UNIVERSIDADE DE PERNAMBUCO

KDMILE 2020

FACEPE
Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco

Impact of Unusual Features in Credit Scoring Problem

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Before

ANALYST

DECIDES

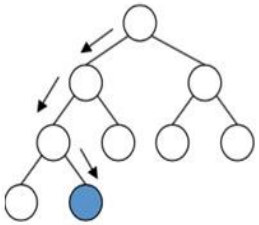
OR

GRANT

DENY

After

ANALYST



MODEL

DECIDES

OR

GRANT

DENY

Features

- Hard features

INCOME

SAVINGS

MARITAL

EMPLOYMENT

AGE

- Soft features

GEOLOCATION

WEB

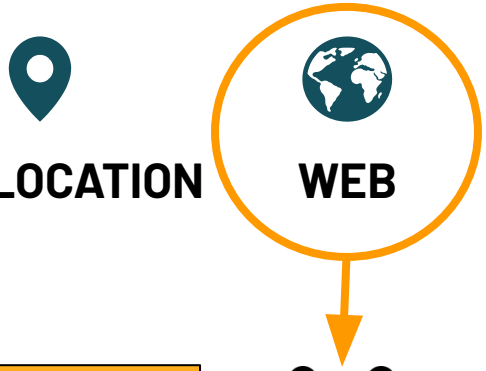
DEMOGRAPHIC

HISTORY

SOCIAL PROGRAM

Previous Works

- Soft features



Our Contribution

- Soft features

Vercosa *et al.* 2020


GEOLOCATION


