Capstone Project

Explaining and predicting customer churn for ClientCo

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Agenda

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    - Churn Impact
    - Actual Problem
2. **Solution Overview**
    - Expected Outcome
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    - Demand Prediction
4. **Business Impact**
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Introduction

ClientCo is an international construction and renovation products distributor. Its core business consists of buying products from suppliers and reselling them through a network of point distributions dedicated to B2B Channels.

Churn Impact on ClientCo

- Limited digital engagement
- Increasing debt costs
- Environmental and regulatory pressures
- Supply chain inefficiently
- Improper handling of customer relationship

Actual Problem's

- **30%** of the customer base of ClientCo has **not** purchased in the **last 6 months.**
  - **53%** of the customers that have not purchased come from sales at **the store, 43%** from sales **by phone** and the rest from the other channels.

- Based on the Average **CLV $109,826.08** and the **50,772 customers that have not purchased in the last 6 months**; there is a **financial impact of $5.5 billion.**

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Financial analysis

Balance sheet

- Rise in goodwill and inventories
- Exponential growth of long term assets in 2006

Cashflow Statement

- Lack of significant dividends in 2011 and 2012 indicates a business reinvestment
- Regular increases in long term debit

Income Statement

- Gross profit shows stable growth year over year

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Solution Approach

Use our insights to personalize customer interactions, enhancing our marketing and loyalty programs. Personalized interactions are more effective, so we'll target at-risk customers with customized marketing depending of their most use channel.

Expected Outcomes

Reduced Churn Rates
-
Using the Churn Model

Increased Customer Lifetime Value
-
Using the Cluster Model

Optimized Inventory Management
-
Using the Demand Prediction Model

=

Higher Sales and Revenue

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Models Development

Churn Prediction Model

Targeting the customers that are going to churn so that we would be able to take measures and keep them.

Demand Prediction Model

Predicting the demand during a certain month and help the company reduce storage cost.

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Models Development

Churn Prediction Model

Churn Labeling

Exploration

- Threshold for recency
- Confidence interval
- K-means
- K-means + confidence interval
- K-means + 3 * purchase interval

Result

- Windows of whether the customer has purchased or not (2 months prediction)

window	0	1	2	3	4	5	6	7	8	9	10	11	12
client_id													
6	1	1	0	1	1	0	0	3	3	0	0	3	0
7	0	0	0	0	0	1	0	1	0	0	0	0	0
14	27	42	42	42	42	43	39	46	40	43	41	45	1
18	12	26	24	25	22	26	24	26	21	27	20	32	1
25	0	0	0	0	0	0	1	0	0	0	0	0	0

Models Development

Churn Prediction Model

Model - XGBoost

Evaluation - *F1 Score: 0.84*

Model evolution

	window	f1_score	roc_auc	accuracy
0	3	0.787780	0.847353	0.785684
1	4	0.790483	0.853984	0.792009
2	5	0.800059	0.850398	0.777489
3	6	0.797245	0.858937	0.790989
4	7	0.797146	0.860591	0.787853
5	8	0.788965	0.870457	0.795831
6	9	0.796392	0.876691	0.798744
7	10	0.795682	0.880946	0.801283
8	11	0.837898	0.891110	0.811055
9	12	0.745712	0.890776	0.828201

```
Window 3: Positive ratio = 0.51
Window 4: Positive ratio = 0.51
Window 5: Positive ratio = 0.56
Window 6: Positive ratio = 0.53
Window 7: Positive ratio = 0.53
Window 8: Positive ratio = 0.50
Window 9: Positive ratio = 0.51
Window 10: Positive ratio = 0.51
Window 11: Positive ratio = 0.56
Window 12: Positive ratio = 0.35
```

