

◆ Nov 2025



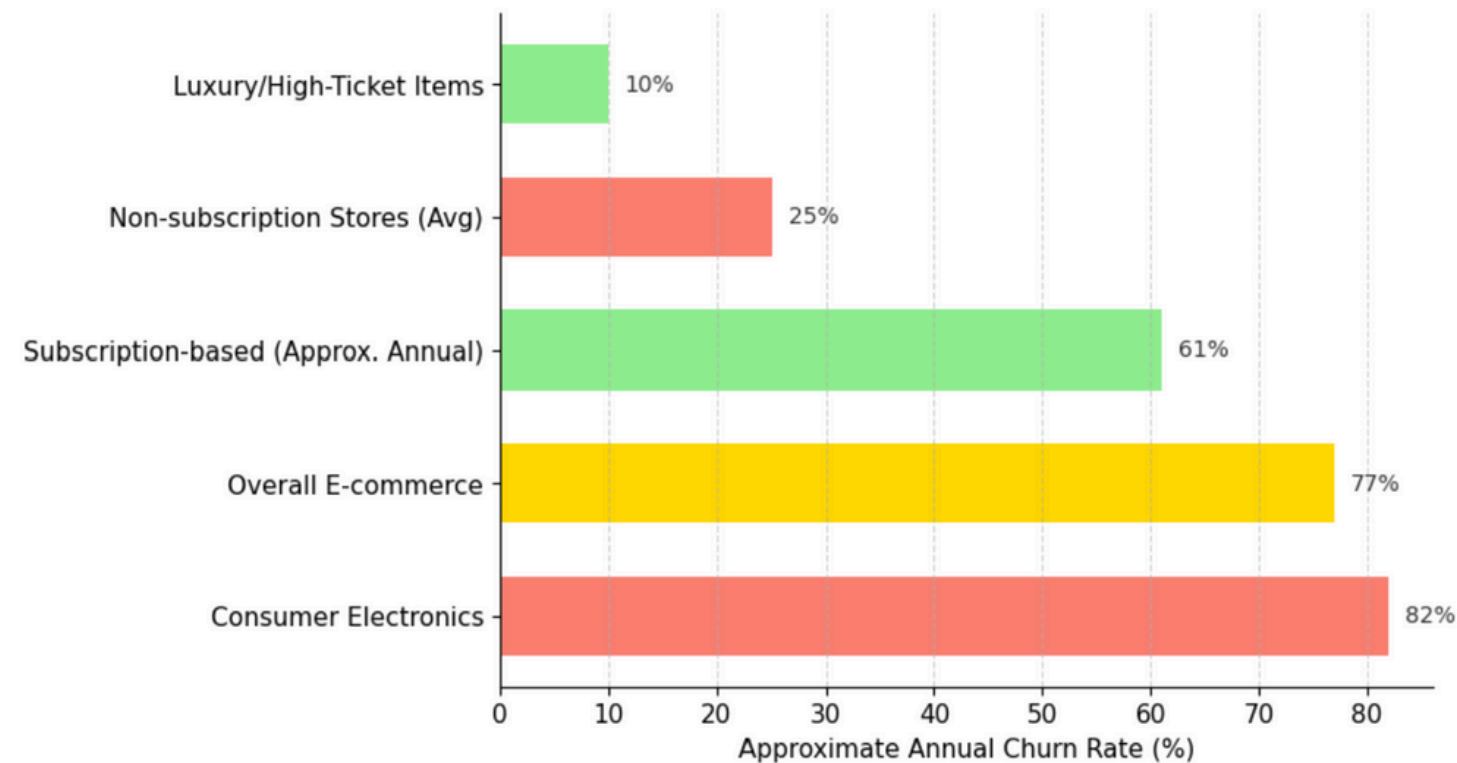
E-commerce Churn Prevention Roadmap

Transform your online business into a revenue-generating powerhouse with personalized strategies. Today I shall guide you through building, scaling, and optimizing your digital storefront for maximum profitability.

