ML BENCHMARK

PRESENTATION

IÉSEG
SCHOOL OF MANAGEMENT

MEET THE TEAM

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OVERVIEW

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PROBLEM DEFINITION

> About one in five U.S. adults have a credit card balance that is higher than the amount of money in their emergency savings accounts.[1]

1- (2018, 09). 10 Surprising Credit Card Debt Facts. Sofi. Obtenido 04, 2022, de https://www.sofi.com/learn/content/10-surprising-credit-card-debt-facts/?__cf_chl_tk=teBh0wjbb89BWHFHDrLSDtqmH1O3u0BraVfN2c.tEQI-1649588890-0-gaNycGzNCKU

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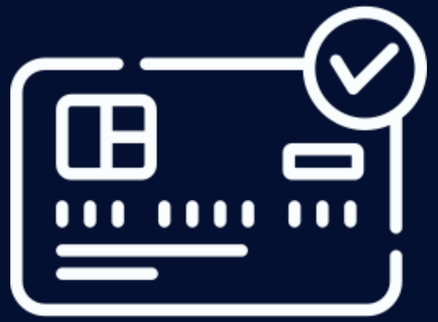
PROBLEM DEFINITION



A financial institution wants to build a classification model to predict the likelihood of credit card default for its customers and identify the key factors that determine this behavior.

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EXPLORATORY DATA ANALYSIS

30,000	OBSERVATIONS
66.66%	TRAIN OBSERVATIONS
33.33%	TEST OBSERVATIONS
77.93%	NO DEFAULTS
22.07%	DEFAULTS

23	PREDICTORS
14	NUMERICAL PREDICTORS
9	CATEGORICAL PREDICTORS

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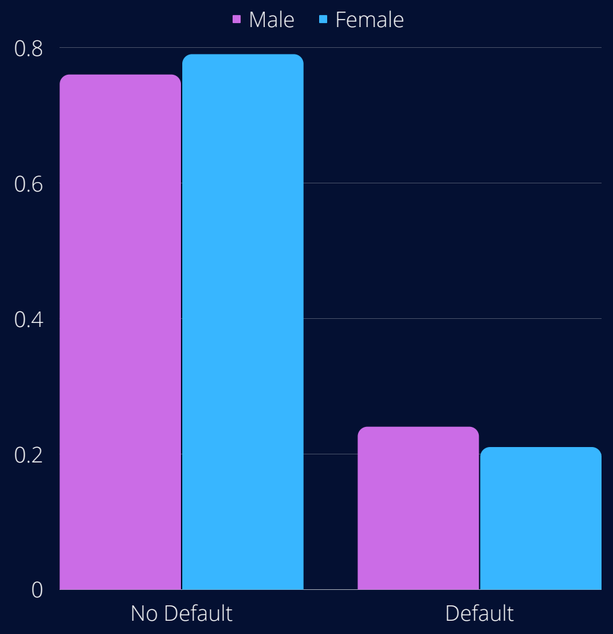
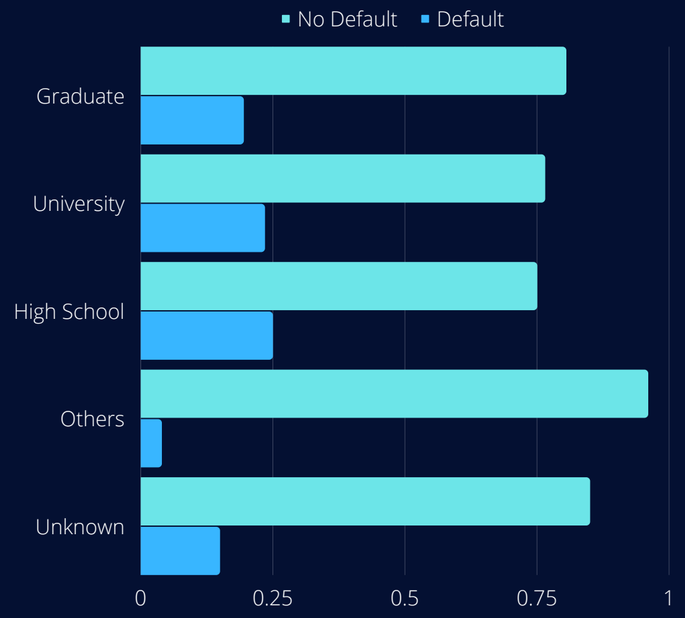
EXPLORATORY DATA ANALYSIS

