Maximizing Taxi Driver Revenue Payment Type Analysis

Data-Driven Revenue Optimization Study

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The Problem & The Goal

The Challenge

In the competitive taxi sector, maximizing driver revenue is essential for long-term success and driver satisfaction. With multiple payment options available, understanding which methods drive higher fares can unlock significant revenue opportunities.

Our Mission

Using data-driven insights to determine if payment type has a significant impact on taxi fare revenue. This analysis will guide strategic decisions to optimize revenue without compromising customer experience.

Project Objectives

Problem Statement

In the competitive taxi sector, maximizing driver revenue is essential for long-term success and driver satisfaction.

Objective

Run an A/B test (two-sample t-test) to examine the relationship between total fare and payment method.

Research Question

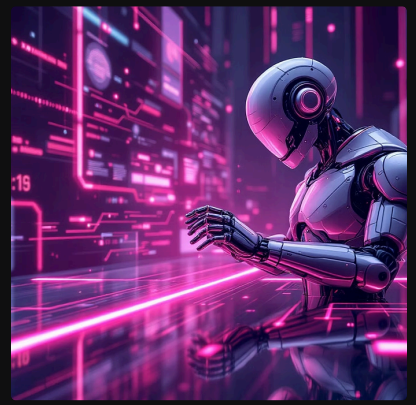
Can we nudge customers towards a payment method that generates higher revenue, without harming customer experience?

Data & Methodology

Our analysis leverages 200,000 New York Yellow Taxi trip records, providing a robust dataset for statistical testing. This comprehensive dataset captures real-world payment patterns and fare information across thousands of rides.

Data Source

200,000 NYC Yellow Taxi trip records with complete payment and fare information



Cleaning Process

Multi-step data cleaning to ensure integrity and remove invalid entries

Statistical Method

Two-sample t-test to compare fare amounts across payment types

Key Data Cleaning Steps

01

Filter Payments

Isolated the dataset to only "Card" (65%) and "Cash" (34%) payments, as these are the two groups for our A/B test.

