Comprehensive Statistical Analysis and A/B Testing for NYC TLC Data

Executive summary report

Commission Prepared by **Automatidata**

Overview

In this phase we addressed the question of whether taxi fare amounts differ based on customers' payment method, specifically comparing cash and credit card transactions. The goal is to investigate the relationship between fare amount and payment type to provide insights that could inform business decisions for the New York City Taxi & Limousine Commission.

Objective

To investigate the relationship between payment type (cash vs. credit card) and taxi fare amounts, in order to understand how payment methods may influence revenue patterns for the New York City Taxi & Limousine Commission.

Results

- **H_0:** No difference in average fare between cash and credit card.
- **H_a:** Difference exists in average fare between credit card and cash.

```
h_o=taxi_data[taxi_data['payment_type']==1]['fare_amount']
h_1=taxi_data[taxi_data['payment_type']==2]['fare_amount']
_,p_value=stats.ttest_ind(a=h_o,b=h_1,equal_var=False)
```

There is a statistically significant difference in the average fare amount between customers who use credit cards and customers who use cash.

Methods Used

- **Descriptive Statistics**: to summarize and the distribution of fare amounts across payment types.
- **Hypothesis Testing**: formulation of null and alternative hypotheses regarding fare differences.
- **Two-sample t-test (Welch's t-test):** to test whether the difference in average fares between credit card and cash payments is statistically significant.

Next Steps

The Automatidata team suggests that the New York City TLC promote the use of credit cards by encouraging customers to pay with them. Strategies could include placing signs in taxis that state 'Credit card payments are preferred,' asking drivers to politely remind passengers, and offering small incentives such as cashback rewards or discounts for credit card transactions.