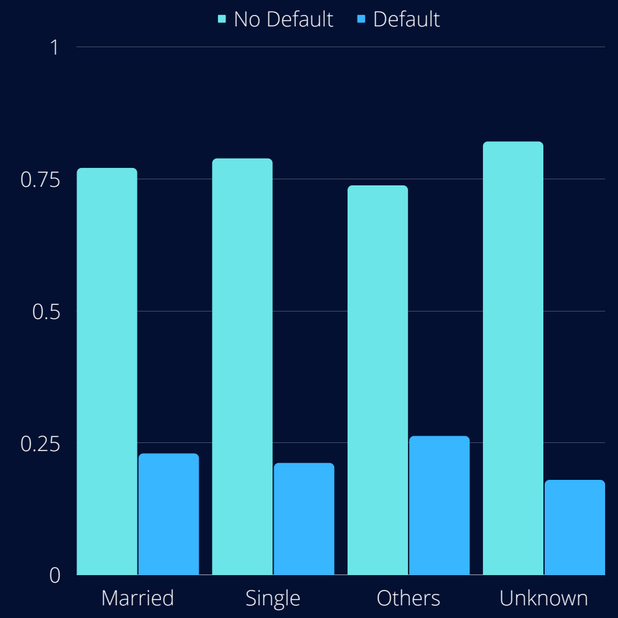
GENDER VS TARGET DISTRIBUTION



EDUCATION VS TARGET DISTRIBUTION



MARRIAGE VS TARGET DISTRIBUTION



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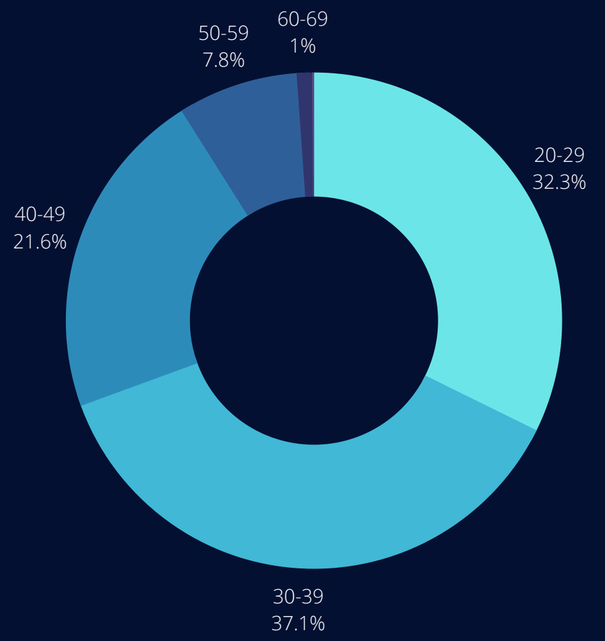
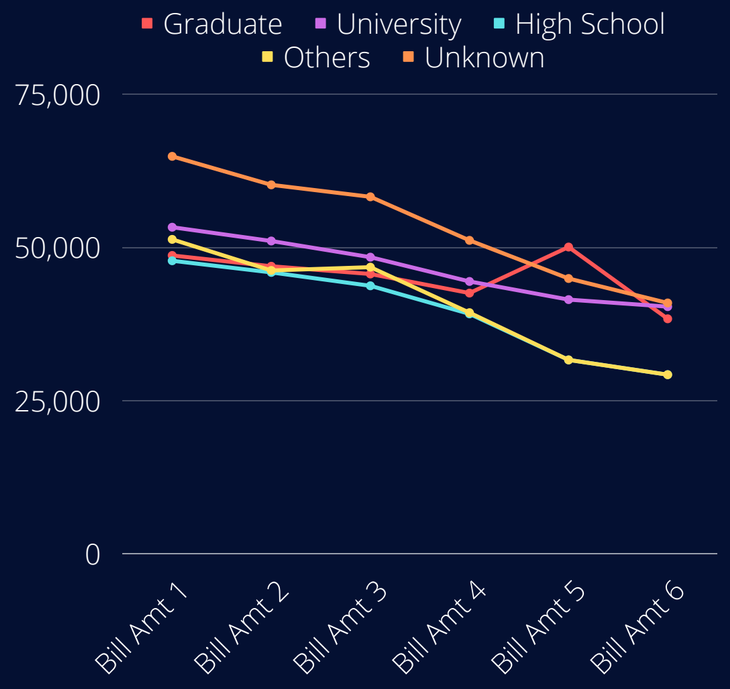
EXPLORATORY DATA ANALYSIS

