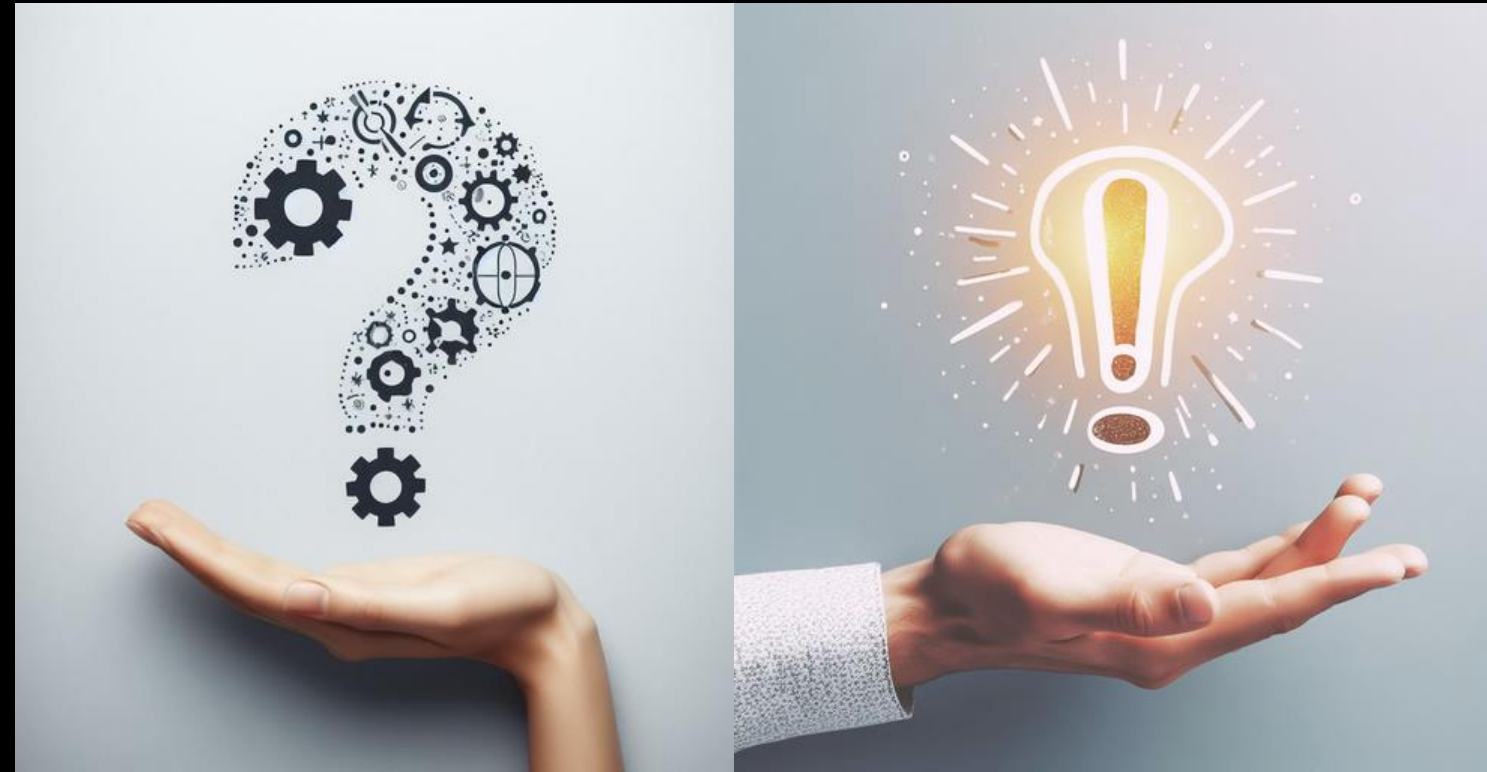# Delivery Duration Prediction (DoorDash)

Presented by: **Olatunbosun Ayetan**

Motivation

Problem Statement

Inconsistent delivery times lead to customer frustration and dissatisfaction.

Overly conservative estimates affect operational efficiency.

