Promoting Inclusion through Dynamic Pricing and Supportive Rides

Accessibility

How the ride-sharing revolution failed passengers with disabilities

“About 25 million people in the US have travel-limiting disabilities, 3.6 million of which are homebound.” - Bureau of Transportation Statistics

“Part of this is due to the fact that many communities in the US lack accessible transportation options. While the Americans with Disabilities Act of 1990 (ADA) mandates equal access to transportation, facilities built prior to the ADA – like the NYC subway system – are exempt.” - The Verge

“While 12 .4% of people aged 18 to 64 without disabilities report using ride-hailing services at least once in the last 30 days, only 4.6% of people with disabilities report doing so. Some organizations, including transit agencies and healthcare providers, have begun subsidizing ride-hailing services for people with disabilities.” - Bureau of Transportation Statistics

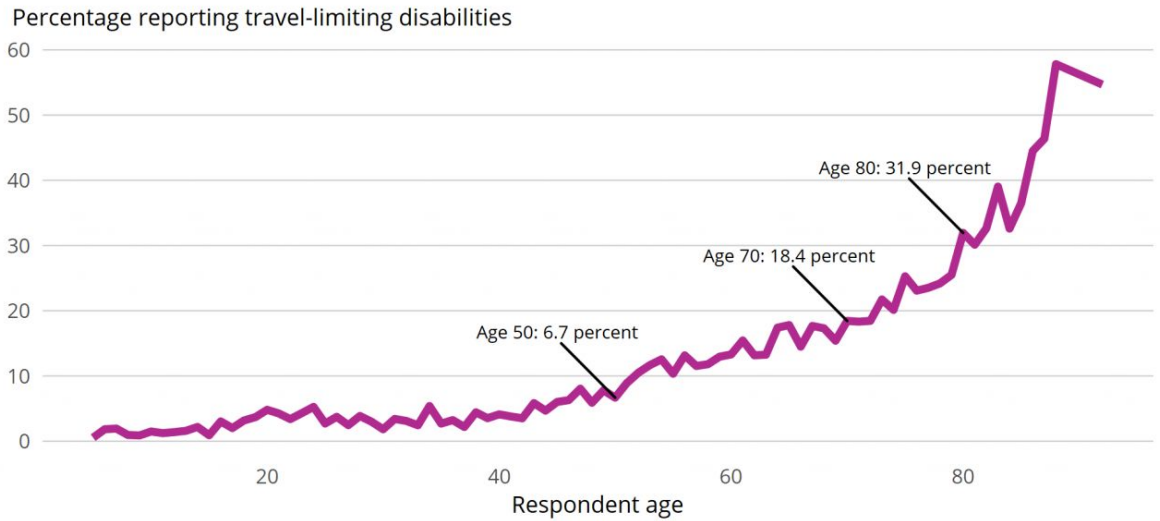
“People who use service animals, for example, are often refused service by Uber and Lyft drivers. Some riders have seen their accounts deactivated for “too many cancellations,” even though the rides are abandoned because drivers decline their requests after learning of their disabilities.”

“Late last year, the US Department of Justice filed suit against Uber alleging that the company discriminates against people with disabilities by charging them a “wait time” fee while entering the vehicle. Passengers with disabilities, such as those who use a wheelchair or a walker, often need more time to get into the car than passengers without disabilities.” - The Verge

Research

Over half (57.8%) of all respondents with disabilities use one or more medical devices:

- Walking canes (37.8%)
- Walkers (22.9%)
- Wheelchairs (11.6%)
- Motorized scooters (4.4%)
- Motorized wheelchairs (3.9%)
- Crutches (2.6%)
- White canes for visual impairments (1.3%)
- Seeing eye-dogs (1.1%)



SOURCE: U.S. Department of Transportation, Federal Highway Administration, 2017 National Household Travel Survey.

Machine Learning Solutions

Accessibility matching: Develop a machine learning model that matches riders with disabilities to drivers who possess suitable access vehicles or have received training to assist with specific needs. The model will take into account factors such as the type of disability, required equipment (e.g., wheelchair ramps), and driver experience.
Approach: Gather data, preprocess data, feature engineering, model training, model evaluation, deployment and iteration
Technologies: Jupyter, Python, NumPy, Pandas, Sklearn, Matplotlib, Seaborn

Dynamic Pricing: Implement a dynamic pricing strategy that offers attractive prices for shared rides involving passengers with disabilities, encouraging other passengers to choose these rides. This approach helps strike a balance between the cost of providing accessible services and offering competitive fares.
Approach: Gather data, preprocess data, feature engineering, pricing model development, dynamic pricing algorithm, real-time optimization, A/B testing and refinement, Compliance and Ethics, Monitoring and Maintenance
Technologies: Jupyter, Python NumPy, Pandas, NumPy, SciPy, Statsmodels, Sklearn, Matplotlib, Seaborn

Becoming an “Outstanding Citizen”

Outstanding Citizen: Someone who shares a ride with another rider who is disabled to help them while earning a lower fare.

Certification for Outstanding Citizen Status: Establish a certification process or test that individuals must successfully complete to earn recognition as Outstanding Citizens. It is worth noting that certain professionals such as nurses or EMTs may already meet the criteria for this distinction. This certification ensures that individuals who qualify have demonstrated exceptional qualities and conduct deserving of the Outstanding Citizen recognition.

Rating System: Allow riders with disabilities to rate their experience with Outstanding Citizens, providing valuable feedback on their performance.

Alternative Names for “Outstanding Citizens”

1. Inclusive Support Ambassadors
2. Special Assistance Heroes
3. Accessibility Allies
4. Accessible Journey Guardians

Incentives

QR Codes with Trip Time Note: Introduce QR codes that, when scanned, display a note indicating that the driver assisted with a passenger with a disability, accounting for any extra time required for the trip. This feature can be useful if the passenger is concerned about arriving late to work or appointments.