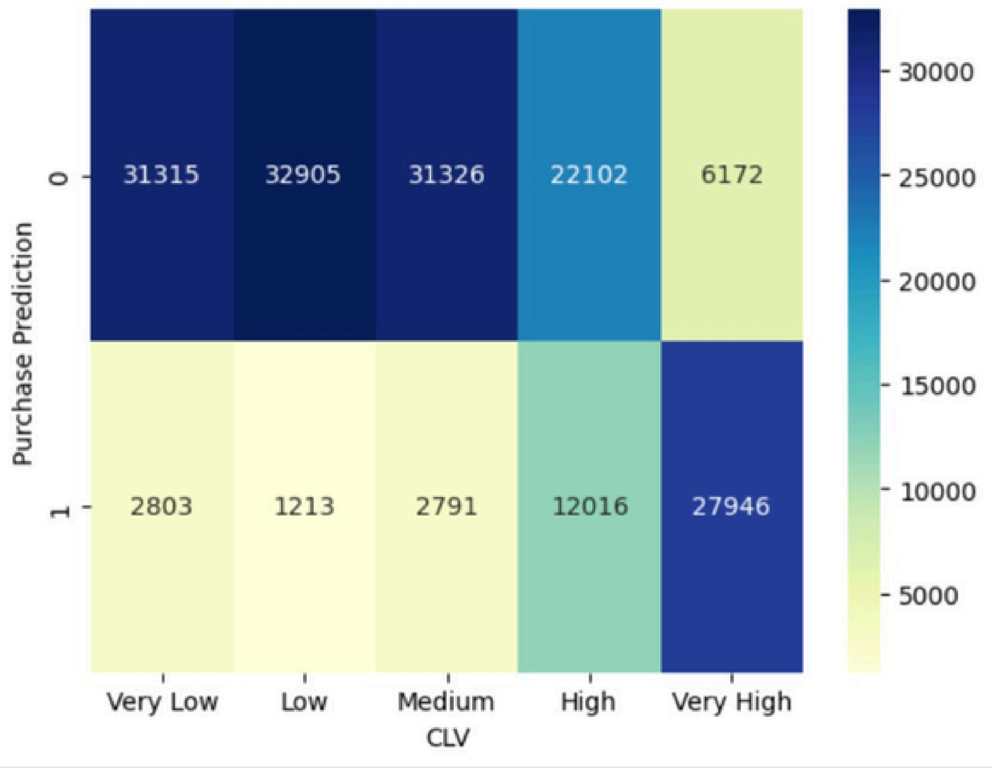
client_id	most_common_order_channel	most_common_branch	product_id	purchase_prediction
6	by phone	8470	169851	0
7	at the store	7453	121848	0
14	by phone	10319	2512504	1
18	at the store	6654	3000784	1
25	at the store	2876	91564	0