SOLUTION

Data Science can be used to address these challenges.
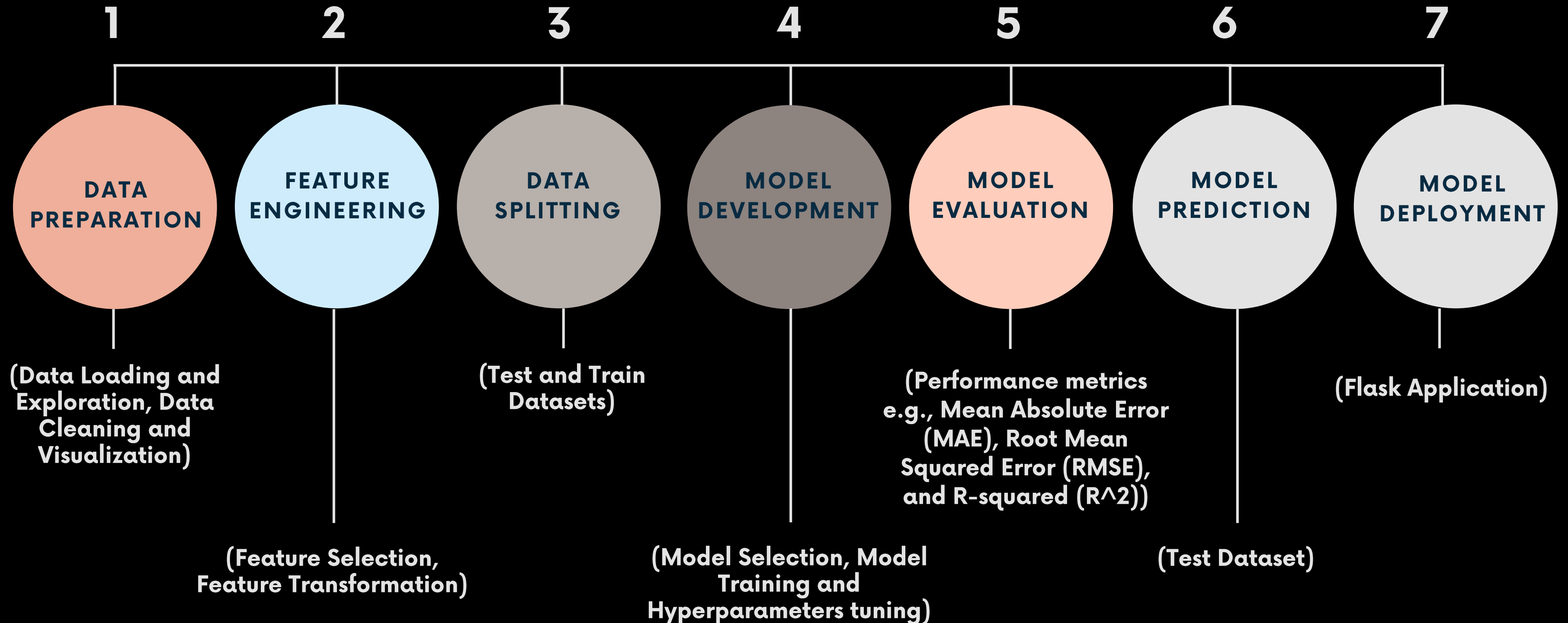
DATASET OVERVIEW

SOURCE

Originates from DoorDash's historical deliveries for the first two months of 2015 across specific cities.

