Capstone Project 2 Proposal

Home Credit Default Risk

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Springboard

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Overview

Every single person has been applied to get a loan, lease /finance a car or house/apartment at least once in his/her life and bond investors has to consider credit risk of each applicant. Credit risk which is also known as default risk is the risk that a bond issuer will default on their payments of interest and principal.

Many people struggle to get loans due to insufficient or non-existent credit histories. And, unfortunately, this population is often taken advantage of by untrustworthy lenders. The goal of this project is to be able to predict the likelihood that an applicant will experience difficulty in repaying their loan.

The two most critical questions in the lending industry are:

1) How risky is the borrower?

2) Given the borrower's risk, should we lend him/her?

Business Objective: Home Credit Default Risk

Home Credit strives to broaden financial inclusion for the unbanked population by providing a positive and safe borrowing experience. In order to make sure this underserved population has a positive loan experience, Home Credit makes use of a variety of alternative data--including telco and transactional information--to predict their clients' repayment abilities.

Home Credit needs an algorithm that will take as inputs various personal and alternative financial information originally taken from a loan applicant's profile, and then determine a probability of the applicant has at least one late payment when repaying their loan. This probability will be in the range [0.0, 1.0], where 1.0 represents a 100% certainty that the applicant will have at least one delinquent repayment and 0.0 indicates that there is zero chance that the applicant will ever be delinquent.

The algorithm will be tested on a set of 48,744 individuals who previously borrowed from Home Credit. Home Credit knows which borrowers ultimately paid off their loans, and which ones had one or more late payments. A good algorithm will need to predict a high probability of delinquency for the majority of borrowers who did actually make one or more late payments. This algorithm will also need to predict a low probability of delinquency for the majority of borrowers who eventually did successfully repay their loans with no late payments.

Data

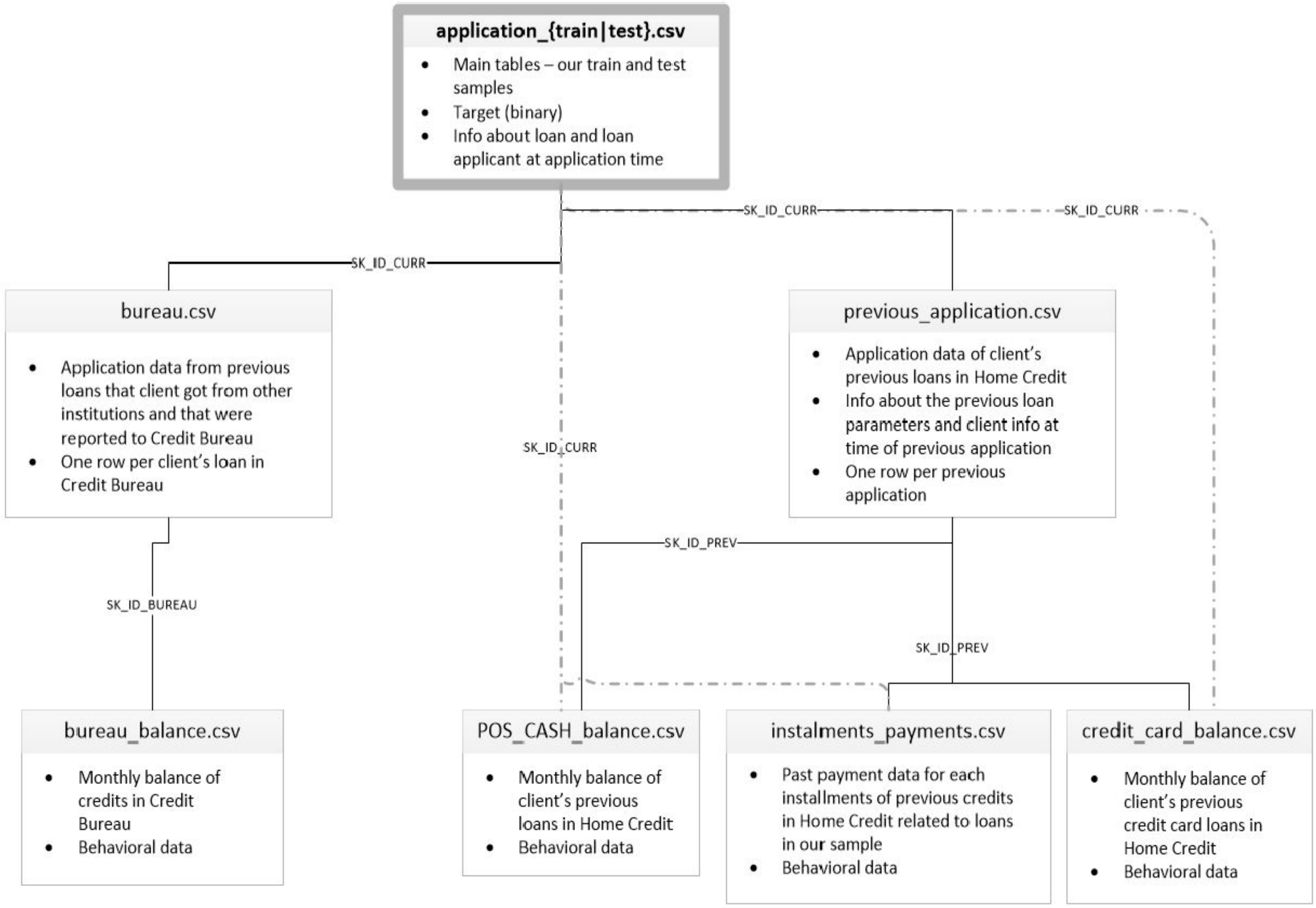
The dataset as it is mentioned above was provided by Home Credit Group's data scientists. It contains a wide variety of personal and financial information belonging to 356,255 individuals who had previously been recipients of loans from Home Credit. These individuals are divided into training and testing sets. The training group contains 307,511 individuals' records. The test group contains 48,744 records.

