

Optimizing Restaurant Revenue: A Customer Segmentation Strategy (RFM)

Tool used : SQL (PostgreSQL), Excel, Python, Power Bi

How can we leverage upselling in The Goose Pub customer base?

In this analysis I will build RFM segmentation to identify the behavioral drivers of customers and design targeted upselling strategies to transition them into 'Higher-spend-tier', from 4 different definite groups.

I was able to identify a 'hidden-gem' (Group 3) representing 12% of the sale from the summer season in only 4 weeks. And a 'volume-trap' (Group 2) requiring operational efficiency.

Recommendation: Shift from a generic service model to a segment-specific protocol

Introduction

To protect client confidentiality, all data used in this analysis has been anonymized, and any names or identifying information related to the business have been removed or modified.

For this case study I'm working with The Goose Pub, a restaurant from a small town in Canada. To optimize their sales they ask me to provide a plan to help optimize the revenue by table through analysis and visualization.

Stakeholders :

Joseph, FOH manager, provided me with access to their POS system so I could access the data I needed. I will communicate the recommendation I will find to his team.

Data cleaning and preparation

Data Engineering Methodology To overcome the limitations of the legacy Veloce POS system (proprietary export format), I engineered a **Python-based ETL pipeline**. This process parsed converted PDF reports, validated the data against control totals to ensure integrity, and loaded the dataset into a structured [PostgreSQL](#) relational database.

For a detailed breakdown of the PDF parsing script and database schema, please refer to the [\[Data Cleaning Documentation\]](#).

The necessary data includes the full summer season of 2025 from mid-june to mid-september, which form the basis of this analysis.

Methodology

I choose to use the RFM method because it lets me track behavioral patterns in customers in detail, letting me find personnel recommendations for segmented groups.

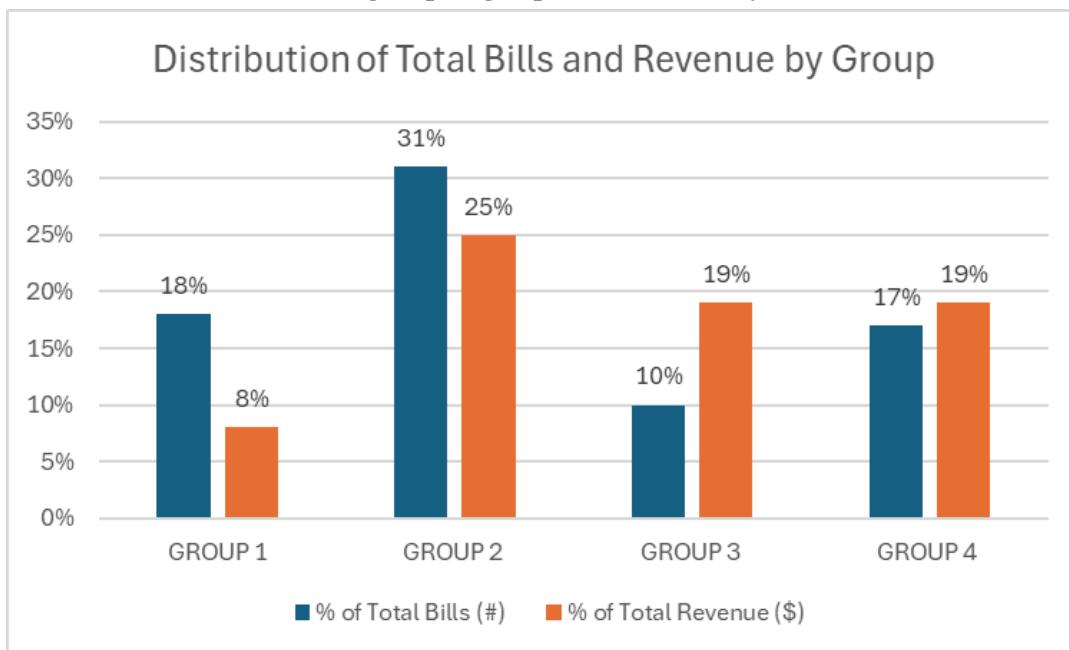
I **realized** the data **doesn't have** any record of customers id so I didn't have any data to track Recency (R) or Frequency (F) so I built an alternative FRM customer classification.