Models Development

Churn Prediction Model

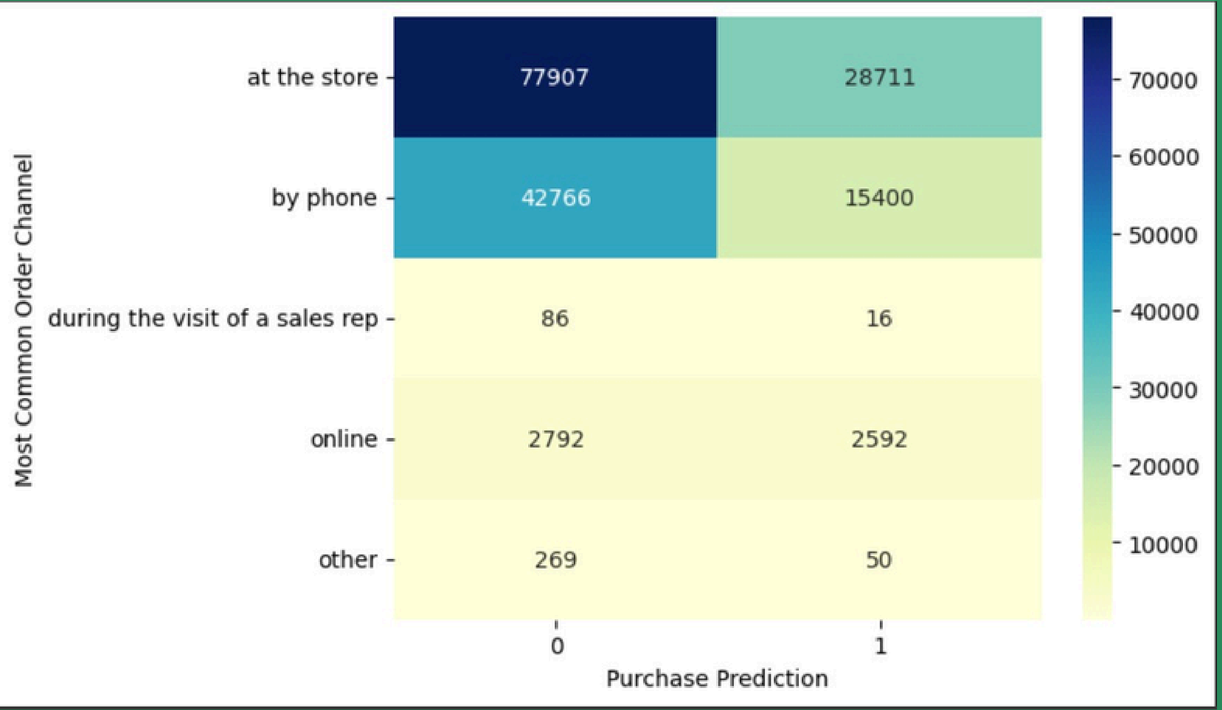
Use Case I

Targeting the high value customer that are churning



Use Case II

Encourage customers that are purchasing mostly by phone to transition to online purchases



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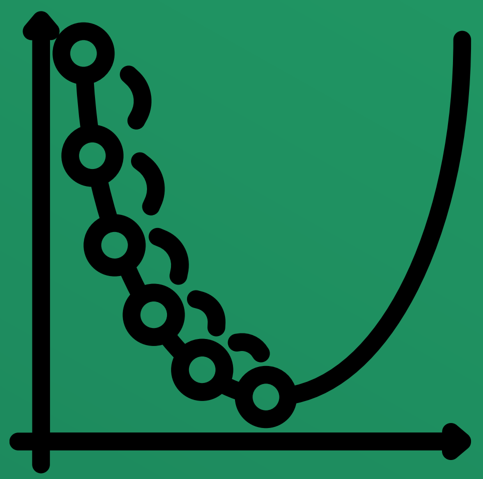
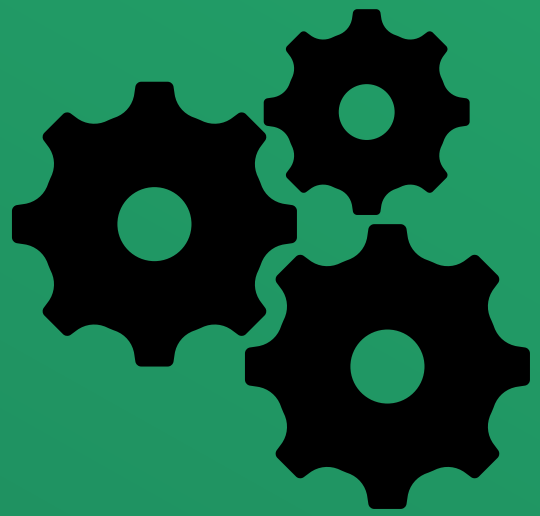
Models Development

Demand Prediction

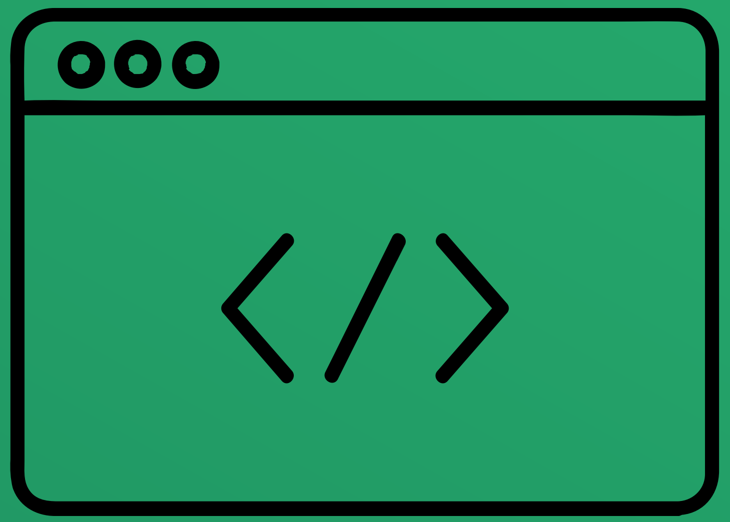


Model - XGBoost



Explanatory Variables

- *Client*
- *Product*
- *Branch*
- *Order Channel*
- *Purchase Month*



Target Variable

- *Quantity*

Evaluation

- MAPE 1.26
- MAE 49.86

Supply Chain Ops Support

Business Impact

- Improved Customer Retention
- Increased Customer Lifetime Value
- Better Demand Forecasting and Inventory Management
- Enhanced Sales and Revenue
- Data-Driven Decision Making

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Financial Impact (Churn Predictive Model)

