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Analysis of Influencing Factors on Service Satisfaction of Online Delivery Riders from the Customers' Perspective

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ABSTRACT

Taking the customer perspective as the entry point, this study conducts an in-depth analysis of the influencing factors on customers' satisfaction with the services provided by online delivery riders; with the rapid development of the Internet and mobile payment, online delivery services have become an integral part of residents' daily lives, and their service quality is directly linked to customer satisfaction and the development progress of delivery platforms. The study collects a large volume of data regarding customers' evaluations of online delivery riders' services through questionnaire surveys and employs statistical analysis methods to process and analyze the data. The results indicate that key factors affecting customer satisfaction include delivery speed, service attitude, delivery accuracy, delivery safety, and after-sales handling; based on these findings, the study proposes targeted improvement suggestions, which provide references for online delivery platforms to enhance service quality and boost customer satisfaction, aiming to facilitate the healthy development of the industry.

KEYWORDS: *Online Delivery Service; Customer Satisfaction with Service; Logistic Regression.*

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1. INTRODUCTION

The iterative upgrading of mobile Internet technology has driven the continuous upgrading of residents' consumption structure and spawned massive demands for the "lazy economy" and "home economy", with the takeaway industry's development aligning precisely with this trend. As a core part of modern service industries, the online delivery sector has boomed relying on mobile Internet; as the terminal logistics link, its service quality, efficiency and cost directly impact consumers' meal-ordering experience, given the need to deliver goods timely and intact. With China's per capita GDP exceeding 10,000 US dollars, residents' disposable income and consumption scale have grown steadily, and demands for timeliness have risen sharply—traditional three-day delivery can no longer meet needs for instant categories like catering, fresh food and medicines. Online delivery services, with millions of riders active daily in cities, have become indispensable "new infrastructure" for urban life.

As the key link between merchants and customers, online delivery riders' service quality directly affects customer experience and satisfaction, further impacting merchants' reputation, performance and the industry's healthy development. Customer satisfaction, a core indicator of service quality influenced by multi-dimensional factors, has been studied extensively in logistics, catering and e-commerce, but research on its influencing factors in online delivery (from the customer perspective) remains insufficient. In-depth research on this topic helps platforms grasp customer needs, optimize operations and improve service quality: high satisfaction boosts platform usage frequency, word-of-mouth communication and repeat usage willingness. For takeaway O2O platforms and merchants to gain competitive advantages, they must control logistics service quality effectively, enabling customers to perceive service value, form satisfactory experiences and enhance repurchase and recommendation intentions.

2. Reliability and Validity Testing

This study adopted Cronbach's α coefficient to test the internal consistency reliability of the

questionnaire, with the test objects being the 5 core items of the satisfaction dimension of online delivery services (on-time delivery, correctness of goods and quantity, good preservation of goods, service attitude of delivery staff, and overall satisfaction). The test results showed that the overall Cronbach's α coefficient of this dimension was 0.926, which is higher than the excellent standard of 0.9, indicating that the questionnaire has good internal consistency.

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_y^2}\right)$$

To test the construct validity of the questionnaire, Exploratory Factor Analysis (EFA) was employed. First, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were conducted to verify the suitability of factor analysis. The results showed that the KMO value was 0.847 (≥ 0.8), indicating a low partial correlation among variables and thus supporting the appropriateness of factor analysis. For Bartlett's test of sphericity, the chi-square statistic was 3256.781 (df = 10, $p < 0.001$), which rejected the null hypothesis that the correlation matrix is an identity matrix. This further confirmed the applicability of factor analysis.

Table 1 KMO Test and Bartlett's Test Results

Sufficiency Test	KMO Value	0.887
Bartlett's Sphericity Test	Approximate Chi-Square	3256.781
	df	10
	P	.000

3. Descriptive Statistical Analysis

3.1. Basic User Profile

The user portrait of online delivery service users presents the following characteristics: in terms of gender distribution, females account for 53.8%, slightly higher than males at 46.2%, showing a relatively balanced structure; regarding age, the 18-25 age group is dominant (187 users), followed by 26-30 (149 users) and 31-40 (91 users), while users aged 41 and above make up less than 10%, indicating that young people are the core group; in terms of usage frequency, over 40% of users (208 people) use the service 3-5 times a week and 178 people use it 1-2 times a week, with high-frequency and regular users forming the main body, and cross-analysis of gender and frequency shows no significant differences in usage habits between male and female users, as "3-5 times a week" is the primary choice for both genders.

