Mars Petcare Churn Prediction Final Presentaion
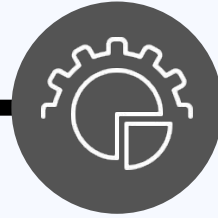
George Lyu

Agenda

MARS

Executive Summary

Extra Exploratory Data Analysis

Churn Defining Process

Modeling & Prediction

Reflection

Executive Summary

The Challenge

- Defining Churn is a hard process. There are multiple ways to define churn and finding a standard to fit different customers' behavior
- What level of Churn should we focus on?
- Business Impact based on Churn rate

My Approach

Segmenting data into 4 major parts and define churn separately based on different types of pet food; Modeling and Predicting different brands churn rate

A. **Increased accuracy** by analyzing customers' separately impacted by different types of food

B. **Maximum utilization of data** by grouping on Shopper Baskets and looking at churn rate for each brand

Reflection

- Defining customers' churn time scope (3-month, 6-month, etc)
- Looking at specific customer churn behavior (Churning from one brand to another)

Agenda
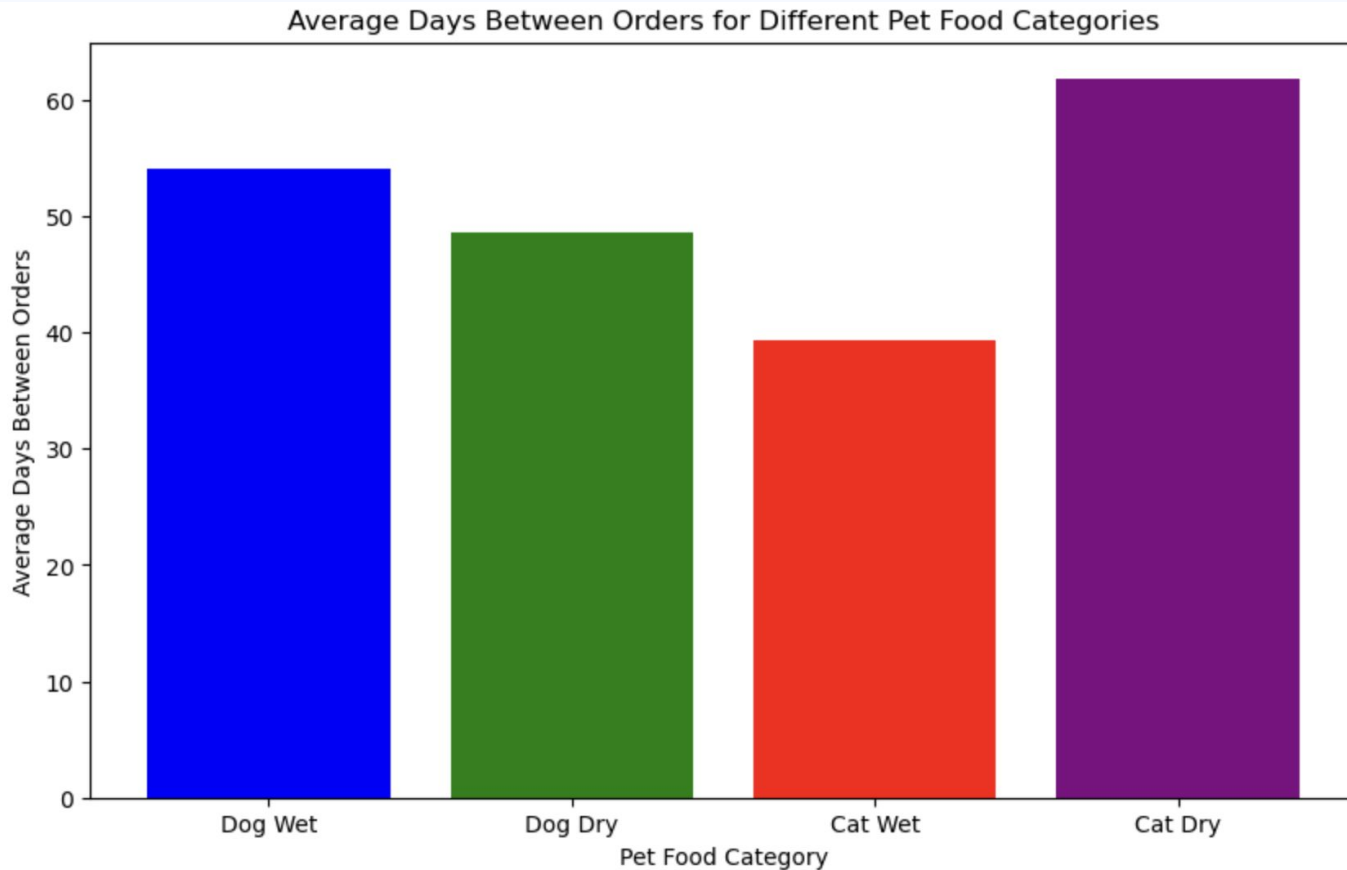
MARS

Executive Summary

Extra Exploratory Data Analysis

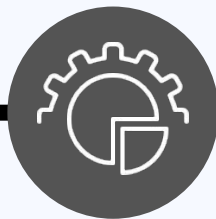Churn Defining Process

Modeling & Prediction

Reflection

Average Days Between Orders for Different Pet Food Categories

Agenda

MARS

Executive Summary

Extra Exploratory Data Analysis

Churn Defining Process

Modeling & Prediction

Reflection

Defining Churn

- Churn: During a specific period of time, whether this customer continues purchasing or stops purchasing.