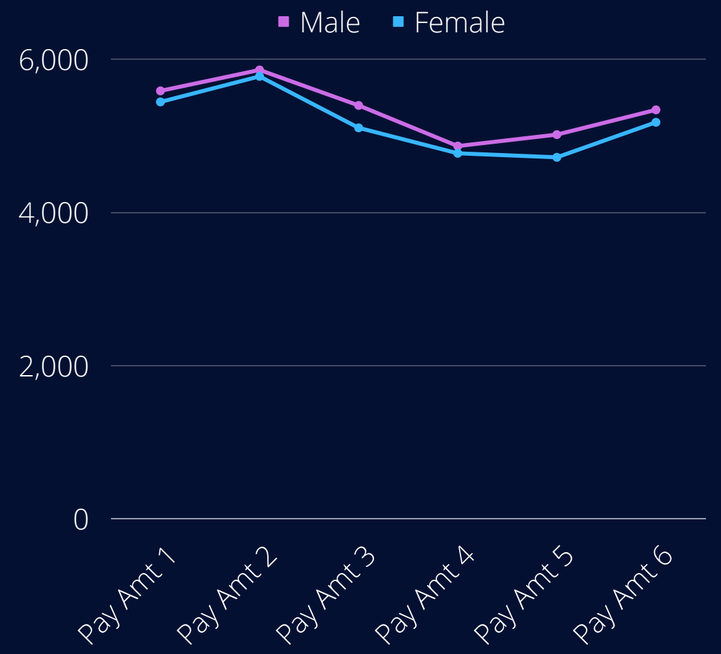
AGE CATEGORIES DISTRIBUTION



EDUCATION VS BILL AMOUNTS



GENDER VS PAY AMOUNTS



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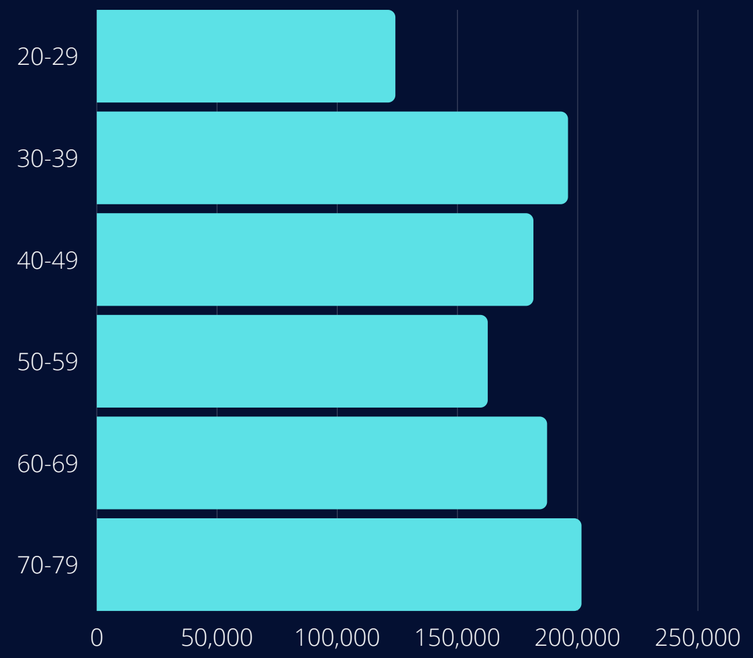
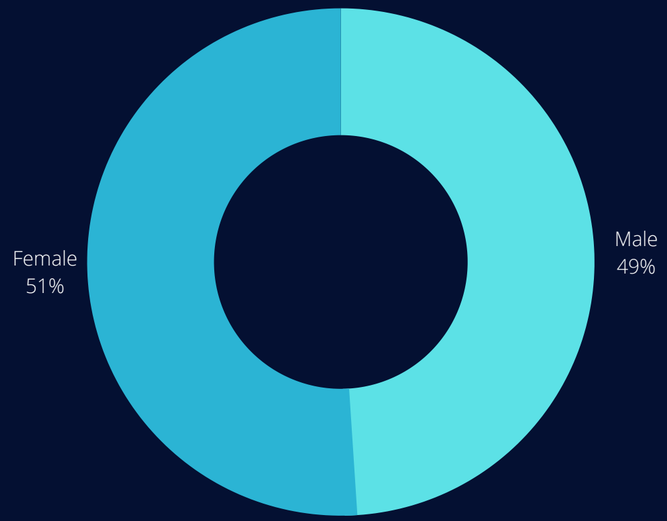
EXPLORATORY DATA ANALYSIS