THE TARGET VARIABLE
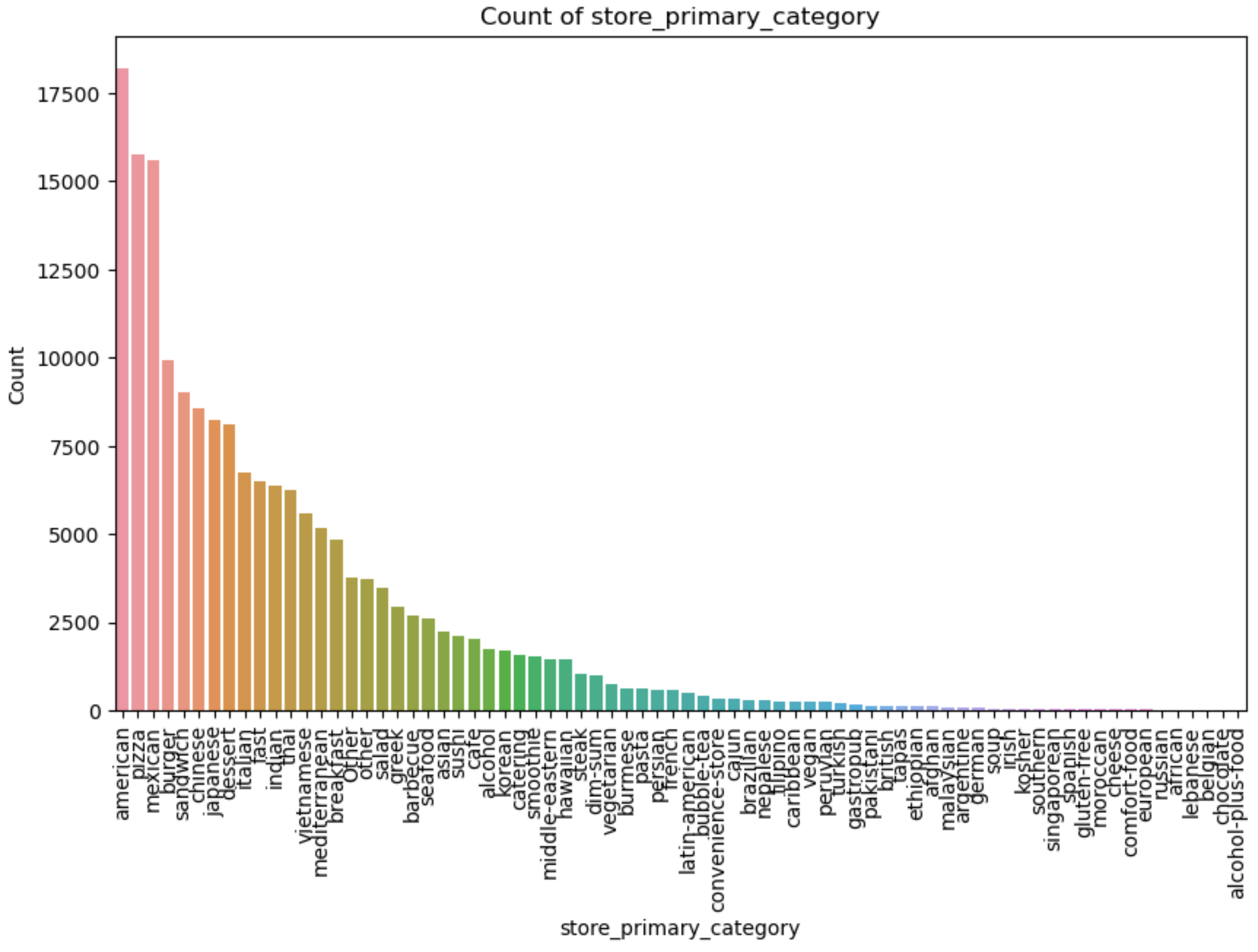
The target variable is the time