E-commerce Churn Reduction using the AI Marketing Canvas

Background

E-commerce Annual Churn Rates by Category

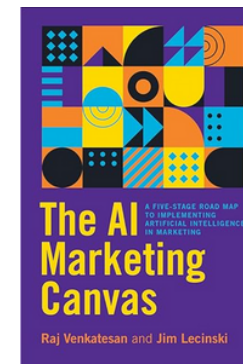


Business Questions

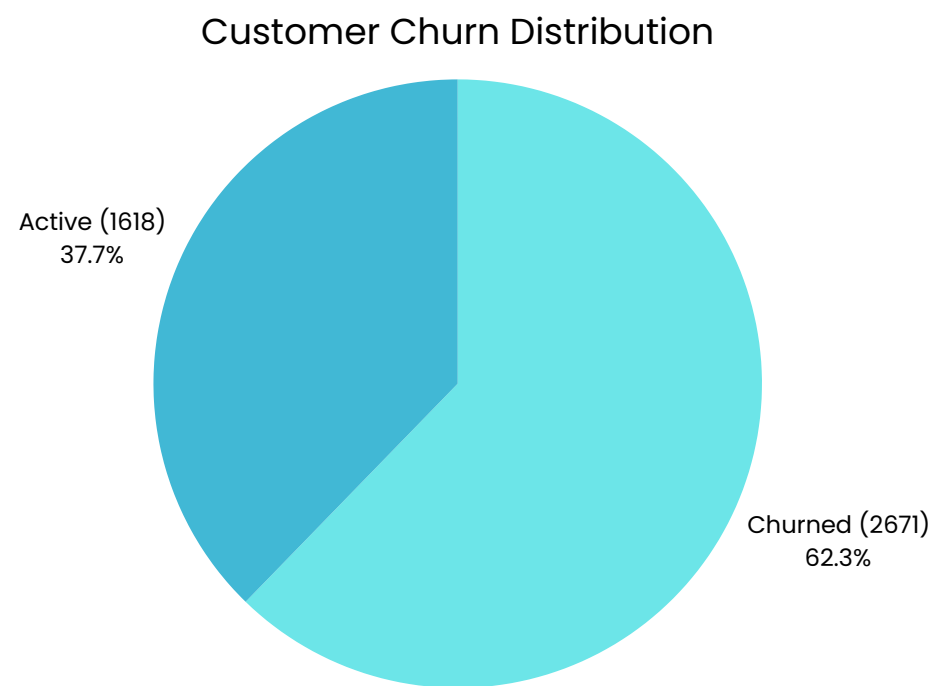
- How can we reduce 'The churning rate' of a E-commerce business?
- How can we improve ROI?
- What number customers can be saved from churning annually?

The Solution (Using AI marketing Canvas)

- **Foundation:** Dataset, RFM, Churn Labeling
- **Experimentation:** EDA & Predictive modeling
- **Expansion:** Segmentation, Strategy, EV
- **Transformation:** Agentic AI, RAG Chatbot
- **Monetization:** Fin. Results & Future opportunity



Foundation: Data & Infrastructure



Data Source

The dataset comes from the **UCI ML Repository** and contains real transactional records from **a UK-based online retailer selling gift products**.



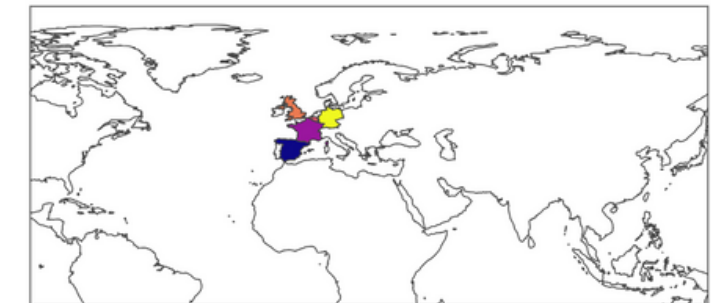
Data Preparation & Feature Engineering:

Data was cleaned (missing data, outliers removed) and extensively engineered to create over **20 rich, predictive features** (e.g., basket characteristics and customer-level aggregates).