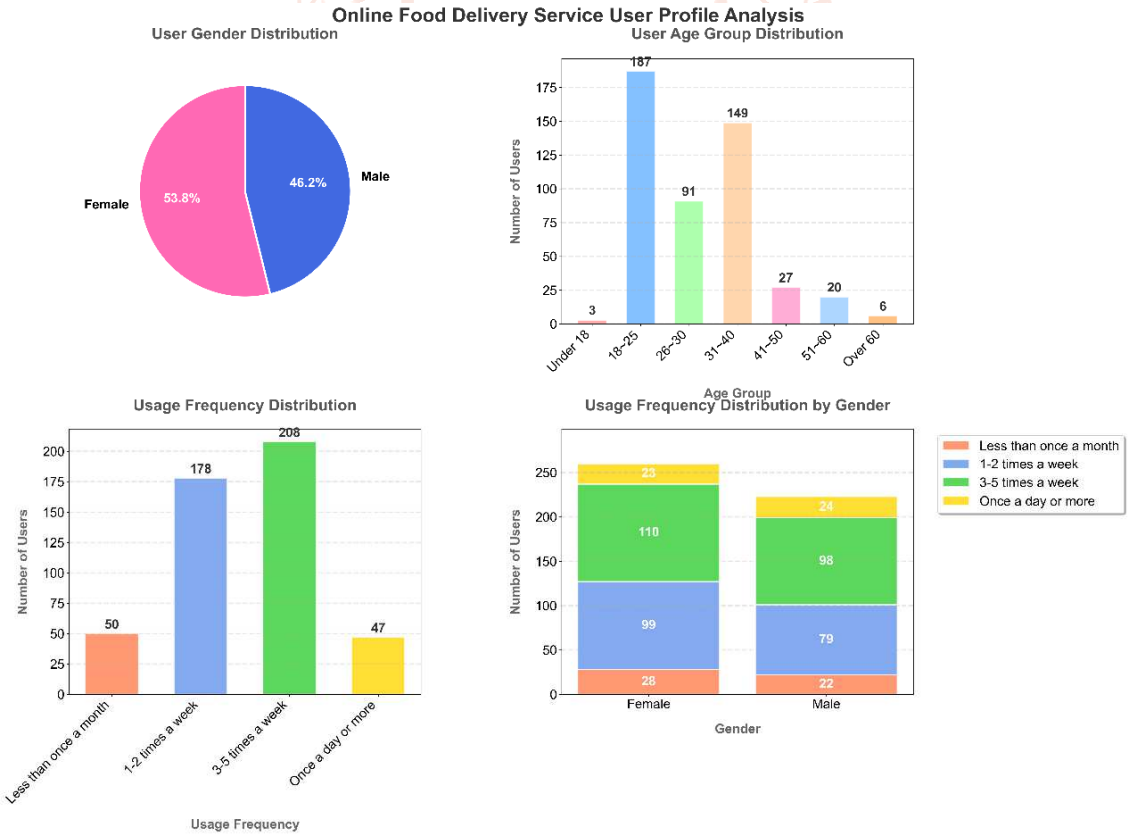

Figure 1 Basic User Profile

3.2. Online Delivery Usage Behavior

In terms of the delivery market structure, from the platform perspective (left chart), Ele.me dominates with a 36.5% share, while Meituan follows closely at 28.7%—together, the two account for over 65% of the market and serve as the core players in the industry. Among other platforms, Flash Express, SF Express, and Dingdong Fresh hold shares of 14.1%, 12.3%, and 7.3% respectively, with the remaining portion captured by other smaller platforms. From the service type perspective (right chart), fresh produce delivery is the most prominent segment (21.3%), while shares of other scenarios such as medicine delivery (15.5%), retail store delivery (13.7%), and errand delivery (9.0%) are relatively dispersed; an additional 29.0% of the share belongs to other uncategorized delivery service types.

