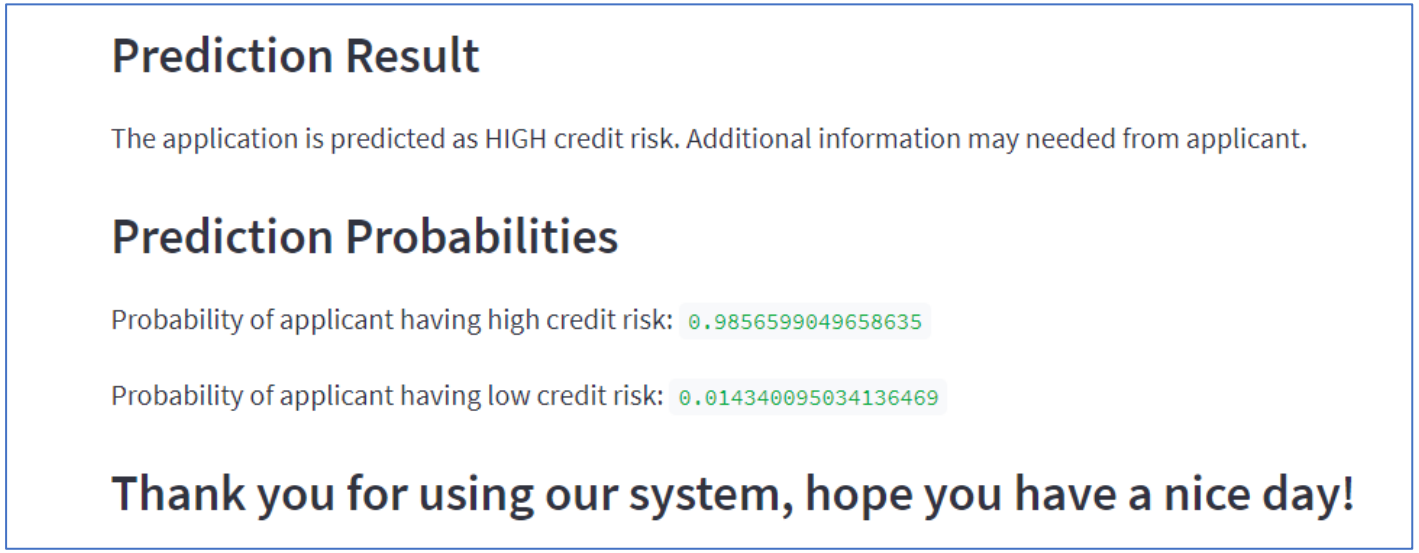
# Limitations - Model

- Long processing time
- Limit to the linear relationship

```
Logistic Regression Processing Time: 1.7161731719970703
Linear SVC Processing Time: 0.03702974319458008
Naive Bayes Processing Time: 0.005909442901611328
LDA Processing Time: 0.020890235900878906
Decision Tree Processing Time: 0.031910419464111133
KNN Processing Time: 0.003125429153442383
```

# Limitations - Interface

- Lack of visualization
- Repetitive
- Absence of feedback
- Low Accessibility



# Lessons

- Model Functions
- Choice of Model
- Limitations and Trade-off
- Different Aspects

# Thank You