Customer Base and Purchase Behavior

- **Customer Base:** 170.589 unique customers
- **Customers not purchasing in the last two months:** 78.565 customers (46%)

Model Performance Metrics

- **F1-Score of the Model:** 0.84
- **Average Customer Lifetime Value (CLV):** $109,826.08

Financial Impact Estimation

- Total Revenue Saved = True Positives × Average CLV
- **Total Revenue Saved** = 7.252.747.760,60

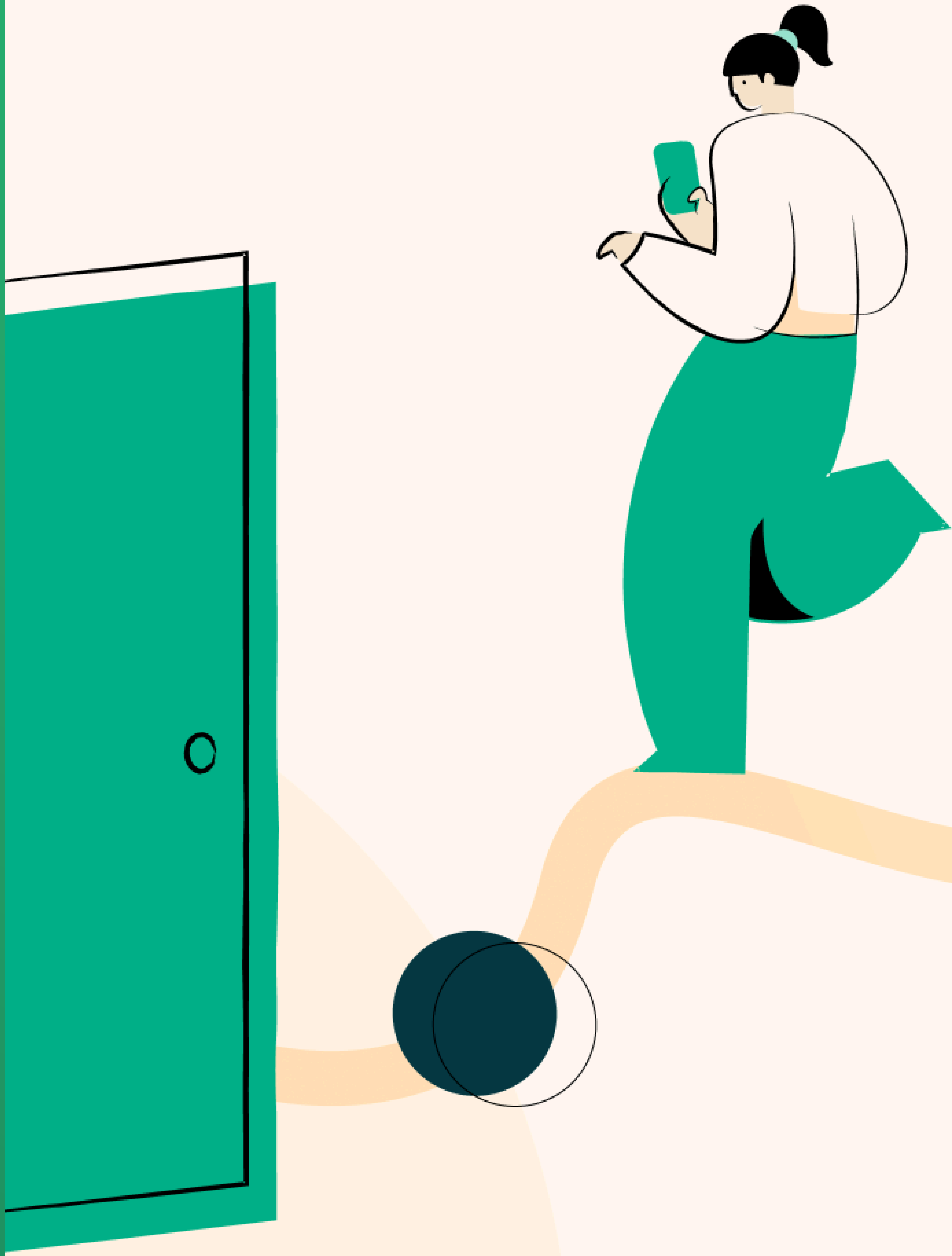
Call to Action

Enhance Online Channel Presence

- Transition phone customers to online purchases with incentives.
- Develop a user-friendly e-commerce platform with personalized recommendations.