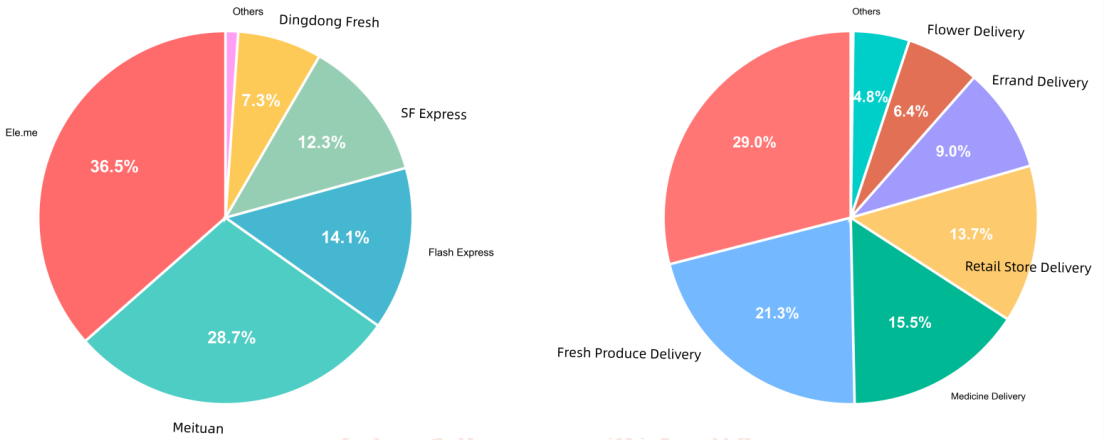

Figure 2 Online Delivery Usage Behavior

3.3Analysis of Delivery Riders' Attitudes and Safety Perceptions

This visualization captures user tolerance for delivery disruptions and concerns about safety: For slight cargo damage, 38.9% of respondents adopt an "Understanding & Tolerant" stance, with only 5.2% seeking compensation—reflecting broad leniency toward minor issues. Similarly, 50.1% of users "Urge but accept" 10–30 minute delays , with minimal cancellation or complaints (3.9%), indicating flexible timeliness expectations. However, safety emerges as a critical concern: 58.2% of users reported encountering riders' dangerous behaviors, and 56.7% viewed rushing behaviors as a "Serious safety threat", linking observed risks to strong safety awareness.