Customer-Centric Schema (RFM)

Calculated core **Recency**, **Frequency**, and **Monetary (RFM)** metrics for all unique customers (4312).

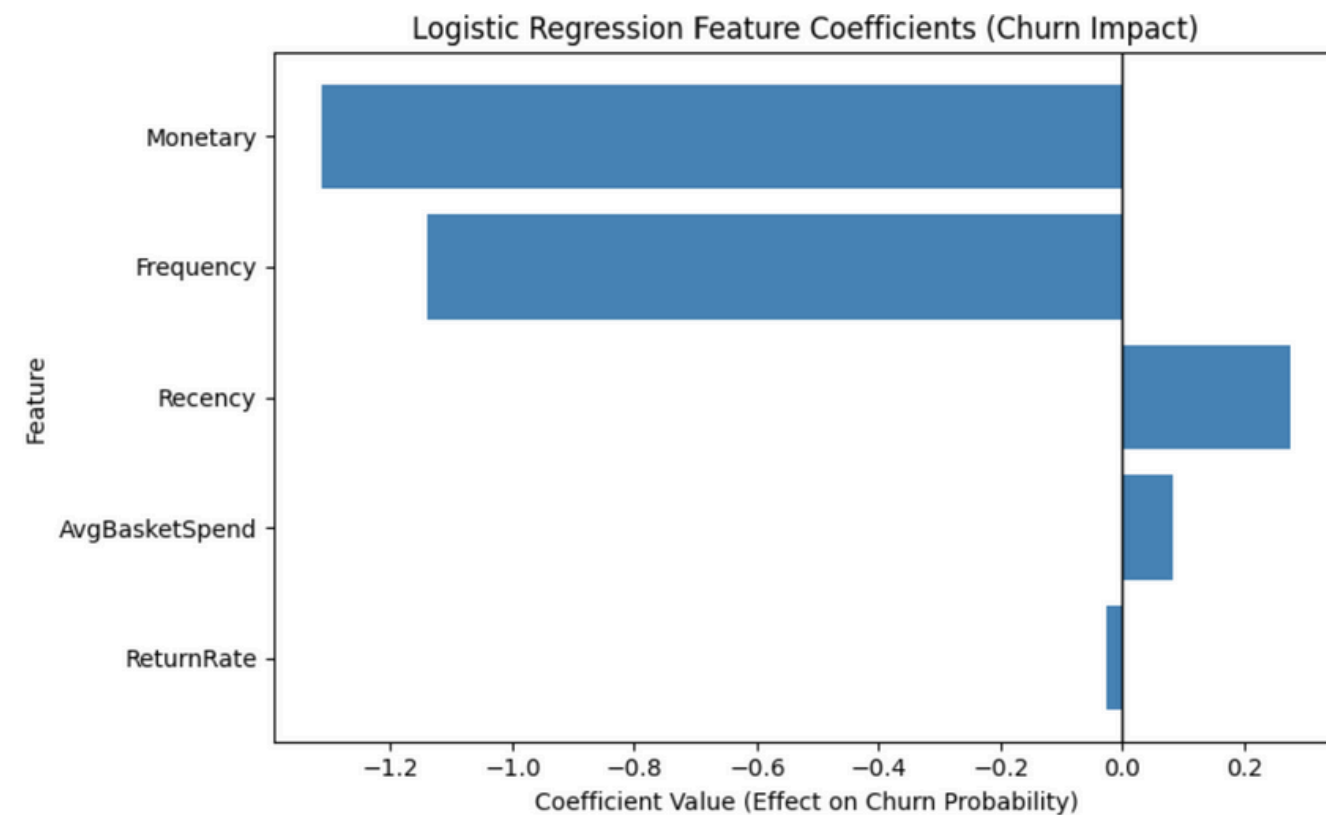
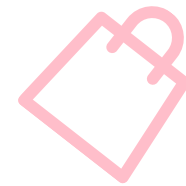


Churn Labeling

Defined the Churn Label (the core predictive target) as no purchase within the last 90 days, establishing a binary metric for retention success.