WEB


DEMOGRAPHIC


HISTORY


SOCIAL PROGRAM

Niu *et al.* 2019

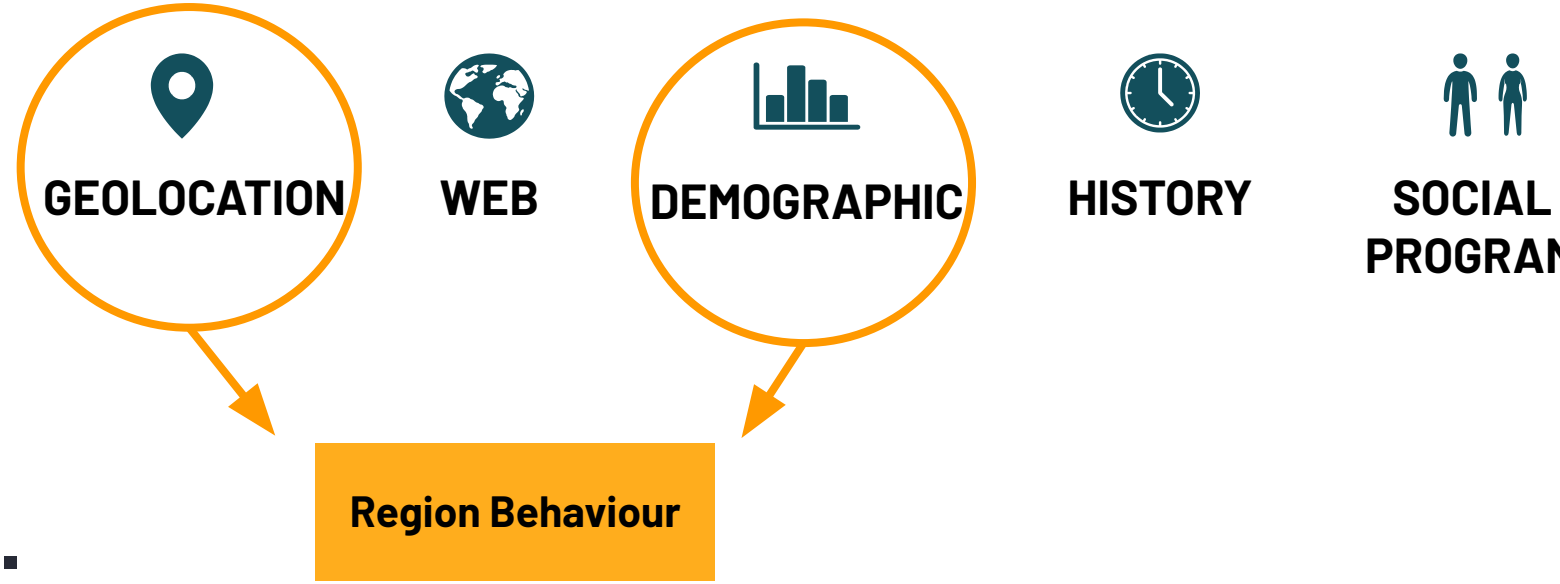

SOCIAL NETWORK


PSYCHOLOGY

Liberati *et al.* 2018

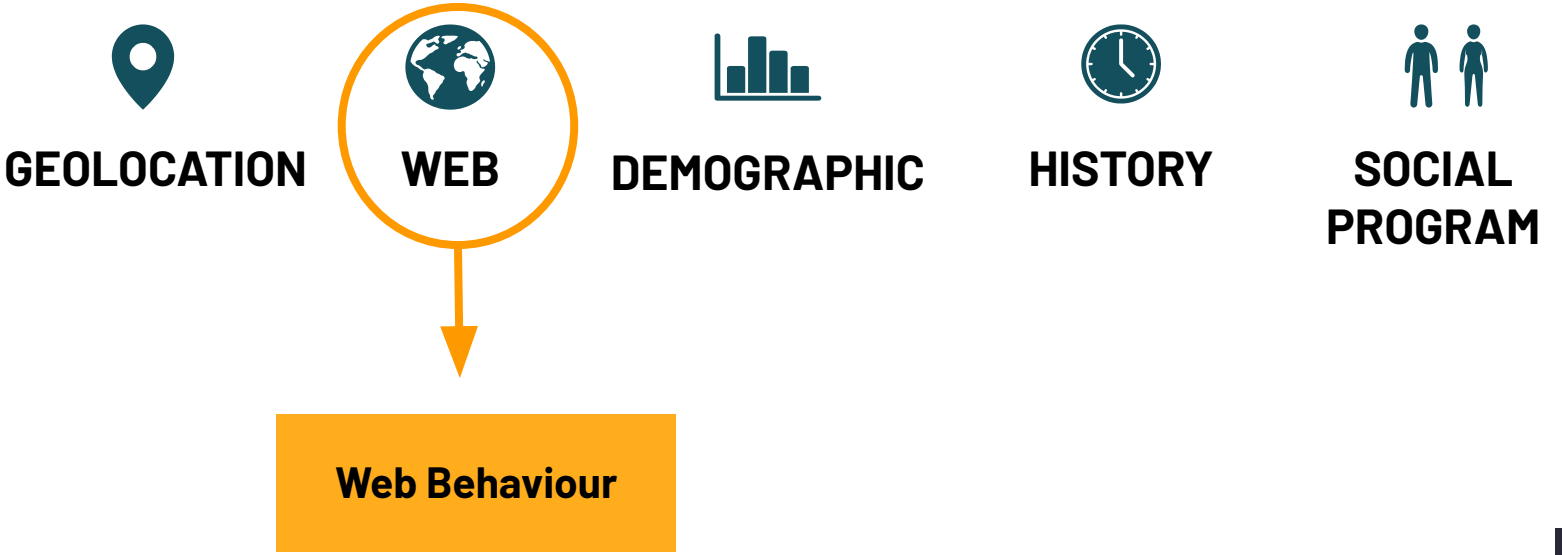
Hypothesis

- Soft features



Hypothesis

- Soft features



Hypothesis

- Soft features

GEOLOCATION

WEB

DEMOGRAPHIC

HISTORY

SOCIAL PROGRAM

Purchase Power

Hypothesis

- Soft features

GEOLOCATION

WEB

DEMOGRAPHIC

HISTORY

SOCIAL PROGRAM

CREDIT CARD GRANTING

CAR INSURANCE

Methodology

- Experiment 1

GOAL

Identify most promising features

METRIC

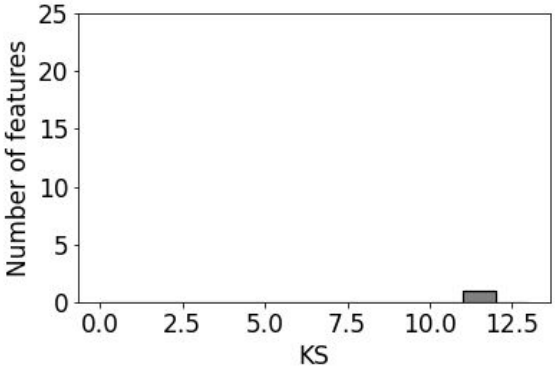
Kolmogorov-Smirnov (KS)