between order creation and successful delivery.
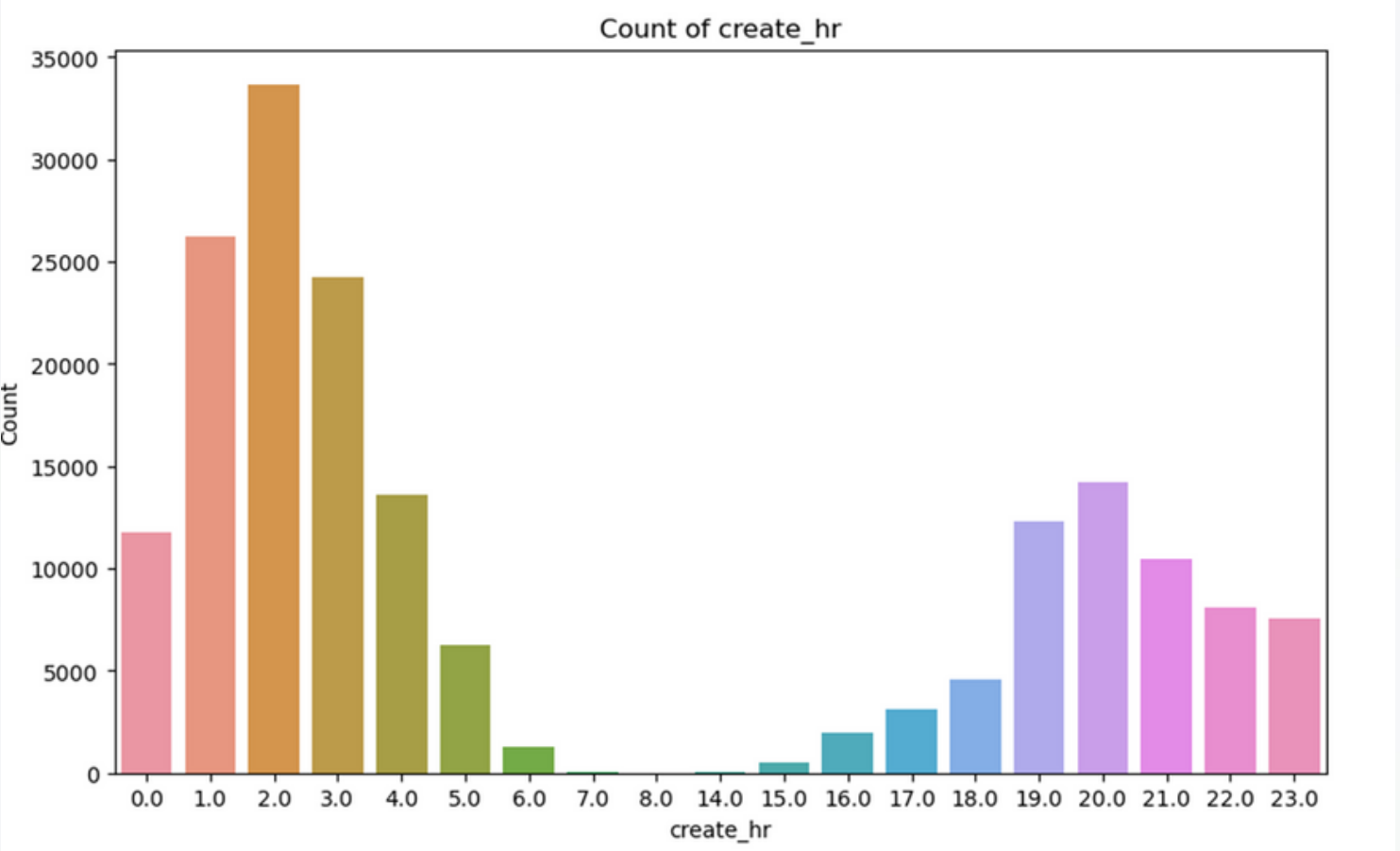
WORKFLOW