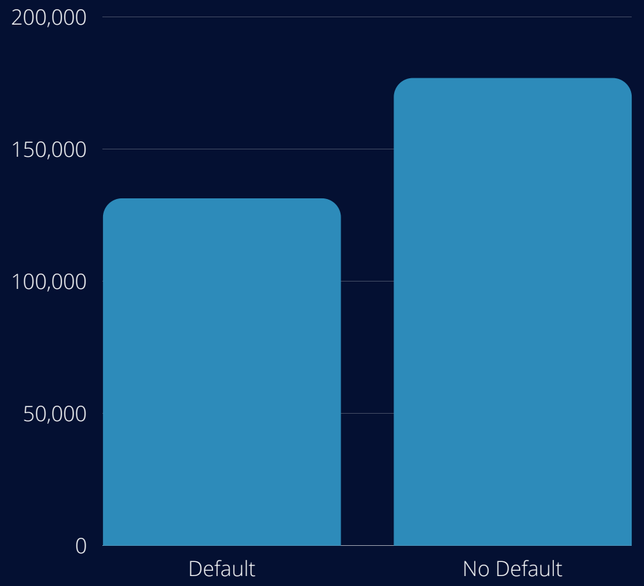
LIMIT BALANCE PER AGE CATEGORY



LIMIT BALANCE PER GENDER



LIMIT BALANCE AVERAGE PER TARGET



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DATA PROCESSING

25%

NULL VALUES THRESHOLD

DROP VARIABLES OVER THRESHOLD

EDUCATION FEATURE

MERGE MULTIPLE UNKNOWN CATEGORIES

MARRIAGE FEATURE

MERGE MULTIPLE UNKNOWN CATEGORIES

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DATA PROCESSING

FILLING NULL WITH -1 IN CATEGORICAL VARIABLES

CREATING INCIDENCE RATES PER PAYMENT VARIABLE

ONE HOT ENCODING MARRIAGE, SEX, EDUCATION

MISSING VALUE IMPUTOR USING MEAN IN NUMERICAL VARIABLES

WINSORIZING OUTLIERS ON NUMERICAL CATEGORIES

NORMALIZING NUMERICAL VARIABLES

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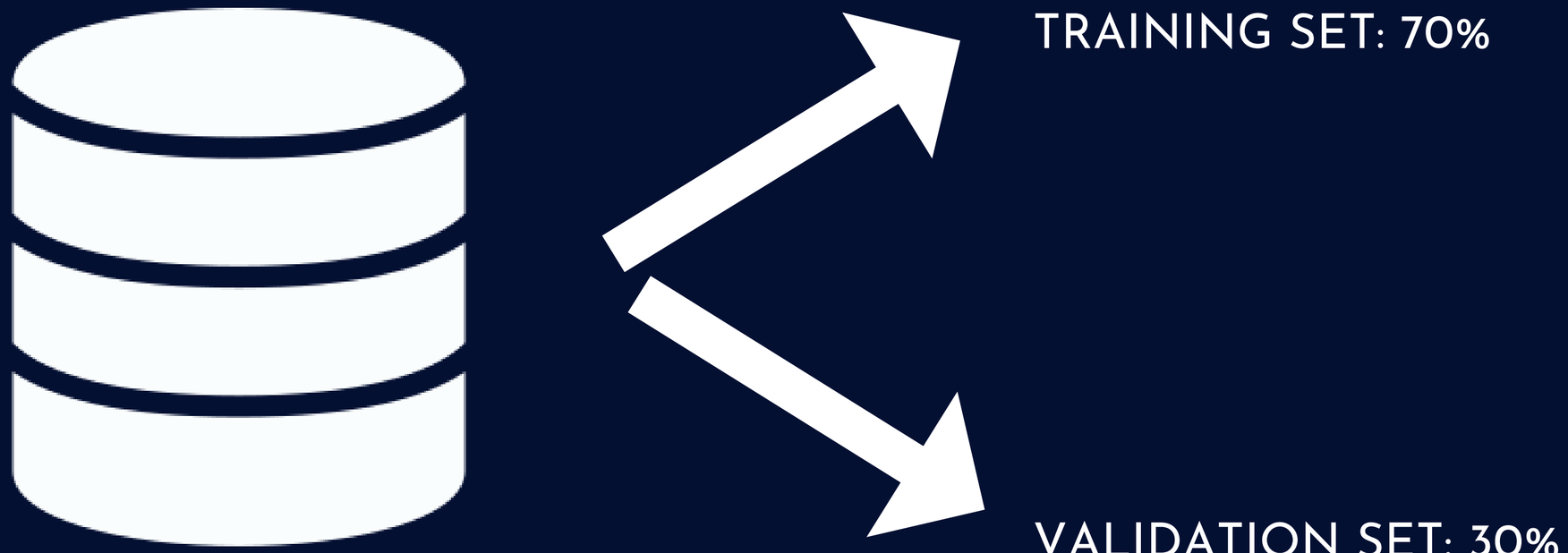
MODELING



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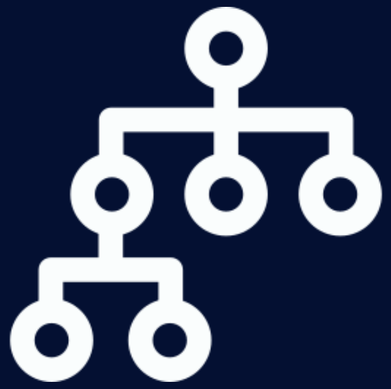
MODELING