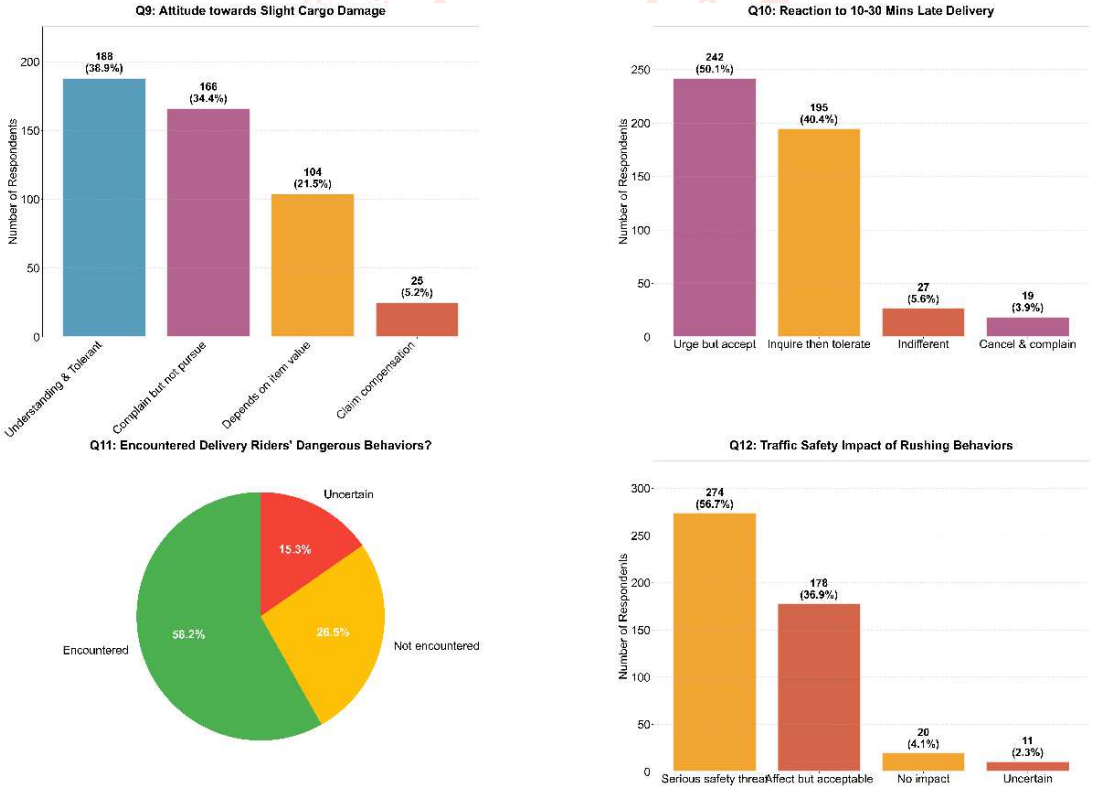

Figure 3 User Attitudes Toward Delivery Issues and Perceptions of Traffic Safety

Figure4 highlights user priorities in extreme contexts and engagement with riders: In bad weather (Q13), 76.0% of users prioritize "Allow delay ensure safety," while just 10.4% favor timeliness—establishing safety as a non-negotiable expectation. For rider support (Q14), low-effort, high-impact actions dominate: "Reduce urging & allow time" (19.3%) and "Provide clear address" (18.3%) are the most common behaviors, whereas resource-intensive support is far less prevalent, aligning with practical, cooperative user-rider dynamics.