1   **2**   **3**   **4**   **5**   **6**   **7**

DATA PREPARATION

FEATURE ENGINEERING

DATA SPLITTING

MODEL DEVELOPMENT

MODEL EVALUATION

MODEL PREDICTION

MODEL DEPLOYMENT

(Data Loading and Exploration, Data Cleaning and Visualization)

(Test and Train Datasets)

(Performance metrics e.g., Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R-squared (R^2))

(Flask Application)

(Feature Selection, Feature Transformation)

(Model Selection, Model Training and Hyperparameters tuning)

(Test Dataset)

Data Exploration

Count of store_primary_category

Count of create_hr

There are three distinct patterns in demand based on the created hour (i.e., 0 am to 5 am, 6 am to 3 pm, and 4 pm to 11 pm)

The most in-demand restaurant categories are American, Pizza, Mexican, Burger, and Sandwich.

Count of market_id
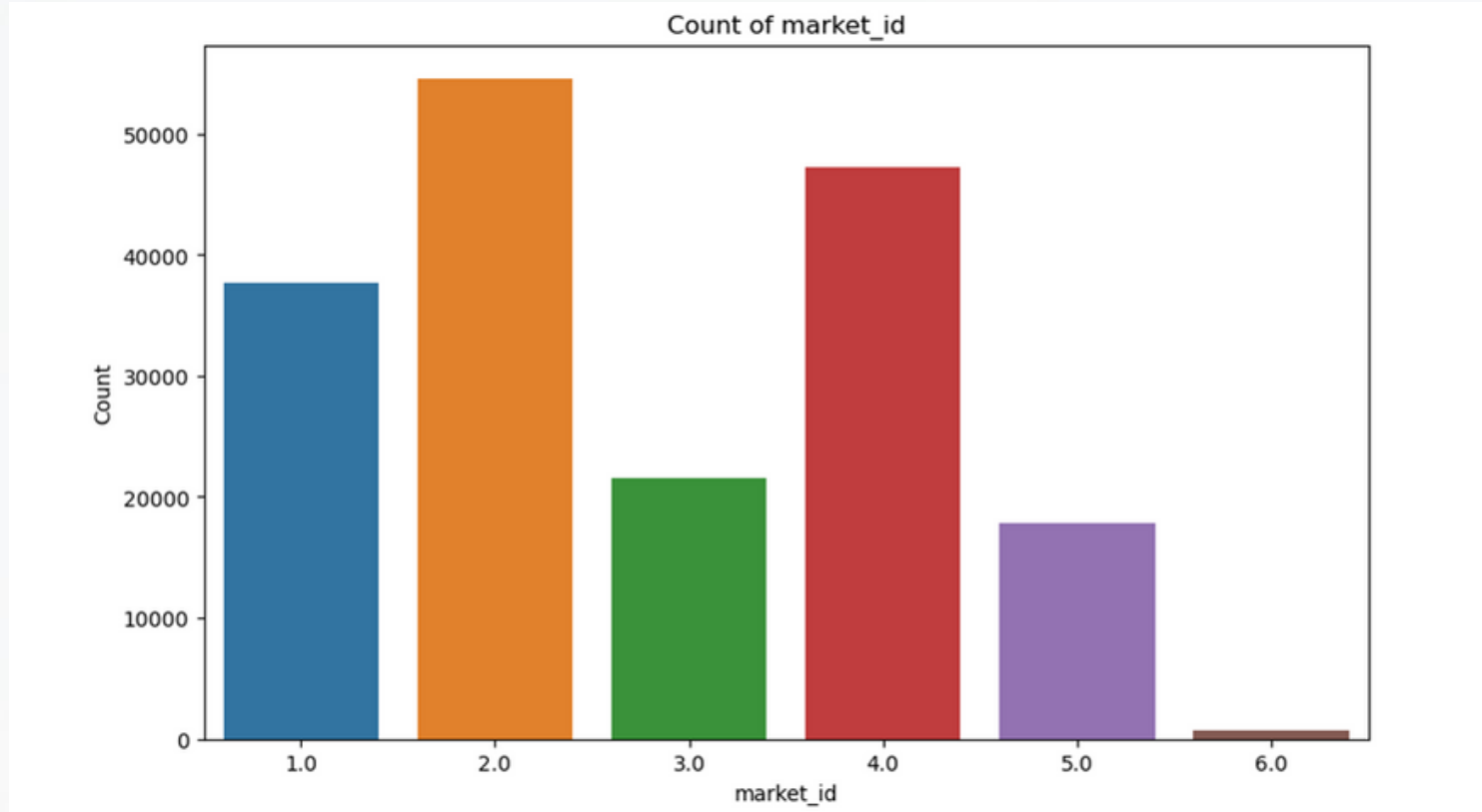
Markets 2 and 4 have the highest delivery demand.

Results

	Linear Regression	Hyperparameter Tuned Random Forest	Hyperparameter Tuned Gradient Boosting	Hyperparameter Tuned XG Boost
MAE:	593.68	575.15	551.70	549.02
MAPE:	24.51%	23.69%	22.45%	22.31%
RMSE:	751.00	731.07	707.70	704.68
R-squared:	0.25	0.30	0.35	0.35