LOGISTIC REGRESSION

AUC: 0.77



DECISION TREES

AUC: 0.69

RANDOM FOREST

AUC: 0.79

K NEAREST NEIGHBORS

AUC: 0.73

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MODELING

NEURAL NETWORKS

AUC: 0.78

GRADIENT BOOSTING

AUC: 0.79

SV CLASSIFIER

AUC: 0.77

HYBRID MODEL

AUC: 0.80

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EXPERIMENTAL SETUP

HYBRID MODEL

SUBSAMPLE: 0.6
MIN_CHILD_WEIGHT: 1
MAX_DEPTH: 10
LEARNING RATE: 0.1
GAMMA: 5
TREE METHOD: GPU_HIST
COLSAMPLE_BYTREE: 0.6

CRITERION: GINI
N_ESTIMATORS: 200
MAX_DEPTH: 10
MAX_FEATURES: AUTO

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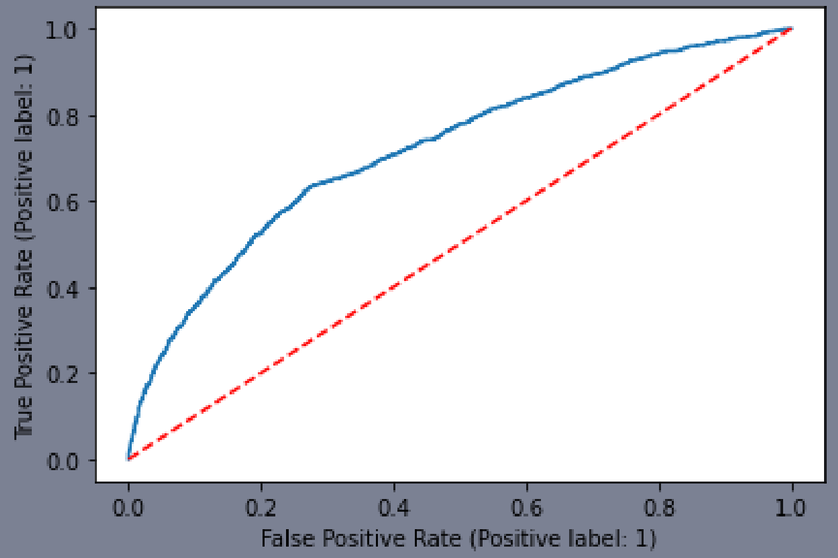
RESULTS

ACCURACY TRAIN: 0.80
ACCURACY VAL: 0.788

AUC TRAIN: 0.86
AUC VAL: 0.73



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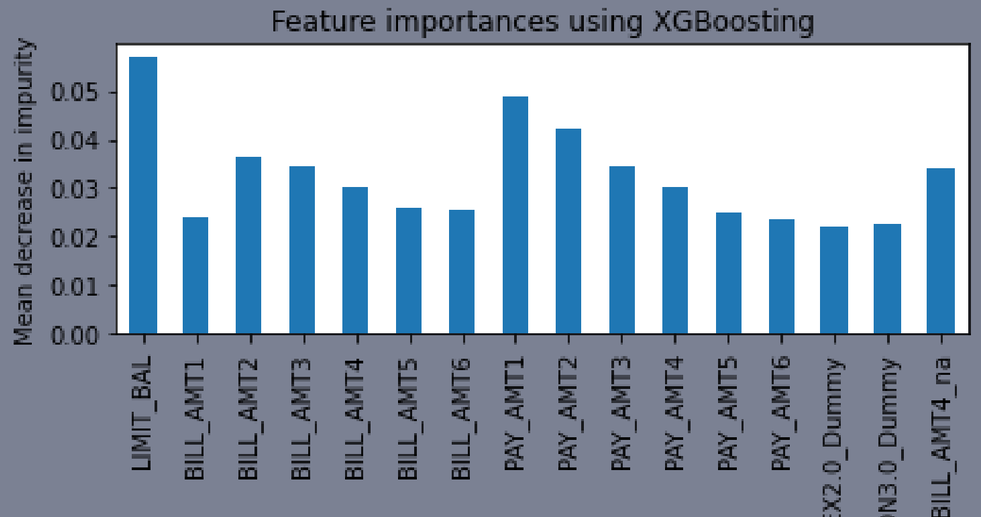
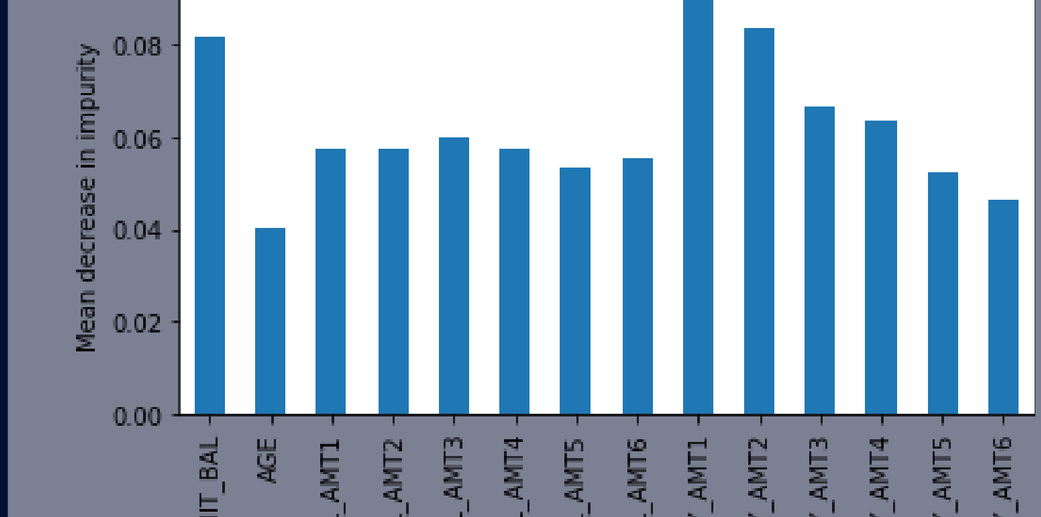
RESULTS