Collaborate with partner companies: Offering discounts to Outstanding Citizens, individuals who have demonstrated exceptional conduct.

Ex: “Free museum day at MoMA.”

Approach to Accessibility Matching

Data Collection

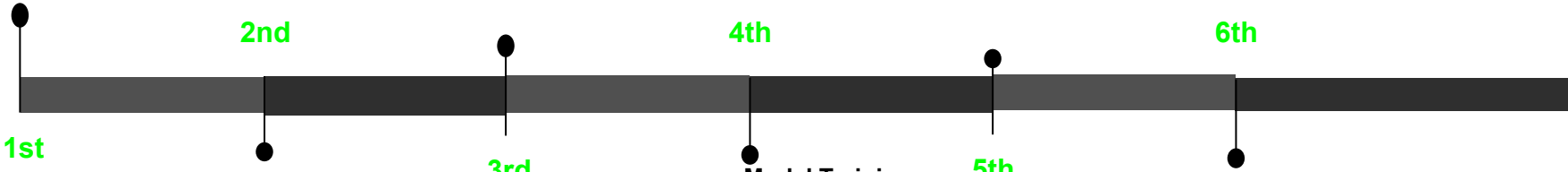
Gather a dataset that includes information about riders with disabilities, drivers, and their corresponding attributes.

Feature Engineering

Extract relevant features from the dataset that can help the model make accurate predictions. For example, you could create binary variables for specific drivers certifications or experience levels and encode categorical variables, such as disability type, using one-hot encoding.

Model Evaluation

Evaluate the trained model's performance using the testing set. Common evaluation metrics for classification tasks include accuracy, precision, recall, and F1-score. These metrics will help you assess how well the model is performing in matching riders with suitable drivers.



Data Preprocessing

Clean and preprocess the data to handle any missing values, outliers, or inconsistencies. Convert categorical variables in numerical representations if necessary and normalize the data to ensure that all features have similar scales.

Model Training

Split the preprocessed dataset into training and testing sets. Choose a suitable classification algorithm (e.g., decision trees, random forests, support vector machines). Train the model and optimize hyperparameters. Use cross-validation techniques for evaluation.

Deployment and Iteration

Once the model is trained and evaluated, deploy it into a production environment where it can be integrated into an application or system for accessibility matching. Continuously monitor and collect feedback on the model's performance to iteratively improve its accuracy and effectiveness.

Dynamic Pricing Approach

Data Collection

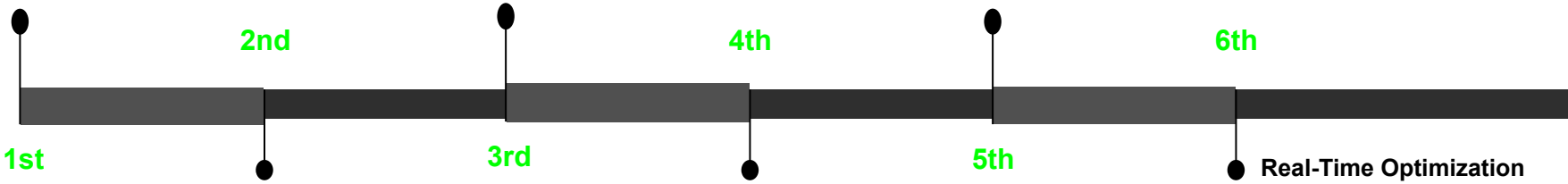
Gather relevant data on past shared rides involving passengers, type of disability, and fares charged.

Feature Engineering

Extract meaningful features from the data that can be used by the pricing model. This could include variables such as distance travel, time of day, demand-supply ratio, weather conditions, and historical data on the availability of accessible vehicles.

Dynamic Pricing Algorithm

Develop an algorithm that adjusts the fares in real-time based on predicted demand and other relevant factors. The algorithm should strike a balance between the costs of providing accessible services and offering competitive fares. This involves continuously monitoring the demand, availability of accessible vehicles, and other relevant factors, and adjusting the prices accordingly.



Data Preprocessing

Clean and preprocess the collected data. This may involve removing outliers, handling missing values, and transforming the data into a suitable format for analysis.

Pricing Model Development

Train a machine learn model using the preprocessed data and the engineered features. The model should be capable of predicting the demand for shared rides involving passengers with disabilities based on various factors.

Real-Time Optimization

Integrate the dynamic pricing algorithm into the ride-sharing platform's infrastructure to enable real-time optimization of fares. This involves continuously monitoring the demand, availability of accessible vehicles, and other relevant factors, and adjusting the prices accordingly.

Dynamic Pricing Approach Continued

A/B Testing and Refinement

Deploy the dynamic pricing strategy in a controlled manner perform A/B testing to assess its impact on passenger behavior and the overall business performance. Analyze the results and refine the pricing algorithm as necessary based on feedback and insights gained.

Monitoring and Maintenance

Continuously monitor and evaluate the performance of the dynamic pricing strategy. Update the machine learning model periodically to incorporate new data and changes in market dynamics, ensuring that the strategy remains effective and aligned with the organization’s goals.

Compliance and Ethics

Ensure that the dynamic pricing strategy adheres to legal and ethical considerations. Avoid discriminatory practices and ensure that the pricing approach treats all passengers fairly and equitably.

Team

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How you can help me

Additional Information

- A dataset that includes information on riders with disabilities, drivers, and their corresponding attributes.
- Any relevant data on past shared rides involving passengers, type of disability, and fares charged.