MANAGER, ADVANCED ANALYTICS
INTERVIEW ASSIGNMENT

The Home Depot (THD) Canada has a hyper loyal PRO customer base part of their ProXtra Loyalty program. ProXtra members enjoy benefits such as 60-day no interest terms on commercial accounts, purchase tracking and an extended 365-day return policy. In addition, members also earn Rewards Points redeemable for Home Depot Gift Cards as well as fuel savings for 10c/L discount at any Petro-Canada location.

Even though the true recognizable base for PRO is based on the ProXtra customer database, we realize that there may be more customers who are shopping as PROs, without being part of our ProXtra Loyalty Program. As such, the Analytics team has built a Pro Algorithm that identifies a PRO based on their purchase behaviour. As a result of this algorithm, we're able to identify an additional 20% of total sales that should be considered as PRO and it is the definitive measurement of PRO Sales across the business.

The current Pro Algorithm has been in place for over three years and was initially built using a step-wise regression model to identify the relevant variables that would identify a PRO customer. Each variable then received a weight that would identify each customer as a PRO or a Consumer.

Some sample variables include:

Variables Used for Current Pro Algorithm
Number of transactions
Average number of PCS (Pro Classes Shopped) classes shopped per transaction
Number of PCS classes shopped
Number of months with PCS classes shopped
Number of months shopped in various Pro identified classes
% of transactions at specific registers (Pro Desk, Tool Rental, etc.)
% of transactions within specific time ranges (weekdays, 8am-10am, etc.)

With the advancements in analytics over the past number of years, coupled with customer behaviour changing, the Analytics team would like to revise the Pro Algorithm.

As a leader of the Advanced Analytics/Data Science team, you've been asked to propose an approach to the Senior Leadership Team (SLT) on your recommendation to revise the Pro Algorithm. This recommendation should be sound and cover the following aspects:

- Training data set
- Classification model approach
- Frequency of updates

In addition, there are a few concerns related to the current Pro Algorithm that should be addressed which have been a topic of discussion within the Analytics team:

- Should we use current ProXtra members as part of our training data set? The analytics team is concerned it may heavily skew the data towards hyper loyal
- Should we use a deep learning model? Explain-ability to the business is a critical part of adoption. A deep learning model may be hard for the business teams to understand and get behind
- What should be the length of look-back window used and should a customer be re-classified if their behaviour changes?
    - Current Pro Algorithm runs every month using previous 24-month of history and re-classifies customers at the end of every run. This means a single customer can switch from Pro to Consumer with each monthly run

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Please present your recommendation during your interview. Recognizing that there is only so much you can know about THD Canada from outside the company, we expect you to leverage your existing knowledge and expertise within the industry. We also expect you to make reasonable assumptions and explain the benefits behind your approach.

The time allotted to this should not exceed 15min. Communication style during the interview is up to you (PPT deck, verbal, whiteboard, etc.). There will be a projector present in the room for you to use if you wish to do so.

To aid in the analysis, a sample transactional output data has been provided from the current Pro Algorithm. The data set can be downloaded from the link below.

https://homedepot.box.com/s/yhuhemeqtuyq3ixpoxd5641c787am2ql