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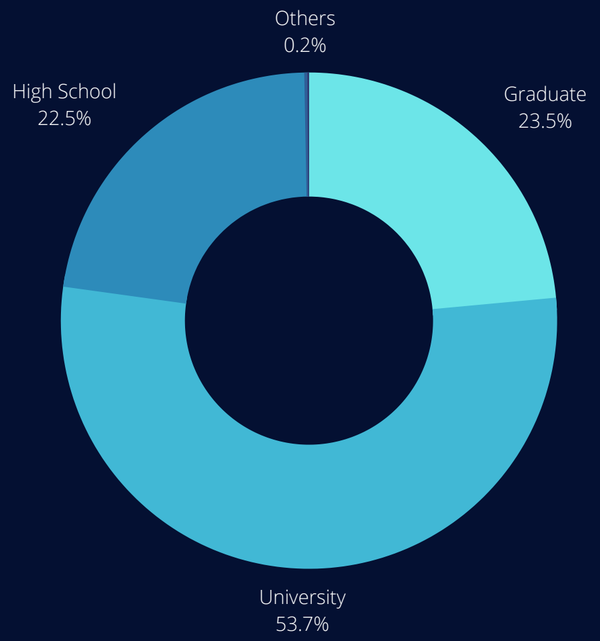
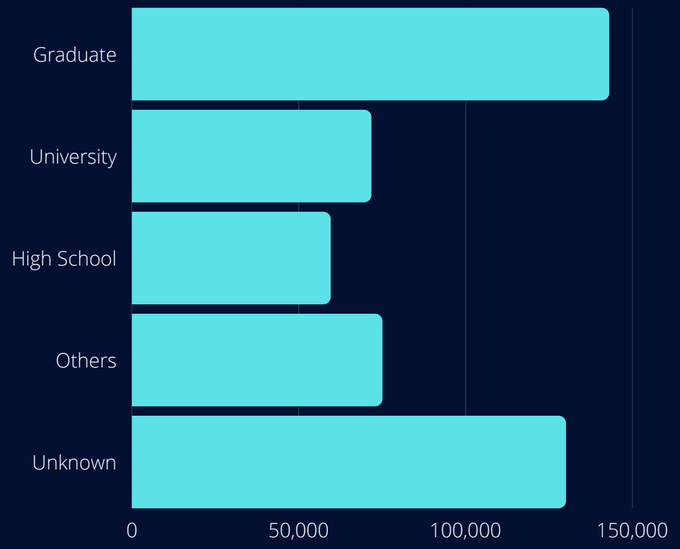
PROFILING