- Divide the dataset into 4 separate parts: "Dog Wet", "Dog Dry", "Cat Wet", "Cat Dry".

- Finding average days between each purchase for each separate dataset

- Label the person as "Churn" if two or more "days-between-orders" are larger than the average

Defining Churn

	Dog Wet	Dog Dry	Cat Wet	Cat Dry
Average Days Between Each Order Cross Different Categories	54 days	48 days	39 days	61 days

SPECIES	FOOD_TYPE	BASE_PRICE	PRICE	PROMO_FLAG	UNITS	PRICE_TIER	PACKAGE_SIZE	FEEDING_PHILOSOPHY	NATURAL_CLAIM	TEXTURE_FORMAT	LIFESTAGE	DAYS_BETWEEN_ORDERS	CHURNED_LABEL
DOG	WET	0.87	0.87	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	CIG	UNSPECIFIED	0.0	1
DOG	WET	0.87	0.87	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.88	0.88	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.9	0.81	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	101.0	1
DOG	WET	0.9	0.81	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.93	0.93	0	4	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	CIG	UNSPECIFIED	137.0	1
DOG	WET	0.95	0.95	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	23.0	1
DOG	WET	0.94	0.94	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.95	0.95	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.43	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	74.0	1
DOG	WET	0.85	0.64	1	2	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.77	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.64	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	7.0	1
DOG	WET	0.85	0.77	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.64	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	CIG	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.64	1	2	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.64	1	2	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.77	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.85	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	26.0	1
DOG	WET	0.85	0.43	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.64	1	2	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.85	0.77	1	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.95	0.95	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	12.0	1
DOG	WET	0.95	0.95	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.95	0.95	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	0.95	0.95	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	1.0	1.0	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	139.0	1
DOG	WET	1.0	1.0	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	0.0	1
DOG	WET	1.48	1.48	0	1	PREMIUM	TRAY/TUB SML (0-4.9OZ)	WET DOG CULINRY RCPS	NON NATURAL	LOAF/PATE	UNSPECIFIED	597.0	1

Agenda

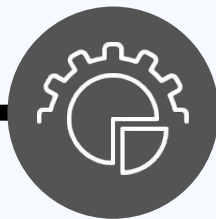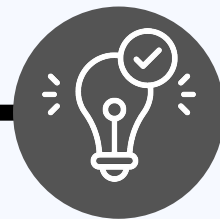**MARS**

Executive Summary

Extra Exploratory Data Analysis

Churn Defining Process

Modeling & Prediction

Reflection

Feature Engineering

- Feature 1: Quarters

- Feature 2: Total Number of Brands Purchased for each shopper

- Feature 3: Number of Brands Changed for each shopper

- Feature 4: Number of Brands Purchased each quarter for each shopper

MARS

Model Used: Random Forest

- **Training Data**:
  2019Q3 - 2022Q1
  "Shopper_ID",
  "Days_Between_Orders", "Product",
  "Total_Brand_Changes", "Quarter",
  "Brand_ID", "Total_Brands_Purchased",
  "Total_Brand_this Quarter"

- **Test Data:**
  2022Q2-2022Q4

```
Accuracy: 0.8609865470852018
              precision    recall  f1-score   support

           0       0.89      0.71      0.79        83
           1       0.85      0.95      0.90       140

    accuracy                           0.86       223
   macro avg       0.87      0.83      0.84       223
weighted avg       0.86      0.86      0.86       223
```

MARS

Churn Rate on Different Brands

	Cesar	IAMS	Pedigree	Sheba
2023Q1	59%	78%	46%	87%

Business Impact

MARS

Customer Retention Issues:

87% and 78%
High Churn Rate in
Sheba and IAMS products

Competitive Analysis

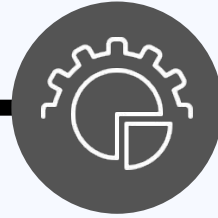**Value Brands**

Relatively Low Churn Rate in
Cesar and Pedigree

Effective Cesar and Pedigree's
business strategies

Agenda

MARS

Executive Summary

Extra Exploratory Data Analysis

Churn Defining Process

Modeling & Prediction

Reflection

Reflection

- Including different time periods for churn
  - Adding features based on different periods of time (Total Brands Change 1 Quarter before, 2 Quarters before)
  - Churn Rate on different brands in 3 months / 6 months
- Brands that one individual Churn from one to another
  - Adding features of brand changes for each customer
  - Looking more into individual shopper behavior

MARS

Thank You!