Risk Analytics Case Study
2025

Prompt
[Fictional] Last year Nelo determined it needed to reduce its First Payment Default (FPD) rate. This case seeks to recreate that scenario with synthetic data similar to the data we had at the time. Your goal is to reduce FPD by as much as possible but by no less than 2 percentage points (2 pp) going forward, while minimizing the impact to approval rate (minimizing how many good users we need to reject to bring down the FPD rate by that much).

Though there are many ways you could approach this task (and no one single right way), but one straightforward path would be to attempt to separate credit-related FPD from fraud-related FPD. The acquisition underwriting score is fundamentally a credit model, but does contain fraud related features. It could be helpful to create a ruleset or even a model that targets fraud-related FPD, for example.

Deliverables
- Executive summary: Prepare an executive summary (a brief written memo) highlighting your findings, conclusions, and 2-3 rule recommendations (or a model) that will reduce FPD by at least 2 pp (with the smallest possible impact on good users). Include visualizations and charts to support your insights as appropriate.
- Working files: Submit your working files, such as a Jupyter Notebook, or any other files that contain your analysis and calculations. Your code doesn't need to be meticulously commented, but a tiny bit of markdown/html explaining what's going on goes a long way.

Evaluation criteria
Your submission will be evaluated based on the following:
- Technical skills: Ability to handle data and perform analysis
- Analytical thinking: Depth/breadth of analysis, ability to propose actionable strategies
- Communication skills: Clarity and effectiveness in presenting your findings and recommendations

Where to start?
Determining expected repayment rate for a certain segment is a good point of departure. Acquisition_underwriting_score (and the binned version of this column) gives you this. The label for the model that generates this score is whether or not the user will be a first payment default. So if the user has a 0.95 score, it means we thought there was a 95% chance that the user would make their first payment.

I understand you don't have as many tools as you'd normally have at your disposal here, just make do with what's in the dataset. If you need to make simplifying assumptions and can defend them, that's fine. Note that other than the first payment default indicator ("is_fpd"), the only columns that contain information from *after* time of loan application are: first_loan_type,

and the three app usage features (e.g. “total_mobile_app_events_between_first_loan_and_first_due_date”).

AI
Like you will on the job, I expect you will use some amount of AI to assist with writing code etc. I also expect you to understand what is going on in your code and analysis. I would not recommend using AI to write your exec summary; I’ve not seen this work out well yet.

Notes on the dataset:
The share of users with first payment default in the dataset was exaggerated for purposes of the case, and the dataset generally is not a true representation of the scale or composition of Nelo’s new user acquisition. The dataset contains one row per user, and is mostly snapshot data as of the time of each user’s loan application.

Clarification on features that may be confusing:

- hotspots_overdue_ratio_near: ratio of users nearby that are overdue
- renapo_curp_*: these features are related to the status of the user’s CURP.
- imss_*: these are features that come directly from the Mexican social security institution.
- The features like ‘credit_check_’ and ‘history_pp_’ at the end are also from a credit bureau
- Fraud score: black box fraud model score from a third party that frankly isn’t very well calibrated and doesn’t work too well.

Final Note
After you get started, if you are enjoying the case, that’s a strong signal that you’ll be a fit for this role. If it feels boring or overly tedious, this is not the role for you, partner. It’s fine for you to not complete it and decide the role isn’t for you.