METHOD

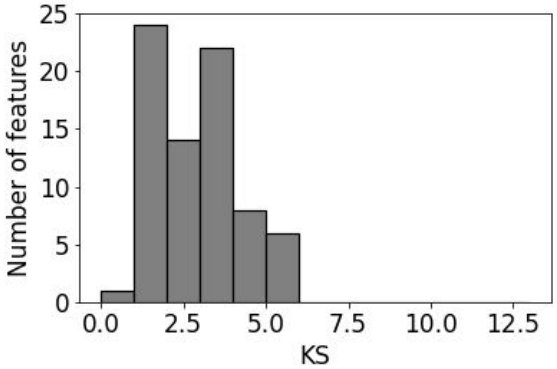
Bivariate Analysis

Results

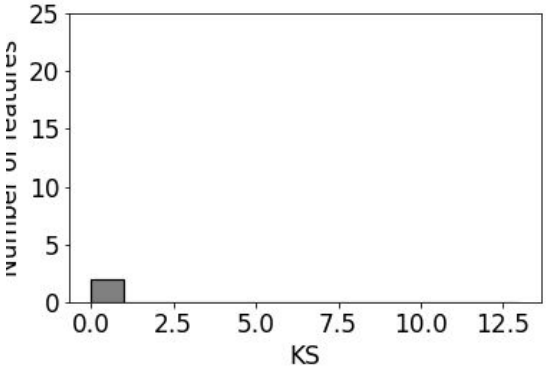
1 REGISTRATION



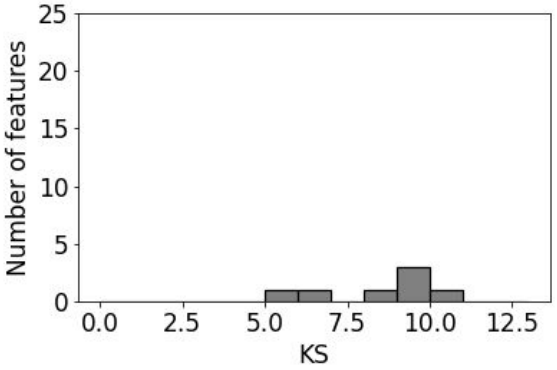
3 GEOLOCATION



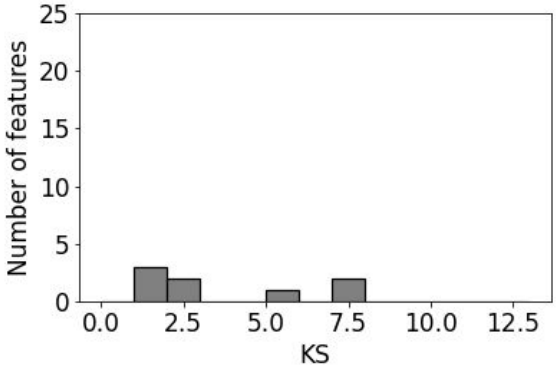
8 GOVERNMENT