02

Clean Invalid Data

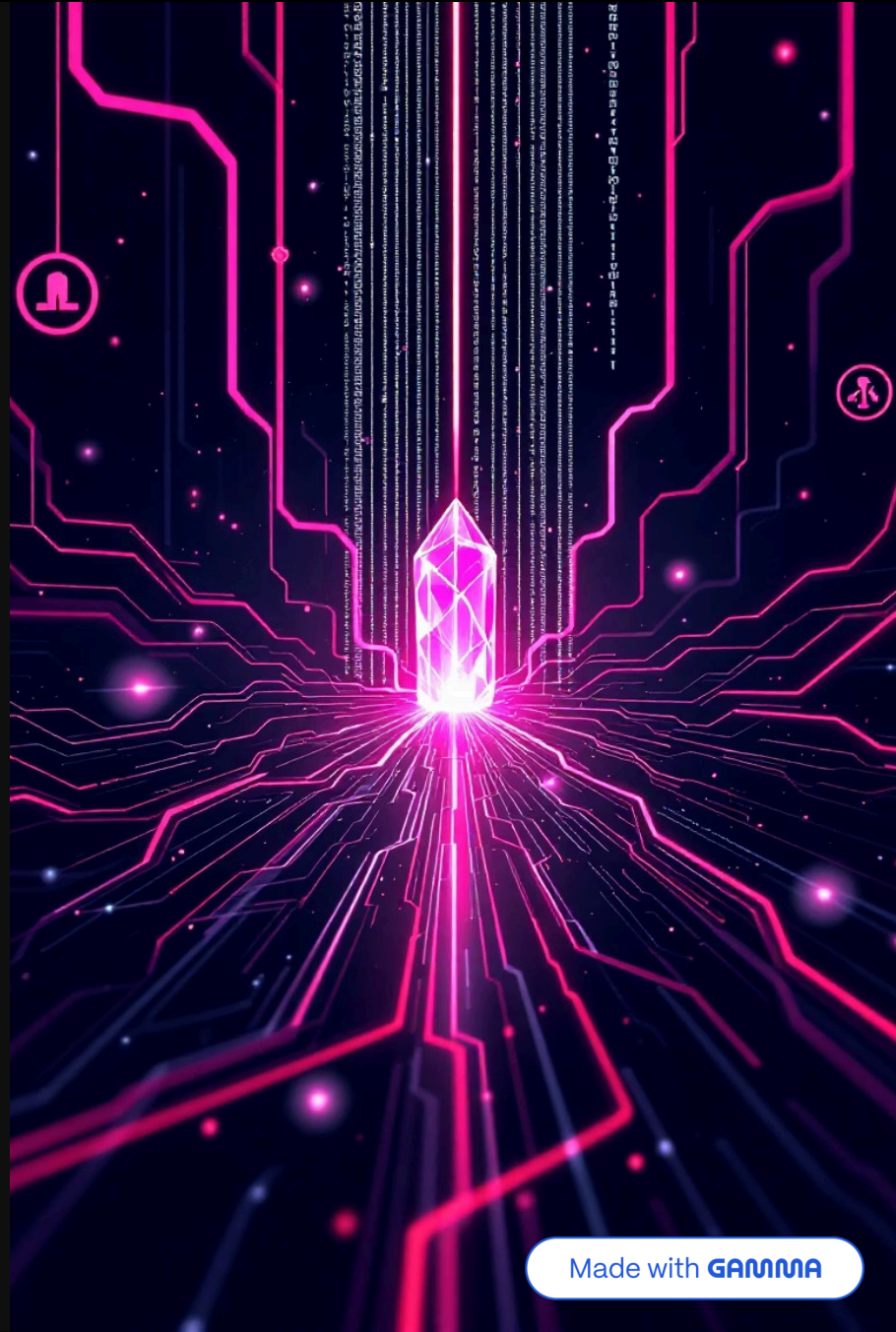
Removed all trips with $0 fares, 0-minute durations, or 0-mile distances to ensure the integrity of the analysis.