The dataset is anonymized, with each individual their loan ID. Any personally identifying, such as name, phone number, or address, has been omitted. Because Home Credit targets the unbanked population, it is unable to rely on traditional measures, such as a credit score, that mainstream financial institutions use when making lending decisions.

Home Credit works around this obstacle by looking at an extensive and diverse array of personal and financial information for each of its applicants. These features range from common characteristics, such as marital status, age, type of housing, a region of residence, job type, and education level, to some incredible niche characteristics, such as how many elevators are in an applicant's apartment building.

Home Credit also looks at aspects of applicants' financial backgrounds, including month-by-month payment performance on any loans or credit card balances that the applicant has previously had with Home Credit, as well as the amount and monthly repayment balances of any loans that the applicant may have received from other lenders. All of these features are spread across seven data tables.

The main data table ('application_train.csv') contains 120 features that comprise applicants' personal background information. The other six data tables contain applicants' previous loan and credit card balance payment histories. The following diagram provides a brief summary:



application_{train|test}.csv

- Main tables – our train and test samples
- Target (binary)
- Info about loan and loan applicant at application time

bureau.csv

- Application data from previous loans that client got from other institutions and that were reported to Credit Bureau
- One row per client's loan in Credit Bureau

previous_application.csv

- Application data of client's previous loans in Home Credit
- Info about the previous loan parameters and client info at time of previous application
- One row per previous application

bureau_balance.csv

- Monthly balance of credits in Credit Bureau
- Behavioral data

POS_CASH_balance.csv

- Monthly balance of client's previous loans in Home Credit
- Behavioral data

instalments_payments.csv

- Past payment data for each installments of previous credits in Home Credit related to loans in our sample
- Behavioral data

credit_card_balance.csv

- Monthly balance of client's previous credit card loans in Home Credit
- Behavioral data

Workflow

1. Collecting data and applying data wrangling
2. Starting exploratory data analysis to find trends and Storytelling
3. Conduct further data analysis to identify relationships between different variables
4. Dimensionality reduction (PCA) or Feature Selection
5. Implement learning algorithms
    a. Classifier Algorithms: Multi-layer Perceptron Classifier, Logistic Regression Classifier, Gaussian Naive Bayes Classifier
    b. Ensemble Methods: AdaBoost Classifier, Random Forest Classifier, Gradient Boosting Classifier

6. Model Evaluation and Validation

Deliverables

- Final report
- Jupyter notebook .ipynb code
- Slide deck
- Presenting the project