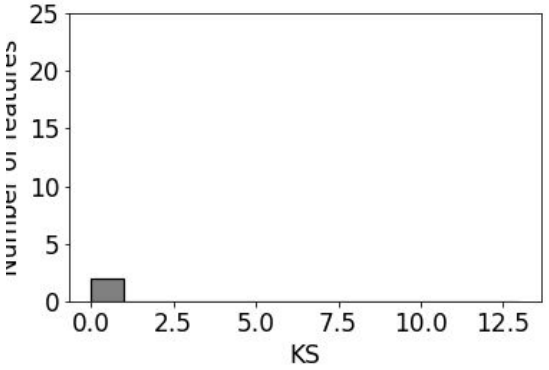
2 HISTORICAL



4 FINANCIAL



9 POLITICS



Methodology

- Experiment 1: part 2

GOAL

Identify most promising features groups

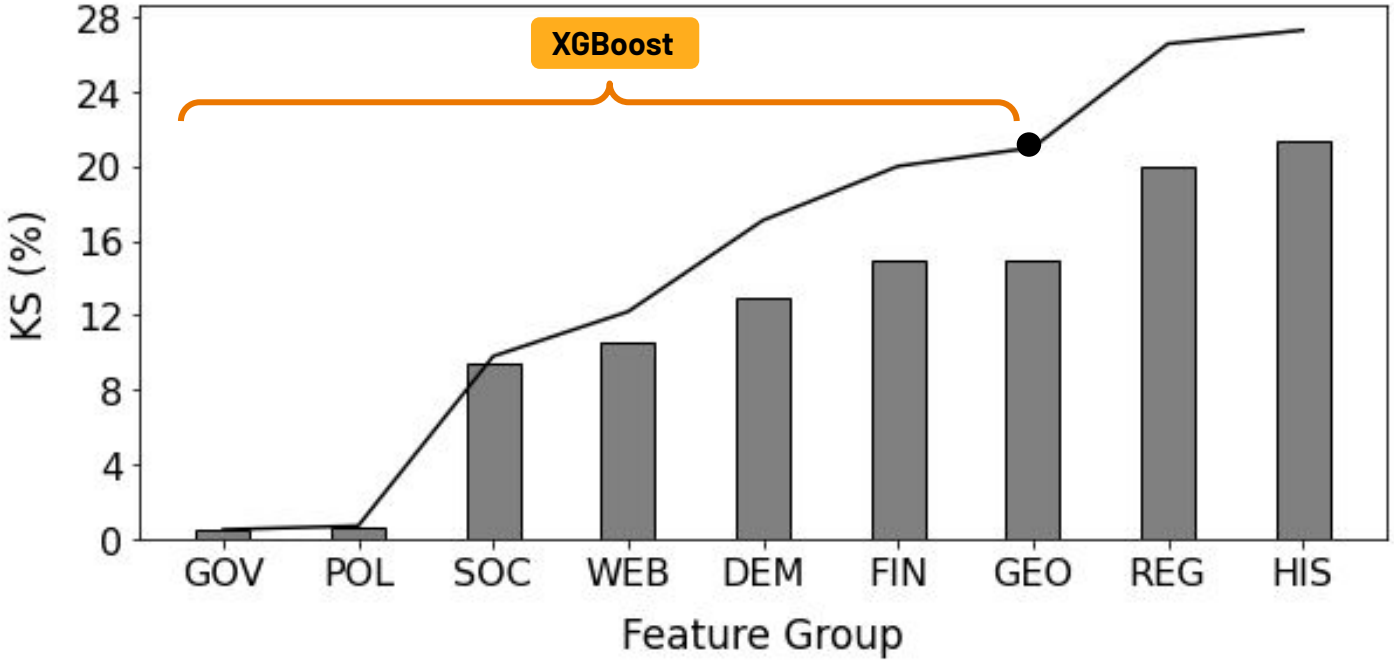
METRIC

Kolmogorov-Smirnov (KS)

METHOD

Extreme Gradient Boosting (XGBoost)

