

Machine Learning Model Outcomes

Executive summary report for the New York City Taxi and Limousine Commission
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Overview

The New York City Taxi & Limousine Commission (TLC) partnered with Automatidata to create a machine learning model to predict whether an NYC TLC taxi rider would be a generous tipper.

Problem

The initial modeling goal—predicting non-tippers—was rejected for ethical reasons. Instead, the focus shifted to predicting generous tippers (defined as riders who tip more than 20%). This decision was made to balance the sometimes conflicting interests of taxi drivers and potential passengers.

Solution

The data team used two different modeling architectures and compared their results. Both models performed acceptably, with random forest architecture producing slightly better predictions. As a result, the team recommended conducting mock testing with taxi drivers to gather additional feedback.

Details

Behind the Data

- The team assumed that a trip’s itinerary, predicted fare amount, and time of day might have a strong relationship with tip amounts.
- After building and testing the selected models, these factors were confirmed to help predict generous tipping. The model’s F_1 score was 0.7235, indicating good predictive performance.

Results Summary

The resulting algorithm can be used to predict which riders are likely to give generous tips, showing reasonably strong precision, recall, F_1 , and accuracy scores.

Next Steps

As a next step, the Automatidata team can consult with the New York City Taxi & Limousine Commission to share these results. The model could serve as an indicator of tipping behavior, but additional data collection would be needed to significantly improve the model’s accuracy and reliability.

	model	precision	recall	F1	accuracy
0	RF CV	0.674919	0.757312	0.713601	0.680233
0	RF test	0.675297	0.779091	0.723490	0.686538
0	XGB CV	0.673074	0.724487	0.697756	0.669669
0	XGB test	0.675660	0.747978	0.709982	0.678349

Image Alt-Text: F_1 scores of the random forest and XGBoost models.

Future Model Suggestions

- Collect more detailed data on both driver and rider levels, including past tipping behavior.
- Use K-means clustering to group and analyze data, which can reveal additional insights.