Customer Happiness Analysis in On-Demand Delivery Services

Survey Insights and Predictive Modeling Foundation

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Background

- Our company is one of the fastest-growing startups in the logistics and on-demand delivery domain.
- We collaborate with several partners to ensure timely delivery and operational excellence.
- As part of our global expansion, maintaining and enhancing customer happiness is a strategic priority.
- Understanding what makes customers happy—or unhappy—helps us design better operational processes and service strategies.
- To this end, we conducted a customer satisfaction survey across a select customer cohort to collect feedback on multiple dimensions of our service experience.

Survey Variables

Target Variable

Y: Customer Happiness Indicator

Binary variable representing overall customer sentiment:

- **1 = Happy Customer**
- **0 = Unhappy Customer**

Features (X1–X6)

Each is rated on a scale of **1 to 5**, higher indicates stronger agreement:

- **X1:** My order was delivered on time
- **X2:** Contents of my order were as I expected
- **X3:** I ordered everything I wanted to order
- **X4:** I paid a good price for my order
- **X5:** I am satisfied with my courier
- **X6:** The app makes ordering easy for me

Survey Context and Purpose

- Feedback is critical to identify operational gaps and prioritize improvements.
- The data will serve as the foundation for building predictive models of customer happiness.
- Insights will guide:
  - Courier training and performance management.
  - App usability enhancements.
  - Pricing and offer optimization.
- The remaining dataset will be reserved as a private test set for validation.
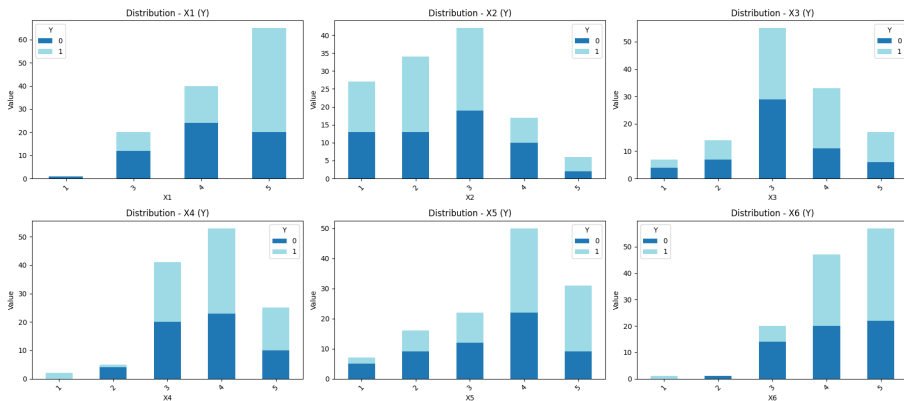
Descriptive Analysis

Figure: Survey results

How We Analyzed the Data

- Our goal is to understand what makes customers happy or unhappy based on their survey responses.
- We used statistical and machine learning techniques to predict customer happiness from six key factors (X1–X6).
- The analysis process followed three main steps:
  1. **Data Preparation:** Cleaned and organized customer feedback data.
  2. **Model Training:** Trained several algorithms to learn relationships between responses and happiness.
  3. **Model Evaluation:** Compared model results using a key metric called **recall rate**.
- This approach ensures that we not only predict happiness accurately but also identify potential operational gaps causing dissatisfaction.

Why We Used These Three Models

- To balance simplicity, interpretability, and reliability, we used three models:
  - **Logistic Regression:** Provides a clear, mathematical explanation of how each factor affects customer happiness.
  - **Ridge Classifier:** A variation of logistic regression that handles overlapping or correlated factors more effectively.
  - **Quadratic Discriminant Analysis (QDA):** Captures more complex patterns in customer behavior while still being fast to compute.
- These models are well-suited for our data:
  - Small number of features (6 survey questions).
  - Closed-form, analytical solutions — meaning quick, reliable results.
  - Easy to interpret and communicate to business stakeholders.