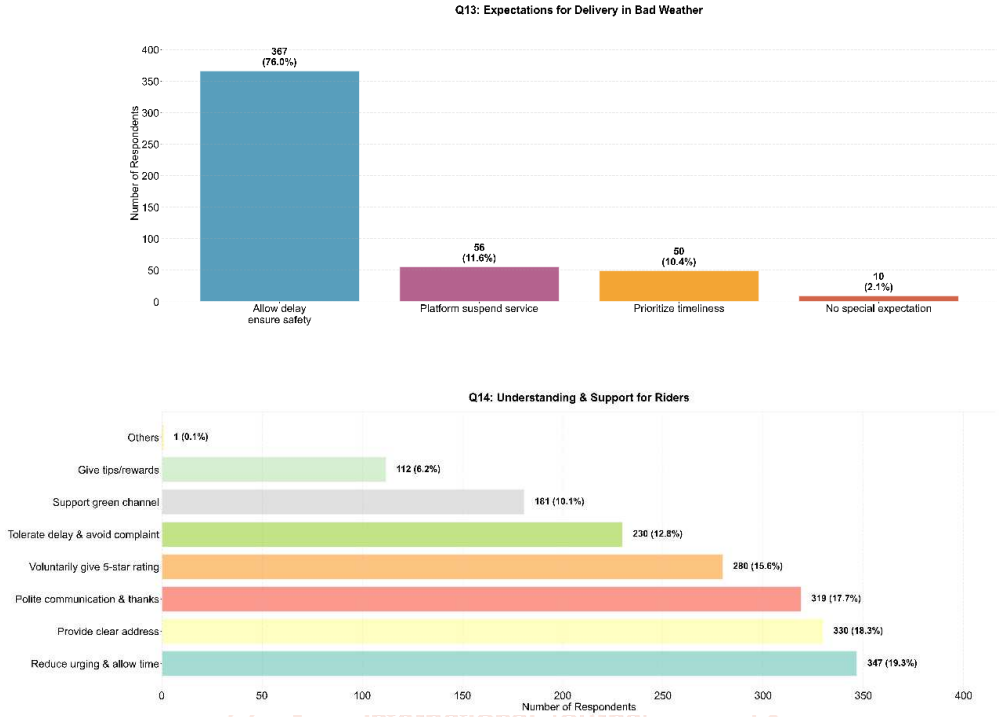

Figure 4 User Support Behaviors for Delivery Riders

This visualization summarizes user reactions to poor service and key behavioral patterns: When dissatisfied (Q15), 31.2% of users reduce platform usage (the top response), with 27.9% complaining to the platform—indicating that disengagement is preferred over confrontation. Core indicators reinforce earlier trends: Tolerance (80.8%) and safety-first expectations (76.0%) are high, while key behaviors (e.g., "Reduce urging," 71.8%; "Provide clear address," 68.3%) confirm that small, collaborative actions define user engagement with the delivery ecosystem.

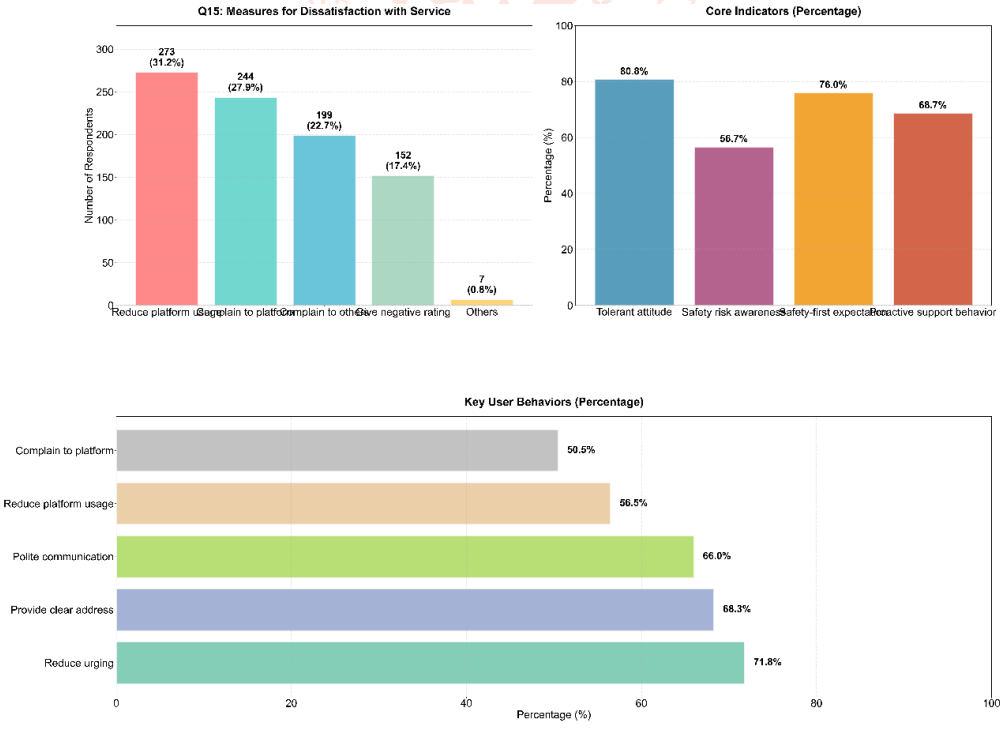

Figure 5 User Responses to Service Dissatisfaction and Key Behavioral Trends

4. Model Construction

4.1. Model Construction: Variables and Core Formulation

In this study, the overall user satisfaction is taken as the core dependent variable, and a binary logistic regression model is constructed to quantitatively identify the extent to which various factors influence the satisfaction with online food delivery services.