Dooordash

Future Directions

1 **Refined Stage-Based Predictions**

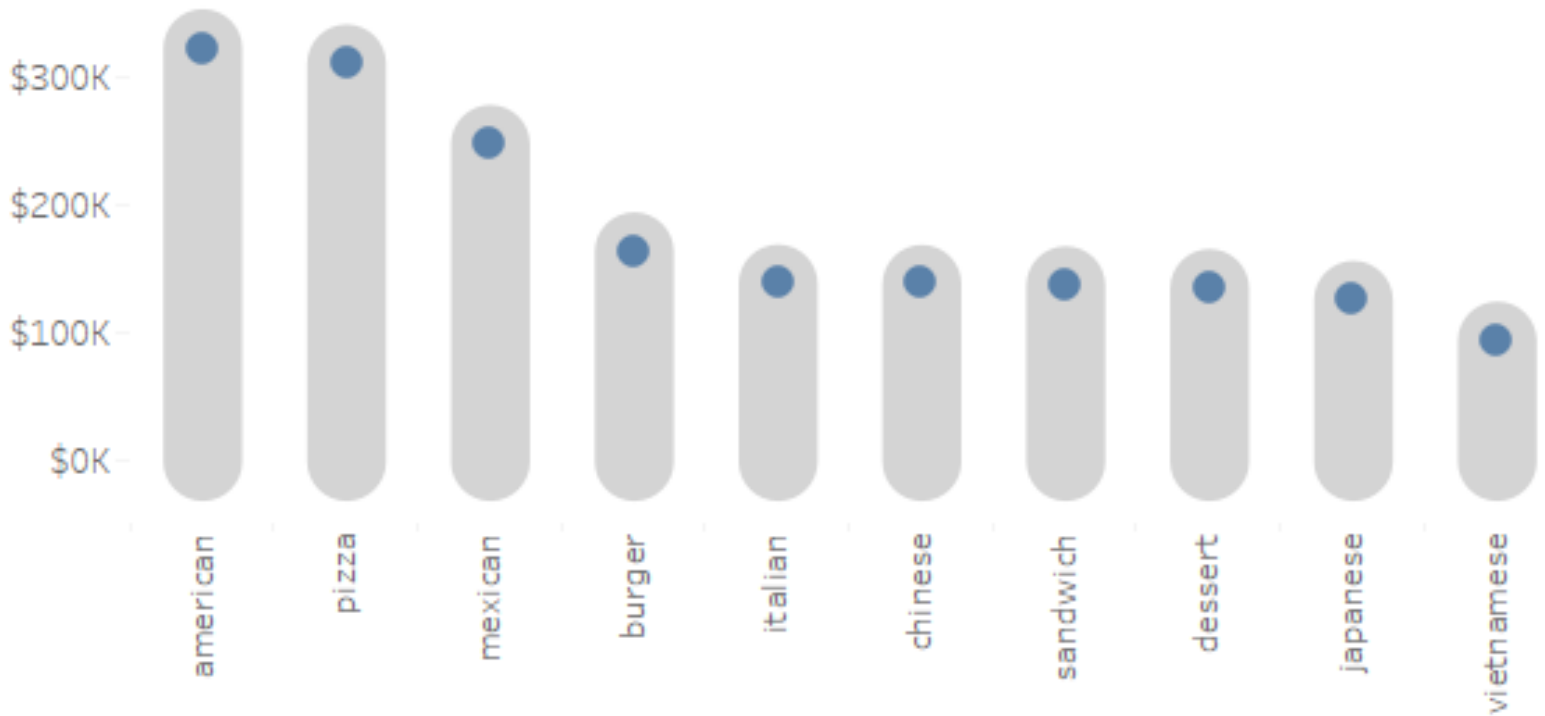**2** **Incorporation of Geospatial Data**