Experimentation: Testing Predictive AI & Insights



Goal

Conduct initial, targeted pilots to generate business insights and validate the power of predictive models for customer retention.



High Churn Risk

The current churn rate is **62.28% (2,671 out of 4,289 unique customers classified as churned)**, identifying retention as the immediate value pocket.



Market Concentration Risk:

The business is overwhelmingly dependent on its domestic market, with the United Kingdom accounting for **83.3%** of all sales.

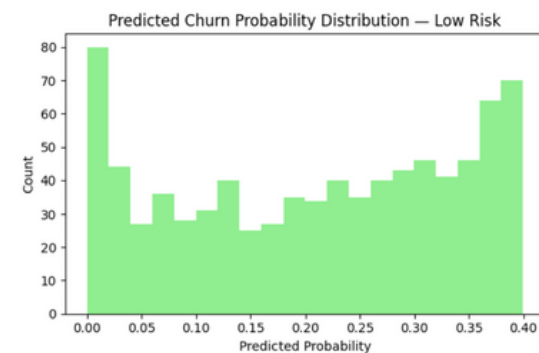
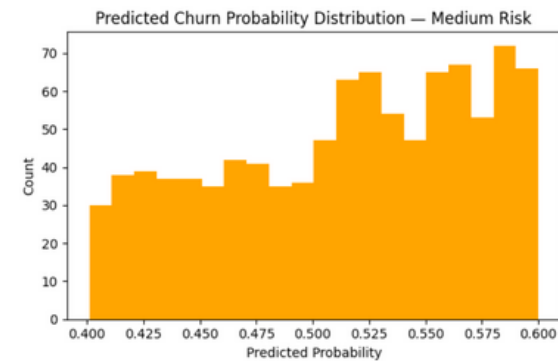
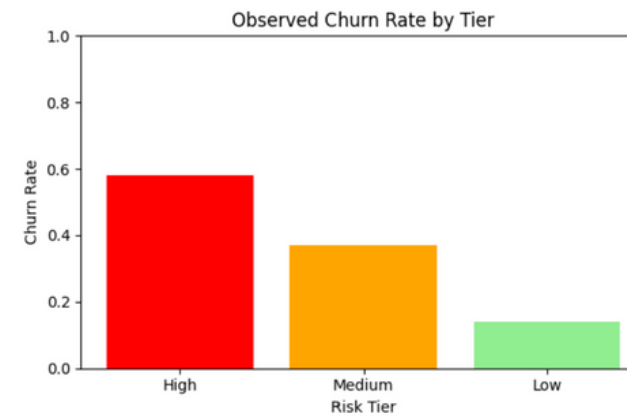
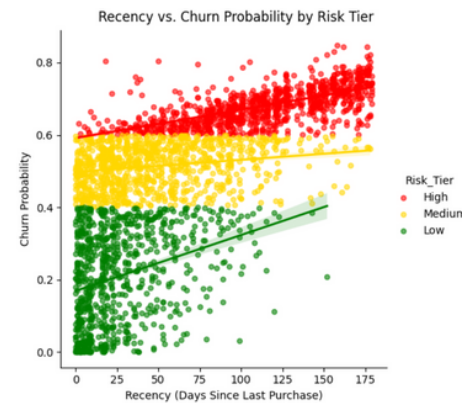
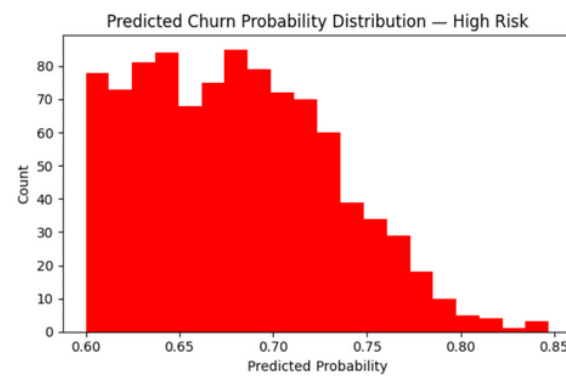


Predictive Modeling

The churn model is predictive (**AUC: 0.723**), identifying *Monetary Value* and *Frequency* as the strongest drivers for customer retention.