With these 3 categories :

1. **Party size Small vs Big** (with no customer count, I made an alternative way to track this, appetizer = 1 point, and main course = 2 points)
2. **Food/Drink ratio**
3. **Spend Tier Low / Medium / High**

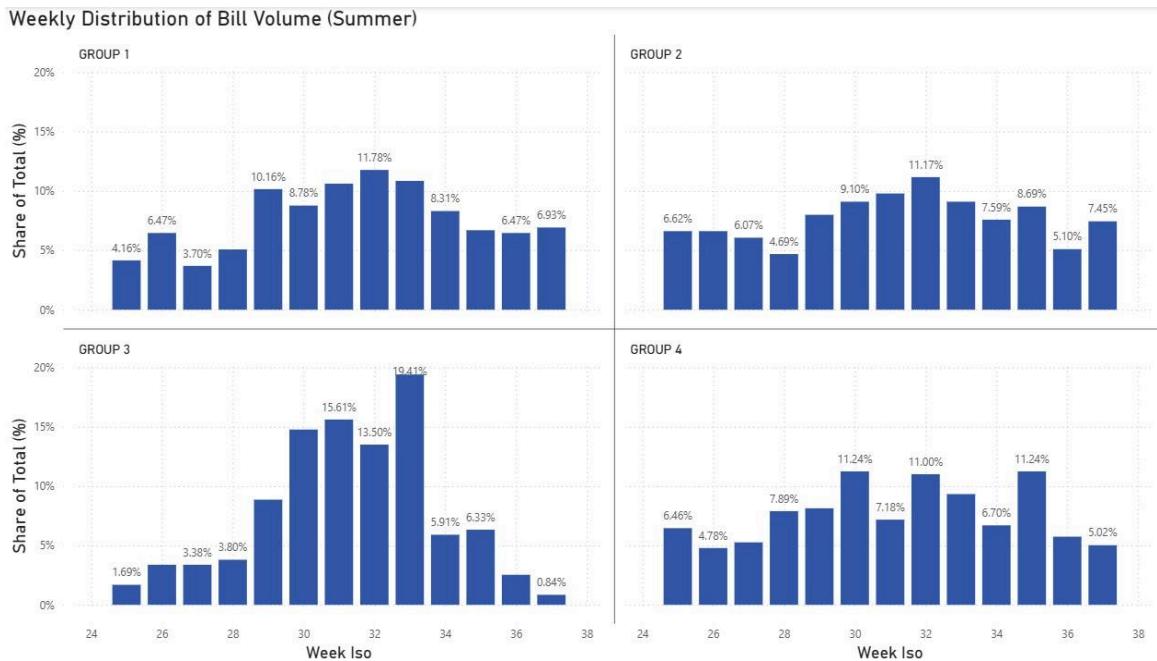
The process has a total of 12 categories. After combining the time bin for early and late. I kept 4 categories to look at because they represent 73% of the traffic by number of bills and 71% of the restaurant revenue.

- GROUP 1 : **SLF** : Small group/Low spend/Food heavy.
- GROUP 2 : **SMF** : Small group/Medium spend/Food heavy
- GROUP 3 : **BMF** : Big group/Medium spend/Food heavy
- GROUP 4 : **Model** : Small group/high spend/drink heavy



ANALYSIS

A. The "Predictable Core" (Groups 1, 2)



- **Profile:** The operational backbone. These groups provide stability but lower margins.
- **The Volume/Value Gap:** Together 1 & 2 consume **49% of table resources** (bill count) but generate only **33% of total sales**. This indicates a "High Effort / Low Yield" operational cost.
- **Strategy: "The Growth Focus."** Since their presence is consistent from Week 25–37, they are the prime targets for a sustained, season-long upselling protocol to close the gap between volume and value.