Why Combine Models?

- Individual models have different strengths and weaknesses.
- By combining them, we can leverage the best aspects of each.

Voting Classifier

- Takes the majority "vote" from all models.
- Provides a stable, balanced prediction.
- Useful when models agree on common patterns.

Stacking Classifier

- A more advanced approach that uses another model (Random Forest) to learn how best to combine predictions.
- Captures subtle relationships that simple voting may miss.
- Produces higher accuracy and robustness.

Why We Focused on Recall Rate

- We measured model performance using the **recall rate**.
- Recall measures how well the model identifies all **unhappy customers**.

Reason for Choosing Recall

- Our business goal is to reduce customer dissatisfaction.
- Missing an unhappy customer is more costly than mislabeling a happy one.
- A higher recall rate means fewer unhappy customers go unnoticed — enabling faster service recovery and process improvement.

- This focus aligns with our commitment to continuously improving customer experience.
- The recall score helps operational teams prioritize corrective actions where they matter most.

Model Comparison Summary

- The table below shows the **recall rate** of each model.
- Recall reflects how well each model identifies **unhappy customers**.

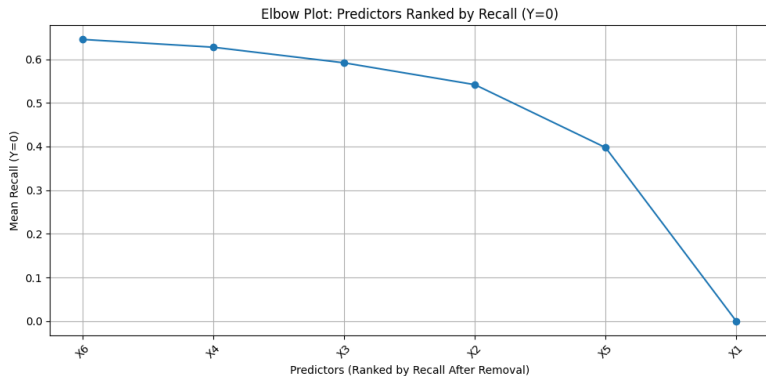| Model	Recall Score
Quadratic Discriminant Analysis (QDA)	0.61
Logistic Regression	0.64
Ridge Classifier	0.64
Voting Classifier	0.64
Stacking Classifier (Best)	**0.75**

Variable Selection

Figure: Feature ranks in UNHAPPY customers

Key Findings

- The analysis shows that three operational areas have the strongest influence on customer dissatisfaction:
    1. **Delivery Timeliness:** Late deliveries are the most common driver of unhappiness. Customers expect reliability, and delays directly erode trust in the service.
    2. **Order Accuracy:** Incorrect or incomplete orders significantly impact satisfaction. Even small mismatches between what was ordered and what was received create frustration and increase support costs.
    3. **Courier Service Quality:** The delivery experience itself—courier professionalism, attitude, and communication—strongly shapes how customers perceive our brand.

- These insights suggest that operational improvements should prioritize:
    - Strengthening last-mile logistics to reduce delivery delays.
    - Enhancing order verification and fulfillment accuracy through better warehouse and partner coordination.
    - Investing in courier training, incentives, and service standards to elevate the customer experience at the doorstep.

Future Strategies

- **Current Limitation:** The analysis is based on a relatively small sample size from a select customer cohort. While findings are directional and actionable, broader conclusions require more data across different regions, partners, and service types.

- **Future Strategies:**
  1. **Expand Feedback Collection:** Launch structured, lightweight feedback prompts post-delivery to increase response volume and diversity.
  2. **Prioritize Root Cause Interventions:** Use current insights to target service areas causing dissatisfaction—on-time delivery, order accuracy, and courier training.
  3. **Operational Experimentation:** Deploy A/B tests on process changes (e.g., delivery time buffers, quality checks) and monitor impact on customer sentiment.

Thank You

We appreciate your time and attention.