Expansion: Optimization & Segmentation



Goal

Scale the validated predictive insights by creating a holistic, financially prioritized *prescriptive strategy* across defined customer segments.

Risk-Based Segmentation

Grouped into **Low**, **Medium**, and **High** Risk tiers. **69.8%** of the customer base falls into the Medium or High-Risk tiers.

Tiered Prescriptive Strategy

Hit the High-Risk customers with immediate, **low-cost win-back**, but upsell **loyalty by CLV** to the Low-Risk customers.

Financial Optimization

Expected Value (EV) for every customer and action (e.g., email, sms, call+coupon) to optimize for the most profitable intervention.

Transformation: Reinforcement Learning Implementation

Goal

Transform the marketing function by deploying dynamic AI systems for personalized interaction & human-in-the-loop decision making.

Dynamic Policy Optimization

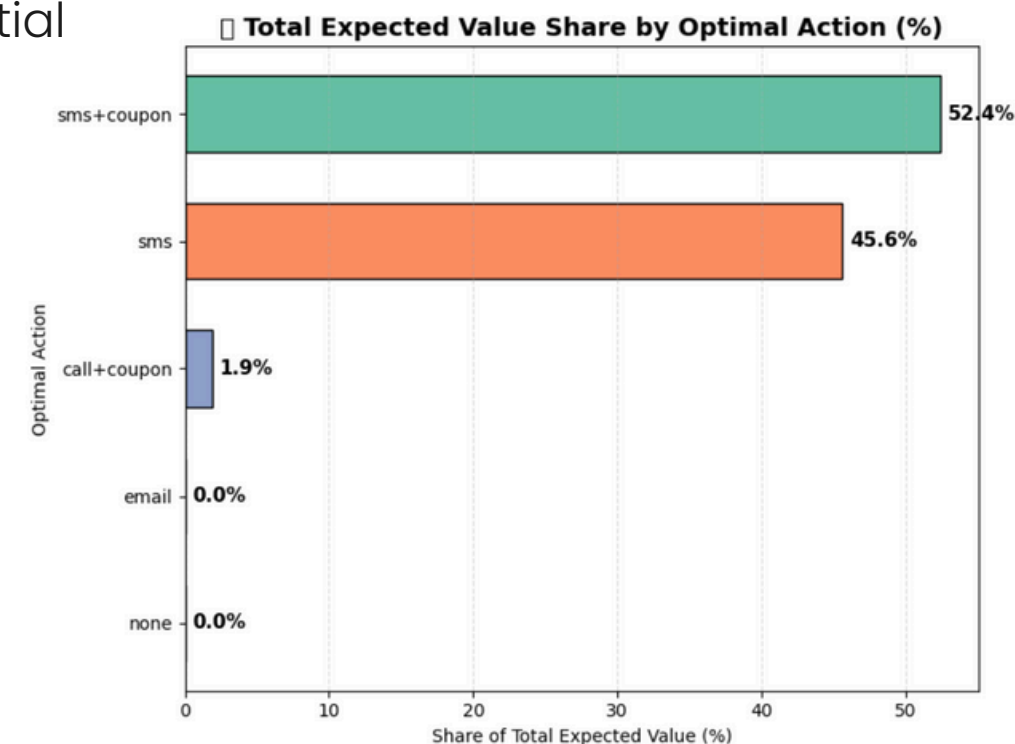
LinUCB Contextual Bandit model continuously learn & recommend the *single most optimal retention action* for every customer based on their unique **RFM**/Context features.

Results

The *bandit model* recommended the *sms+coupon action* for the largest number of customers in the initial simulation, indicating its high estimated reward.

RAG Chatbot

Gemini-powered *RAG Chatbot* to serve as a decision-support tool, enabling marketers to instantly query *optimal retention policies* and complex customer profiles using natural language.



Customer Intelligence Pipeline

A unified system that transforms raw retail data into retention actions and intelligent recommendations.

