Course Case: Apprentice Chef

DAT5303 - Machine Learning
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Apprentice Chef, Inc. is an innovative company with a unique spin on cooking at home. Developed for the busy professional that has little to no skills in the kitchen, they offer a wide selection of daily-prepared gourmet meals delivered directly to your door. Each meal set takes at most 30 minutes to finish cooking at home and also comes with Apprentice Chef's award-winning disposable cookware (i.e. pots, pans, baking trays, and utensils), allowing for fast and easy cleanup. Ordering meals is very easy given their user-friendly online platform and mobile app.

Case Challenge Part I (Individual Assignment 1)
After three years serving customers across the San Francisco Bay Area, the executives at Apprentice Chef have decided to take on an analytics project to better understand how much revenue to expect from each customer within their first year of using their services. Thus, they have hired you on a full-time contract to analyze their data, develop your top insights, and build a machine learning model to predict revenue over the first year of each customer's life cycle. They have explained to you that for this project, they are not interested in a time series analysis and instead would like to "keep things simple" by providing you with a dataset of aggregated customer information.

Case Challenge Part II (Individual Assignment 2)
In an effort to diversify their revenue stream, Apprentice Chef, Inc. has launched *Halfway There*, a cross-selling promotion where subscribers receive a half bottle of wine from a local California vineyard every Wednesday (halfway through the work week). The executives at Apprentice Chef also believe this endeavor will create a competitive advantage based on its unique product offering of hard to find local wines from smaller vineyards.

Halfway There has been exclusively offered to all of the customers in the dataset you received, and the executives would like to promote this service to a wider audience. They have tasked you with analyzing their data, developing your top insights, and building a machine learning model to predict which customers will subscribe to this service.

Data Preparation
In order to appropriately prepare the data for this analysis, the data science team at Apprentice Chef has queried, sampled, and verified a dataset of approximately 2,000 customers. Each customer met at least one of the following criteria:

- at least one purchase per month for a total of 11 of their first 12 months
- at least one purchase per quarter and at least 15 purchases throughout their first year

The data science team assures you that their dataset engineering techniques are statistically sound and represent the true picture of Apprentice Chef's customers. Additionally, in your domain knowledge gathering meetings with stakeholders for this project, you have attained the following information about the company.

Information from Sales and Marketing

Company Mission Statement

To support the busy lifestyle of the working professional with delicious and healthy eating.

Customer Journey Framework

New Customers

1. Go to the website or download the mobile app.
2. Register using a phone number. Confirm the phone number with a one-time code sent via SMS message or voice call.
3. (optional) Select tastes and preferences in terms of food and specify dietary restrictions/food allergies.
4. (optional) May submit a picture of a government-issued ID card if also wanting to purchase alcohol.
5. (optional) Register for a weekly meal plan and receive a discount on all purchases.
6. Select meals and set meal delivery schedule.
7. (optional) Fill in feedback survey on order.

Existing Customers

1. Log into the website or mobile app.
2. (optional) Update profile and/or orders.
3. Select meals and confirm meal delivery schedule.
4. (optional) Fill in feedback survey on order.

Master Cooking Classes

Apprentice Chef, Inc. also offers a series of master cooking classes. These are designed to help develop the cooking skills of customers and take place in San Francisco once every quarter. The team has explained that master cooking classes were originally started as an effort to retain customers for a longer period of time.

Information from Operations

Cancellation Policy

At times, customers need to cancel their meal delivery due to unforeseen circumstances (needing to work overtime, surprise change in plans, etc.). To accommodate such changes, Apprentice Chef, Inc. offers the following policies:

- If canceled before 12:00pm (noon) on the day of delivery, customers will receive a full refund.
- If canceled after 12:00pm on the day of delivery, customers will receive a partial refund of 50%, or the option to have their order stored for up to three days and delivered at a later time.

Note: Cancellation policies do not apply to holiday meal sets.