Results



GOV: Government

POL: Politics

SOC: Social Prog

WEB: Web

DEM: Demographic

FIN: Financial

GEO: Geolocation

REG: Registration

HIS: Historical

Methodology

- Experiment 2

GOAL

Identify best performance

METRIC

KS, Area Under Curve (AUC), MSLE, Lift

METHOD

XGBoost, AdaBoost, Multi-layer Perceptron

Methodology

- Experiment 2
  - Lift metric

$$\text{lift} = \frac{\text{GP in 90-100 percentile range}}{\text{GP in 0-10 percentile range} + 1}$$

  - Models fine-tuning
    - GridSearchCV

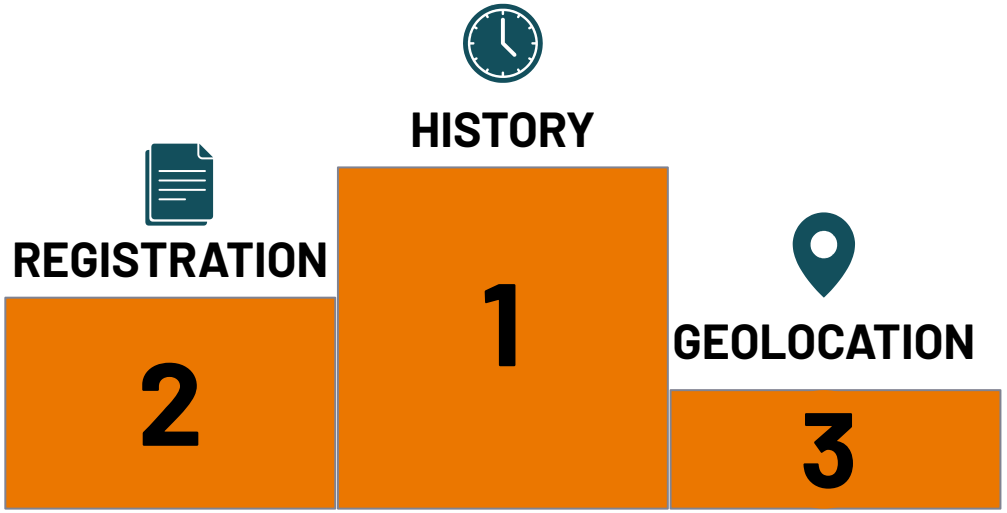
Results

- Experiment 2

Models	Lift	MSLE	AUC (%)	KS (%)
MLP	0.6044	0.12	66.93	24.02
AdaBoost	0.6308	0.1240	68.08	26.34
XGBoost	**0.1099**	0.1099	**68.81**	**27.24**
Company	0.6296	**0.1095**	68.30	26.61

Conclusions

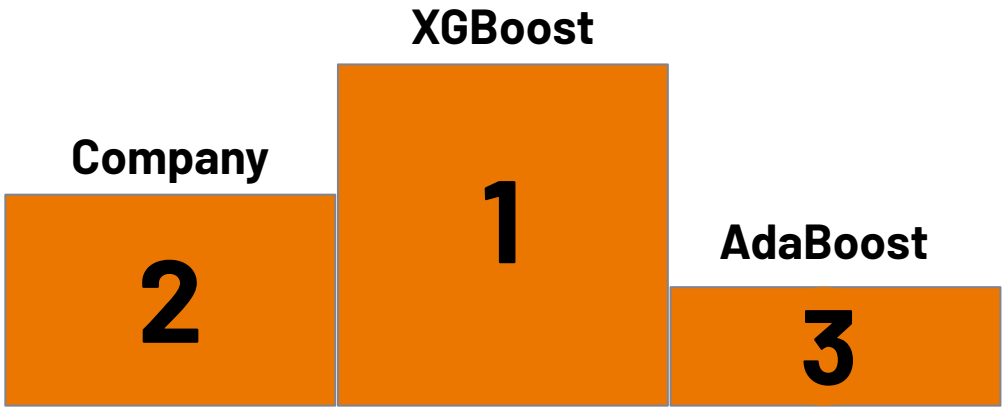
- Promising feature groups



Financial, Demographic, ..., Politics, Government

Conclusions

- Promising models



Limitation

- Available Registration features

Future Work

- Correlation of features
- Feature selection