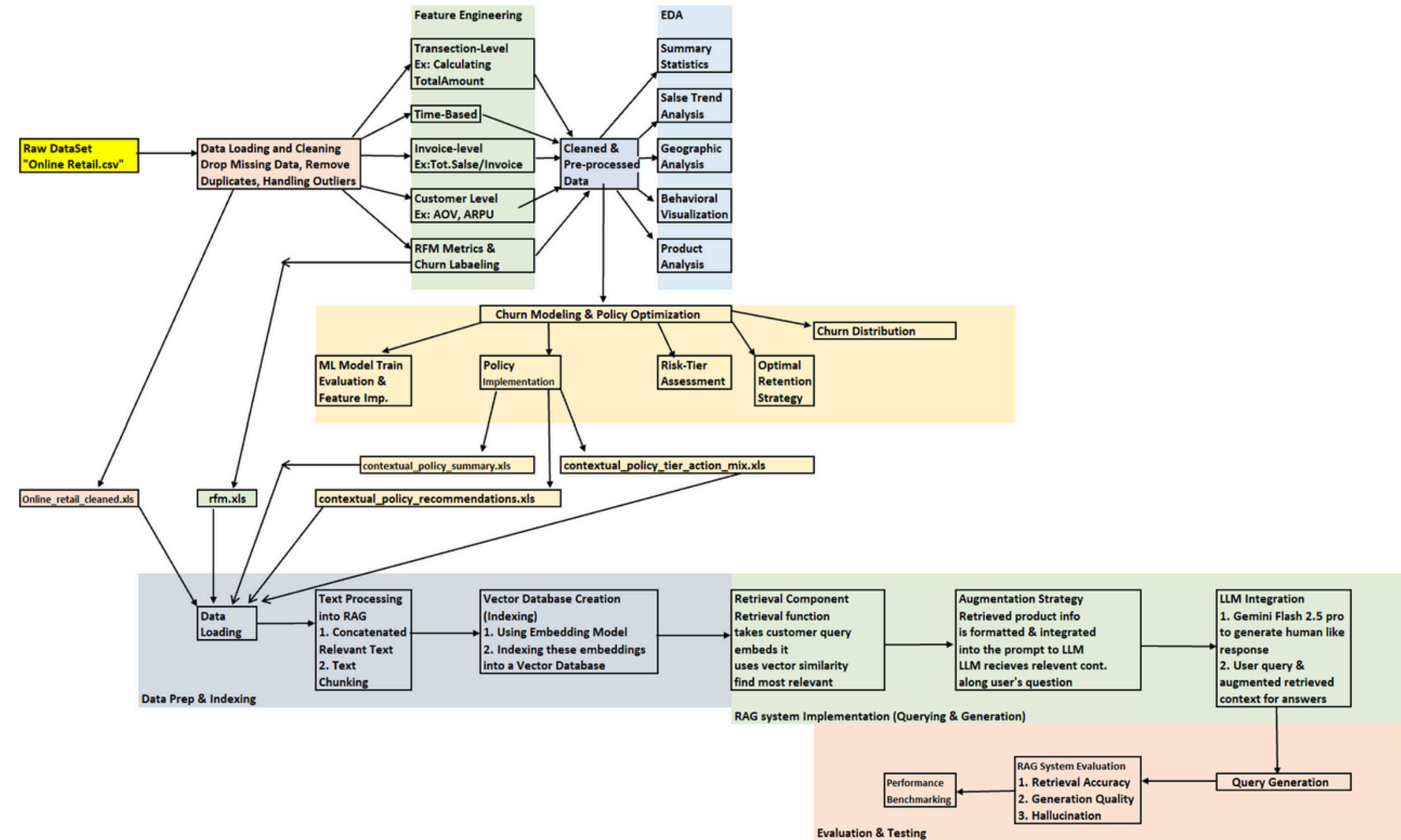
Predictive Modeling + Generative AI

An integrated design where machine learning informs strategies, and generative AI operationalizes them.

Enterprise-Ready AI Workflow

A production-oriented framework designed for scalability, automation, and continuous evaluation.