Address Customer Churn

- Reactivate high CLV customers not expected to purchase soon through personalized outreach.



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Call to Action

Demand Forecasting

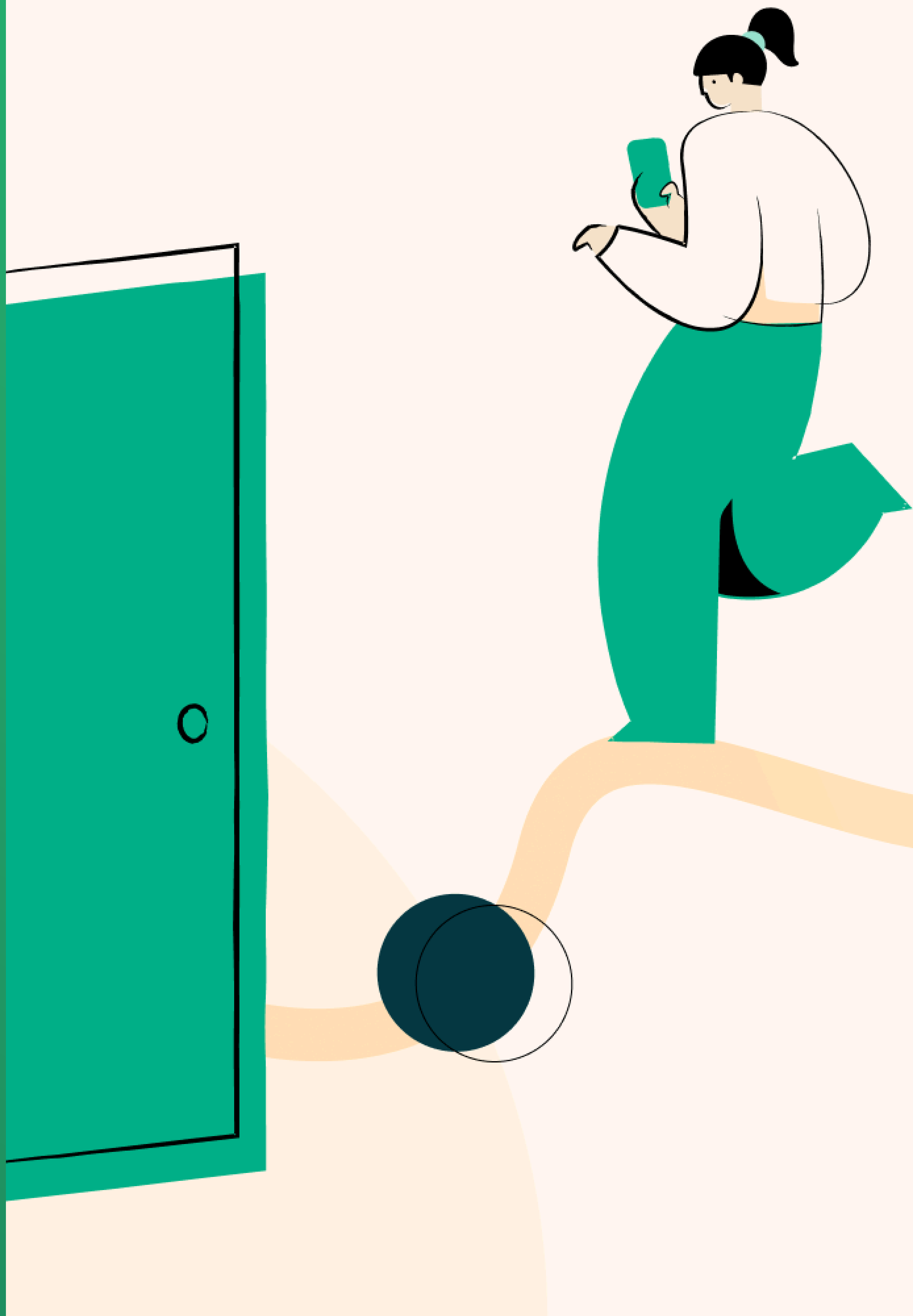
- Utilize the demand prediction model to align inventory with forecasted demand, reducing stockouts and excess costs.

Branch Performance Improvement

- Share best practices from high-performing branches and provide targeted support to underperforming ones.

Monitoring for Data Drift

- Regularly retrain models with new data or use data drift detection techniques to determine the optimal retraining period.



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Q&A

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