Meal Set Characteristics and Pricing

Each prepared meal consists of:

- one prepared protein (marinated steak, herb encrusted chicken, etc.)
- two vegetables (lemon pepper broccoli, green beans in garlic sauce, etc.)
- one carb (steamed rice, parmesan penne noodles, etc.)
- spices and condiments
- cookware that is disposable, biodegradable, and made from recycled materials

Product Pricing

Ad hoc prices for each meal set range from a total cost of US$10 to US$23. Customers may also choose to order from a limited selection of beverages, and those that are at least 21 years of age may opt to order a half bottle of wine with their meal set.

Summary table for meal sets:

Food	l	Protein	Vegetables	Carbs	Seasonings	Total
Minimum	l	6	2	1	1	10
Maximum	l	15	4	3	1	23

Summary table for beverages:

Beverages		Still Water	Sparkling Water	Wine
Minimum	I	1	1	7
Maximum	I	3	5	25

Product Discounts

Customers may subscribe to a weekly meal plan in order to receive a discount on their meal sets. Weekly plans may be set at any point in the customer's life cycle, and are offered as follows:

Weekly Meal Plan		Total Meals	Discount
Basic	I	3	10%
Premium	I	5	20%

At times, additional discounts are given to customers due to special circumstances such as a mistake in an order, but this is extremely rare.

Ordering Platform Characteristics

Meal sets may be filtered based on cuisine characteristics (vegan, gluten free, etc.) as well as cuisine type (Japanese, Spanish, etc.). The ordering platforms also contain a recommendation engine based on factors such as: previous purchases, lookalike scores (a user's similarity to other users), and trending products. If a user does not have enough accumulated data for relevant recommendations, best-selling products will be displayed until enough data has been attained for accurate recommendations. This information is not included in the data you have been given to analyze.

Information from Customer Service

Customer Sentiment

Market research indicates that the key value propositions for Apprentice Chef, Inc. are that it saves considerable time (deciding what to buy/cook, preparation, and clean up). Also, customers enjoy that they can eat a high quality, home-cooked meal that fits into their busy lifestyle. Additionally, after cooking, customers feel they have accomplished something when compared to ordering delivery. This is due to the fact that they still have to do a little cooking before being able to enjoy their meal.

Customer Contact Information

Apprentice Chef, Inc. is very strict in terms of storing customer contact information. Therefore, all information that can uniquely identify a customer is encrypted and anonymized in all internal systems. However, qualified members of the Sales and Marketing department have access to customer email addresses. This is driven by Apprentice Chef, Inc.'s customer service approach, where account managers use this as an identifier to look up customer orders and information. This is especially valuable when a customer is complaining about an order.

During a domain knowledge gathering meeting, you learned that the customer service team is responsible for collecting feedback on orders. They do so via a survey instrument allowing users to rate their experience. The survey instrument is similar to that of hotel booking or ride sharing apps and takes approximately 15 seconds to complete. They also send an email if a user hasn't rated their experience after 24 hours of receiving an order. The team has mentioned that some users give feedback on almost every order, while others only give feedback when wanting to complain.

Additionally, some customers contact customer service directly via phone or webchat. The Customer Service team mentioned that this is sometimes done to change orders or delivery schedules, but the vast majority of cases are complaints. The team has emphasized that this rarely happens, although some customers complain on a higher percentage of their orders than others.

Finally, the marketing team was adamant about the way that they classify email domains, noting that there are different email response rates based on a customer's email domain group. They have provided you with the table below.

Domain Group	Domains
professional	@mmm.com
	@amex.com
	@apple.com
	@boeing.com
	@caterpillar.com
	@chevron.com
	@cisco.com
	@cocacola.com
	@disney.com
	@dupont.com
	@exxon.com
	@ge.org
	@goldmansacs.com
	@homedepot.com
	@ibm.com
	@intel.com
	@jnj.com
	@jpmorgan.com
	@mcdonalds.com
	@merck.com
	@microsoft.com

	@nike.com @pfizer.com @pg.com @travelers.com @unitedtech.com @unitedhealth.com @verizon.com @visa.com @walmart.com
personal	@gmail.com @yahoo.com @protonmail.com
junk	@me.com @aol.com @hotmail.com @live.com @msn.com @passport.com