03

Remove Outliers

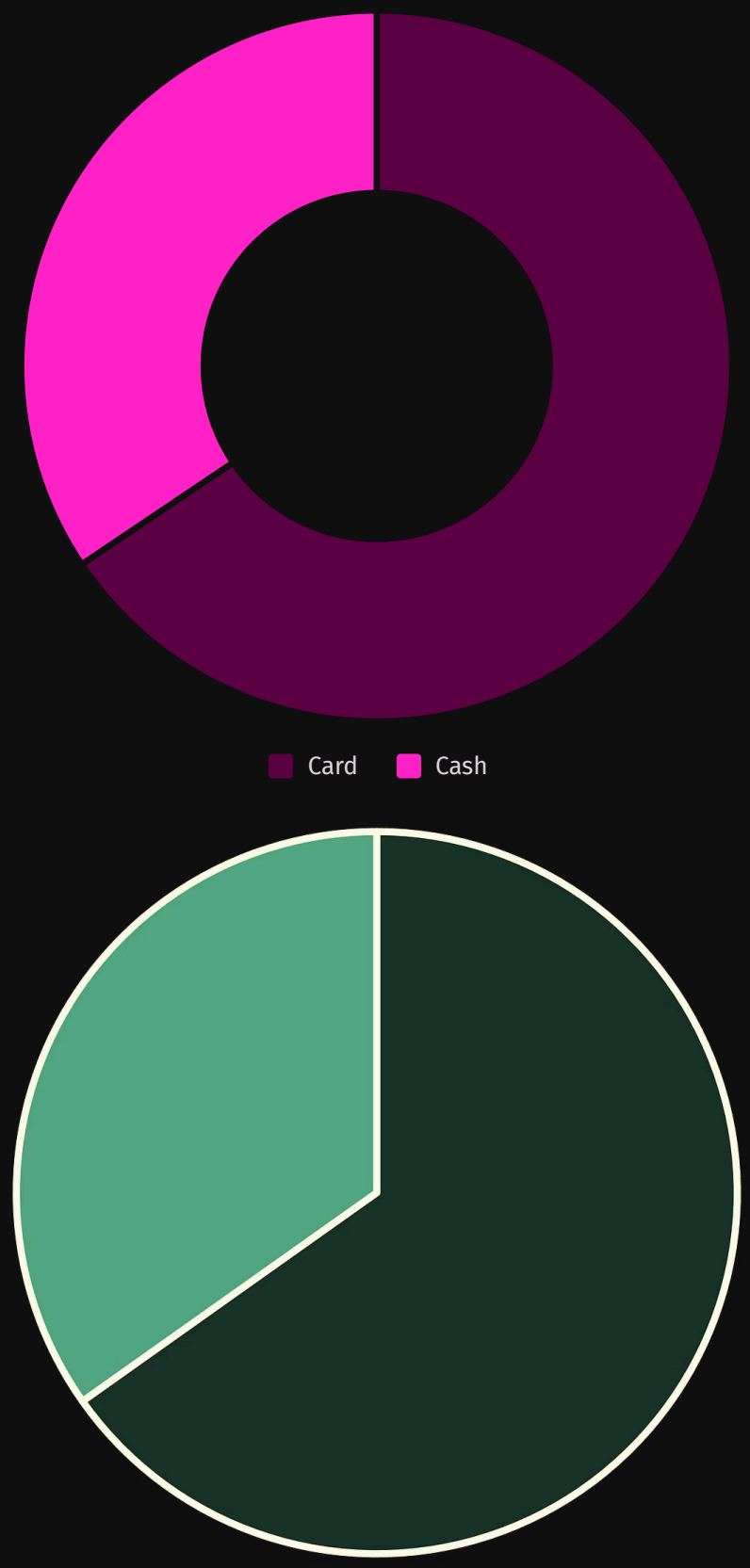
Applied the Interquartile Range (IQR) method to remove extreme outliers from fares, distance, and duration.

These rigorous cleaning steps ensure our analysis is based on high-quality, reliable data that accurately represents typical taxi transactions.



Payment Type Distribution

After filtering, Card payments are nearly twice as common as Cash payments in the dataset, reflecting modern consumer preferences for digital transactions.



Initial Findings: Average Fare

$9.08

Card Payments

Average fare after outlier removal

$8.93

Cash Payments

Average fare after outlier removal

$0.15

Difference

Higher for card payments

Critical Question: Is this $0.15 difference real or just random chance? This is exactly what our statistical test will determine.

Formulating the Hypothesis

Null Hypothesis (H_o)

There is **no statistically significant difference** in the average fare between card and cash payments. Any observed difference is due to random chance.

Alternative Hypothesis (H_a)

There **is a statistically significant difference** in the average fare between card and cash payments. The difference reflects a real pattern.

Significance Level (α)

We set our confidence level at 95%, so the significance level (α) is **0.05**. If p-value < 0.05, we reject the null hypothesis.

The Verdict

P-Value

# $p < 0.001$

Exact P-value: 2.856e-12

Result

Reject H_0

The p-value is significantly smaller than our 0.05 threshold

Interpretation

The $0.15 difference is **highly statistically significant** and not due to random chance. With a p-value this small, we can be extremely confident in our findings.

Conclusion & Recommendation

Conclusion

The A/B test confirms that **Credit Card payments generate a significantly higher average fare** than Cash payments. This finding is statistically robust with $p < 0.001$, indicating the pattern is real and actionable.

Recommendation

To maximize revenue, the taxi service should implement strategies to **nudge customers towards using credit cards** or other digital payment methods as their preferred option. Consider incentives, default settings in apps, or prominent card reader placement.

Next Steps

- Design customer-friendly nudges toward card payments
- A/B test implementation strategies
- Monitor impact on revenue and satisfaction

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