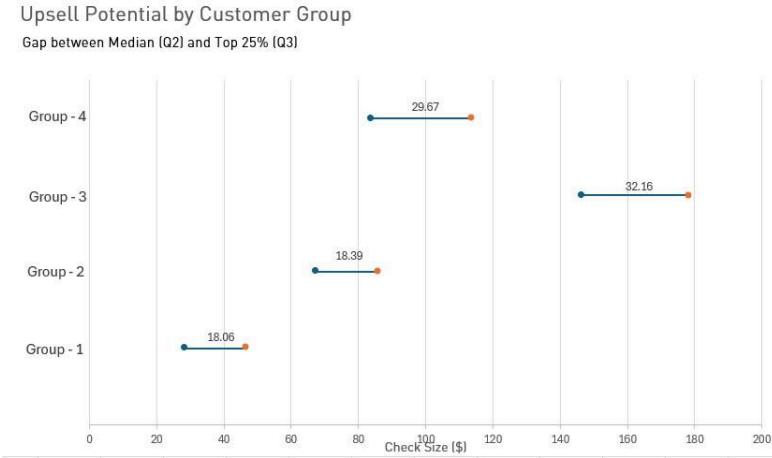
B. The "High-Impact Wildcard" (Group 3)

- **Profile:** Medium-spend, high-volatility.
- **The Power Window:** Highly seasonal. Their activity peaks strictly between **Weeks 30–33**, yet in that short window, they generate **12% of total summer revenue**.
- **Strategy:** During this small window high focus to upsell

C. The "Self driving" (Group 4)

- **Profile:** Stability medium margin
- This group is stable during the summer.

2.Upsell Potential (Based on Spending Variance)



By isolating the upper-quartile variance (Q2–Q3), this section quantifies the Upside Potential of each dining group to determine where consumer spending is most elastic.

- **Group 1 - 2(Lower Potential):** Rigid spenders. Strategy: Prioritize speed over upselling.
- **Groups 3 & 4 (High Potential):** Flexible budgets. These are high-opportunity targets for premium drink and dessert sales.

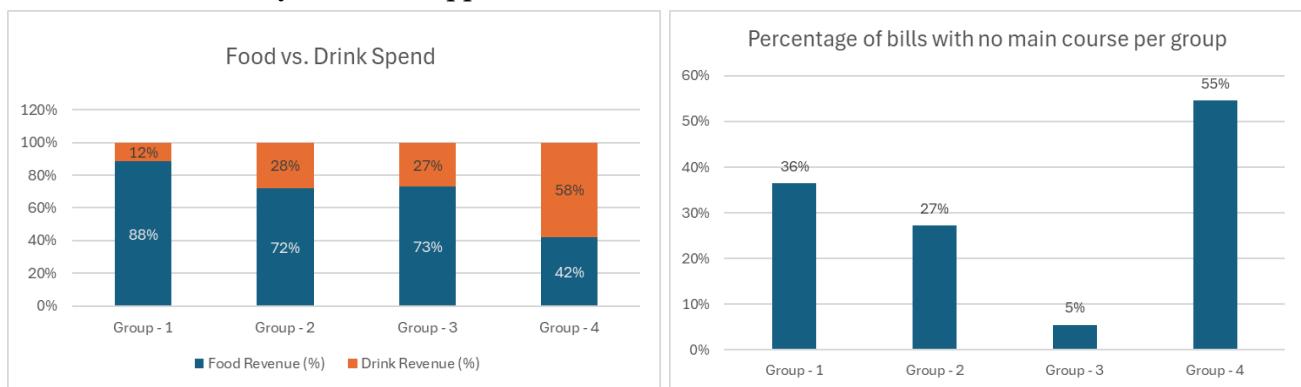
3. Food Vs Drink distribution

Group 1: 88% Food Spend. 36% order no main course, preferring appetizers.

Group 2 : 72% Food Spend and 27% of the bills have no main course.

Group 3: The "Big Table" Segment. Match Group 2's **72% Food Spend**. The main difference is that only 5% of the bill does not order the main course.

Group 4: Happy Hour Crowd 42% Food Spend. No main course. Food spend is low (42%) and dominated by shareable appetizers.



While Group 1 has a high appetizer-to-main ratio, this is misleading as they often skip the main course entirely. The true opportunity lies with **Group 2 and 3**: they consistently order Main Courses but show a low Appetizer Ratio Group 2 (0.58) and Group 3 (0.64). This appetizer gap is a major increase opportunity.