The Architecture



Monetization: Financial Results

4289

2671

1437



Total Revenue

£6M

Total Expected
Retention Cost

£27k


Tot. Exp. Value after
taking retention policies

£2M*


New Expected Churn Rate

29%

Avg Revenue Per Customers, ARPU = 6 Million / 4289 = GBP 1391.47 per customer. Customer Saved = 2 Million / 1391.47 = 1437 customers. New Churned Customers = 2671 - 1437 = 1234 customers. New Churning Rate = 1234 / 4289 = 28.77% ~ 29%




Monetization: Future Opportunity



Dynamic Pricing Strategy

Use *churn probability* and *Monetary Value* to power a dynamic pricing engine, minimizing unnecessary discounts.




Feature Enrichment

Incorporate external and unstructured data sources.. More feature
= Better prediction =
Best ROI

AI-As-A-Service (AIAAS) Productization

Combines the *Contextual Bandit* for dynamic action selection and the *Gemini-powered RAG Chatbot* for decision support.





Metric Incompleteness

Total Expected Value is based only on revenue (sales) and does not account for the Cost of Goods Sold (COGS) or the Cost of Retention Strategies.



The \$2M Value is not Guaranteed

Total Expected Value is a statistical mean. By definition, an expected value, meaning the actual retained revenue could be higher or lower.



Monetary Value Simplification

Ignores the time value of money & fails to account for potential upsells, cross-sells, or natural spending degradation over time.



Limitations

Data and Modeling Bias

The model relies only on RFM features, ignoring customer service history or product return rates data that are strong predictors of true churn.



**This is how we can prevent
churning in a E-commerce
business. Thanks You.**



Any Questions?



Appendix





Customer Insights & Profiles (all 2671 customers profile queries)

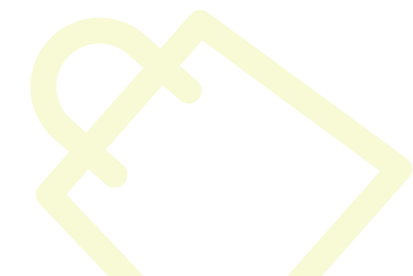
- **What is the RFM summary for Customer 13362, 18272??**
- Which customers have the highest Recency scores in the dataset?
- Identify customers with high Monetary value but low Frequency.
- Identify customers with highest Monetary value but low Frequency.
- Show me the top 3 most loyal customers based on purchase history.
- How many active customers made purchases in the last 30 days?
- What trends can you see in the purchasing behavior of repeat buyers?
- Which customers are most likely to upgrade to premium offers?

Retention Policy & Recommended Actions

- What retention strategy is recommended for Customer 16660?
- **Which customers should receive discount-based campaigns?**
- Which action plan has the highest average ROI?

ROI & Investment Analysis

- If I invest \$1 in a retention program, what's the expected return?
- Which campaign type delivers the highest ROI by segment?
- **Show the top 3 actions sorted by ROI per dollar invested.**
- Identify customers with negative or low ROI actions.





Churn Prediction & RFM Segmentation

- Which factors contribute most to churn probability?
- Identify customers predicted to churn in the next 90 days.
- What's the average Monetary value for churned customers?
- What's the average Monetary value for non-churned customers?

Knowledge Grounded Q&A (RAG Use)

- What are the main takeaways from the RFM segmentation analysis?
- Summarize the correlation between Recency and churn likelihood.
- Provide a short executive summary of this project's key findings.

Operational / Debug Questions

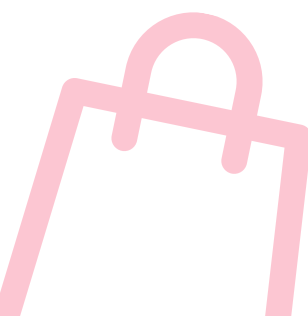
- Which embedding model is the RAG chatbot using?
- What parameters control chunk size and overlap?
- How does the chatbot retrieve and rank relevant documents?
- What's the difference between embedding and retrieval stages?

On next slide,

Red = High Risk customers

Yellow = Medium Risk Customers

Green = Low Risk Customers



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