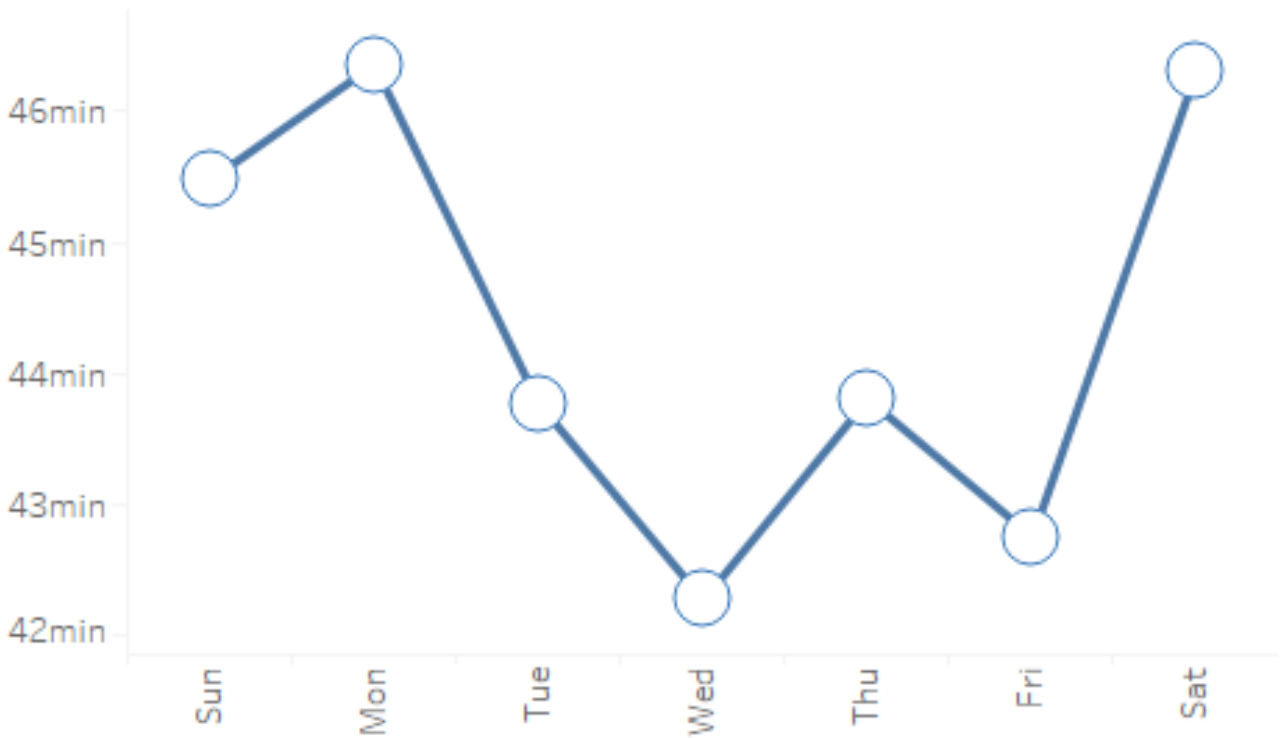**3** **Consideration of Weather and Environmental Factors**

4 **Feature Engineering and Hyperparameter tuning**

DOORDASH DELIVERY DURATION DASHBOARD

Top 10 Store Primary Category by Subtotal

$300K
$200K
$100K
$0K

american
pizza
mexican
burger
italian
chinese
sandwich
dessert
japanese
vietnamese

Daily Average Delivery Duration

46min
45min
44min
43min
42min

Sun
Mon
Tue
Wed
Thu
Fri
Sat

Timeslot by Subtotal

Morning
4% ($82K)

Evening
23% ($412K)

Late Night
72% ($1,308K)
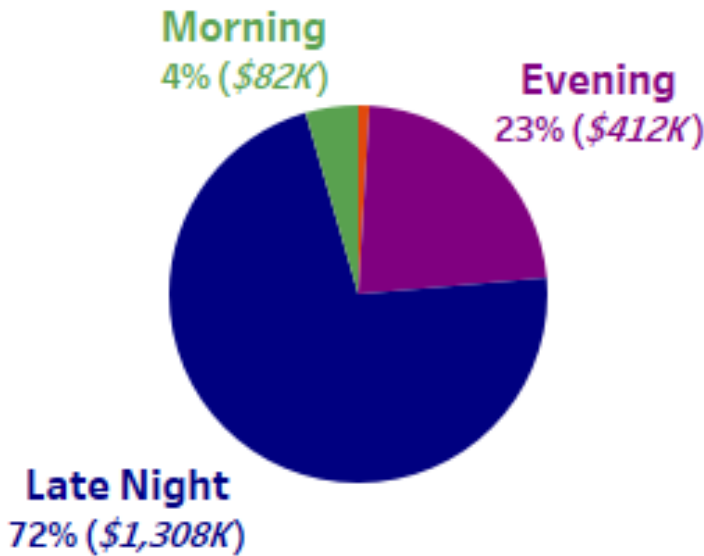
Dashers in the Markets & Avg Delivery Duration

DoorDashers Availability
- Avg Onshift Das..
- Avg Busy Dashers

50
40
30
20

47.5min
42.9min
44.8min
43.6min
44.5min
45.6min

DoorDashers

1.0   2.0   3.0   4.0   5.0   6.0

THANK YOU