The dependent variable is defined as "overall user satisfaction", which is converted into a binary variable based on users' 5-point rating of their most recent delivery service (where 1 = very dissatisfied and 5 = very satisfied). Specifically, ratings from 1 to 3 are assigned to the "dissatisfied (0)" category, while ratings from 4 to 5 are assigned to the "satisfied (1)" category. This conversion is conducted to meet the analytical requirements of the binary logistic regression model. The system of independent variables is constructed around the entire user experience process, covering 13 indicators across four major dimensions. These dimensions include basic user information (gender, age group, and usage frequency, with non-numerical data processed through dummy variable coding), service experience ratings (on-time delivery, correct item delivery, item preservation, and service attitude, all measured using a 1-5 point Likert scale), delivery service issues (failure to place items as agreed and frequent reminders to confirm receipt, both set as binary variables where "0 = not encountered and 1 = encountered"), and tolerance towards delivery riders' behaviors (six indicators such as tolerance for running red lights in the opposite direction and tolerance for 10-30 minute delays, all set as binary variables where "0 = not tolerant and 1 = tolerant"). This ensures that the variables fully cover the key links of the user experience.

The core logic relies on the logistic (Sigmoid) function, which maps the continuous output of linear regression to the interval [0, 1] to represent the probability that a user is "satisfied" with the delivery service. Its formula is:

$$P(Y=1|X)=\frac{1}{1+e^{-Z}}$$

where:

$$Z-\beta_0+\beta_1X_1+\beta_2X_2+\cdots+\beta_kX_k$$

To facilitate parameter estimation and result interpretation, the formula is further transformed into the Log-Odds form, which is expressed as:

$$ln\left(\frac{P(Y=1|X)}{1-P(Y-1|X)}\right)=\beta_0+\Sigma_{i=1}^{k}\beta_iX_i$$

Through this form, the impact of each independent variable on the "odds ratio" of user satisfaction can be analyzed intuitively.

4.2. Model Results

In this study, the SMOTE method was adopted to address the issue of imbalanced sample sizes. A total of 483 samples were oversampled to 838 samples, and the dataset was then split into a training set and a test set at a ratio of 7:3.

Table 2 Test Set Classification Report

	precision	recall	f1-score	support
Dissatisfied(0)	0.8345	0.9206	0.8755	126
Satisfied(1)	0.9115	0.8175	0.8619	126
accuracy	0.869	0.869	0.869	0.869
macro avg	0.873	0.869	0.8687	252
weighted avg	0.873	0.869	0.8687	252

The model demonstrated excellent stability and generalization ability both on the test set and in cross-validation. Results on the test set showed that the overall accuracy of the model reached 86.90%. Specifically, for the "dissatisfied (0)" class, the precision was 83.45%, the recall was 92.06%, and the F1-score was 0.8755; for the "satisfied (1)" class, the precision was 91.15%, the recall was 81.75%, and the F1-score was 0.8619. The classification performance for the two classes was balanced and reliable.