TOP 10% PROFILES WITH HIGHEST PROBABILITY TO DEFAULT

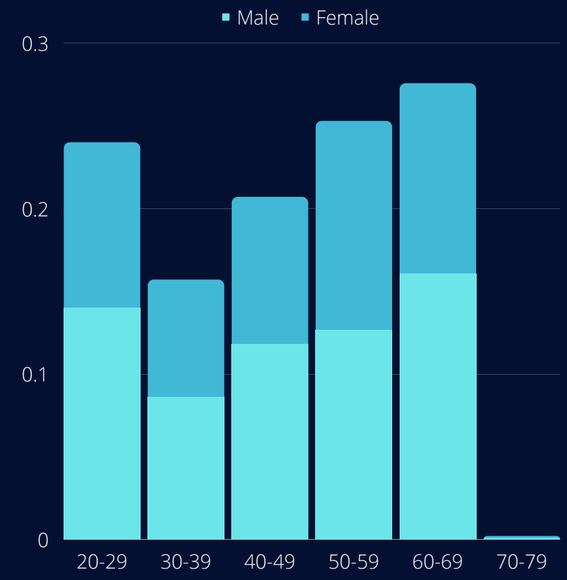
EDUCATION DISTRIBUTION



LIMIT BALANCE PER EDUCATION



AGE CATEGORY DEFAULT RATE



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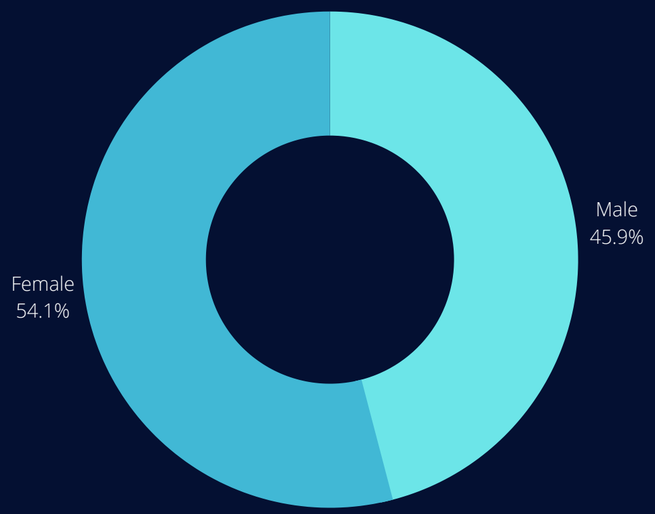
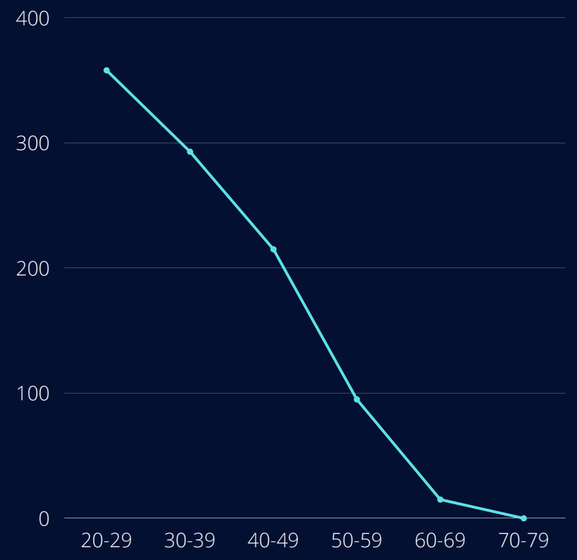
PROFILING

TOP 10% PROFILES WITH HIGHEST PROBABILITY TO DEFAULT

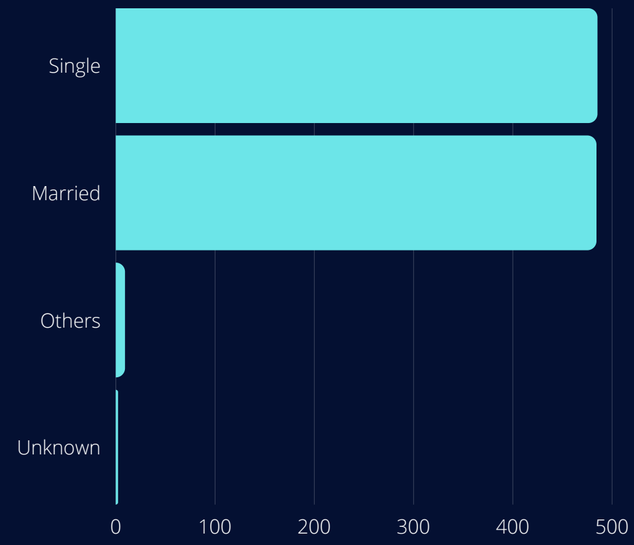
GENDER DISTRIBUTION



AGE CATEGORY DISTRIBUTION



MARRIAGE DISTRIBUTION



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