4. Alcohol Vs Soft Drinks

SOFT DRINKS :

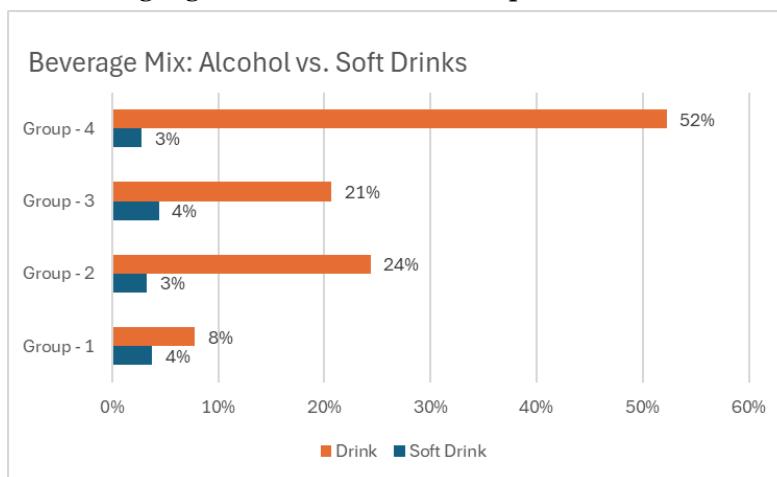
Each group spends about the same amount of their budget on soft drinks, between 2 and 4 %.

ALCOHOL :

Group 1 : A small fraction of their budget is spent on alcoholic beverages 7%.

Group 2 and 3 : Ready to spend a good amount of their budget on alcohol, 20-24% – a good upselling opportunity.

Group 4 : Half of their budget goes to alcohol, hard to upsell further.



ACT AND RECOMMENDATION

Group 1: The Summer Casuals

- **Profile:** Food-Focused (88% spend) | **36% order No Main Course.**
- **Strategy (Low Upsell Potential):**
 - **Slow Nights: Stagger Service.** Offer pauses between courses to keep them seated longer, increasing the chance of a drink order.
 - **Busy Nights: Prioritize Speed.** Since they resist upselling, turn the table quickly to free up capacity for Group 2 or 3.

Group 2: The "Date Night" Socials

- **Profile:** 72% Food Spend | **Strong "Tapas" Behavior (27% No Main).**
- **Strategy (Medium Upsell Potential):**

- **Menu: Pitch "Sharing."** Use the low appetizer ratio (0.58) to explicitly sell sharing platters.
- **Spend Tier Switch :** By focusing on premium drink, wine bottle instead of glass, cocktail and even mocktails to this group.
- **Risk: The Volume Trap.** If they resist the first upsell, pivot immediately to efficiency. Don't let low-spenders camp.

Group 3: The "High-Impact" Wildcards

- **Profile:** Peak Weeks 30-33 | **Large Tables (High Drink Volume).**
- **Strategy (High Upsell Potential):**
 - **Service: "The Hover."** Servers must remain visible during kitchen delays to capture 2nd and 3rd drink rounds.
 - **Beverage: Bottle Service.** Shift alcohol orders from "By the Glass" to "By the Bottle" and upsell soft drinks to Mocktails.
 - **Appetizer ratio :** The ratio of appetizer by main (0.64) should be an easy focus point.
 - **Gold mine.** This group is highly present during 4 weeks and represents 12% of the sale of the summer during those weeks. By focusing on efficient staffing the revenue increase could be major.

Group 4: The "Happy Hour" Grazers

- **Profile:** 54% No Main Course | **Grazing Behavior (42% Food Spend).**
- **Strategy (Maintenance Mode):**
 - **Approach: Passive Service.** This group already spends heavily on alcohol. Aggressive sales tactics risk disrupting their experience. However, if an upsell opportunity is detected, it should be taken, as Group 4 still presents a high upsell potential.
 - **Prioritization:** Treat as "**Self-Sustaining.**" Reserve operational energy and sales pitches for Groups 2 and 3 where the gap between potential and actual revenue is wider.

Projected Revenue Impact: By targeting a modest **15% increase in average check size** specifically for Groups 2 and 3 (equivalent to selling just one shared appetizer, dessert, or drink upgrade per bill), we project a total restaurant revenue lift of **6.6%**.

I have included a 'Rapid Identification Guide' in the appendix. This tool gives service staff a way to recognize high-potential segments within the first minutes of interaction.

Rapid Identification Guide' delivered to the client contains proprietary operational details. To respect client confidentiality and anonymity, this specific document has been excluded from this public portfolio.