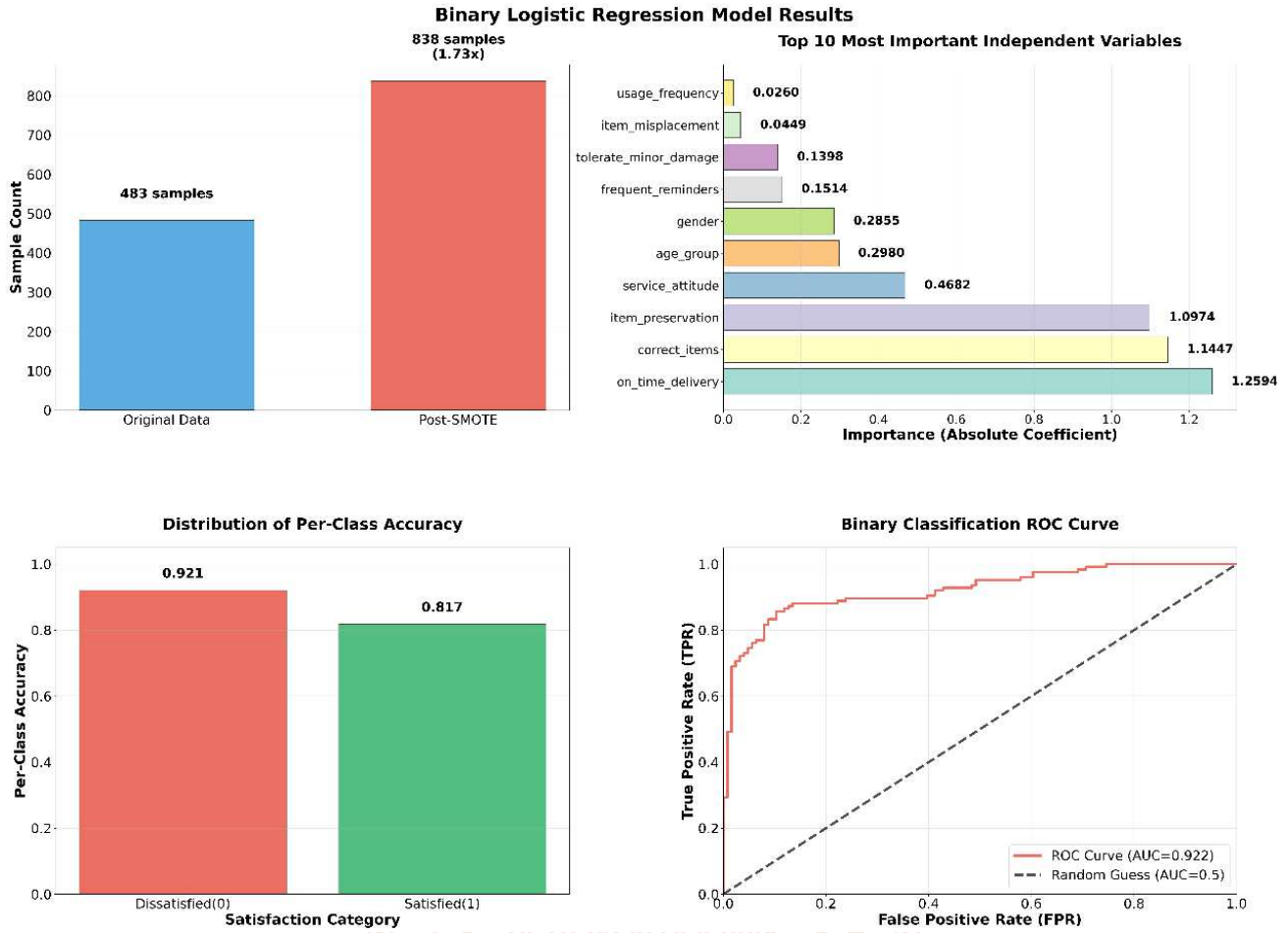

Figure 6 Binary Logistic Regression Model Results

Further verification via 5-fold cross-validation confirmed the model's robustness: the mean accuracy was 86.51% (with a standard deviation of 0.0229), the mean F1-score was 86.16% (with a standard deviation of 0.0270), and the mean area under the ROC curve (AUC) reached 93.14% (with a standard deviation of 0.0151). These values are far higher than the 0.5 threshold for random classification, indicating that the model has a significant ability to distinguish between user satisfaction categories and can effectively support subsequent analysis of influencing factors.

5. Conclusions and Suggestions

The binary logistic regression model constructed in this study demonstrates high reliability and practicality in distinguishing user satisfaction, and its core conclusions can be summarized in three aspects: First, after SMOTE oversampling and 5-fold cross-validation, the model's classification performance and generalization ability have reached the valid thresholds for academic research, making it a reliable tool for analyzing the influencing factors of online food delivery service satisfaction. Second, "on-time delivery", "correct items", and "item preservation" in the delivery performance dimension are the core variables determining user satisfaction, which confirms the user demand characteristic in instant delivery services that "basic fulfillment capabilities take precedence over additional service experiences". Third, the model has higher recognition accuracy for "dissatisfied" samples, providing a quantitative basis for subsequent targeted optimization of service schemes for low-satisfaction user groups. Overall, this model not only completes the quantitative analysis of satisfaction-influencing factors but also provides empirical support for the online food delivery industry to shift from "experience-driven" to "data-driven" service optimization.

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