Transportation Network Providers in the Chicago Area

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Data Background

- 3 main trip files + 1 area coordinates file
- Source: City of Chicago Data Portal
- ~500 million trips from 2018 to present
  - (Uber, Lyft, etc.)
- 100GB total across 22 columns
- Key Features:
  - Trip times (start, end, duration)
  - Distance traveled (miles)
  - Pickup/dropoff locations and coordinates
  - Fare, tip, and fee details

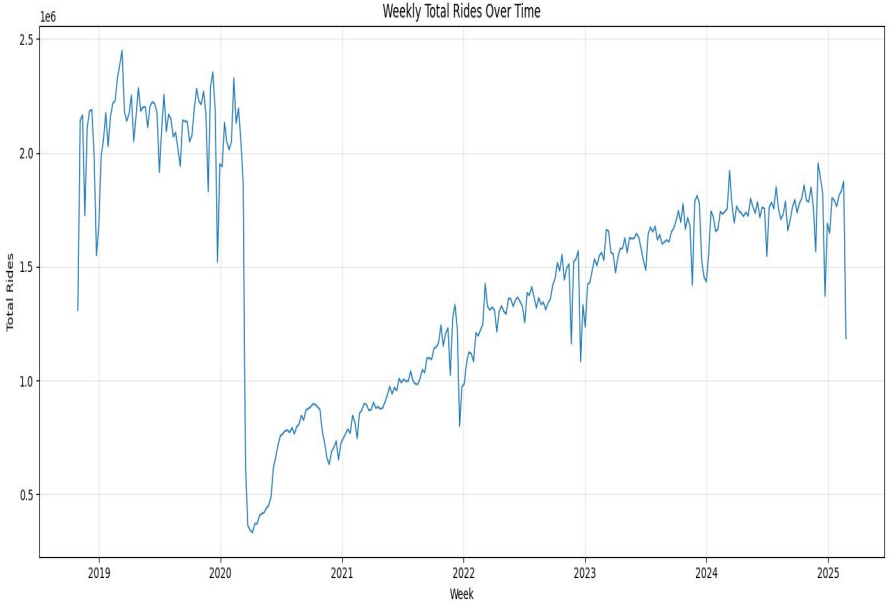
Why?

- Transportation apps like Uber and Lyft shape how people move through a city
- Understand mobility patterns in Chicago using real-world data
  - Data set covers over 500 million trips, offering a rare, large scale view of rider behavior
- Our goal → when, where, and how people ride

Methodology

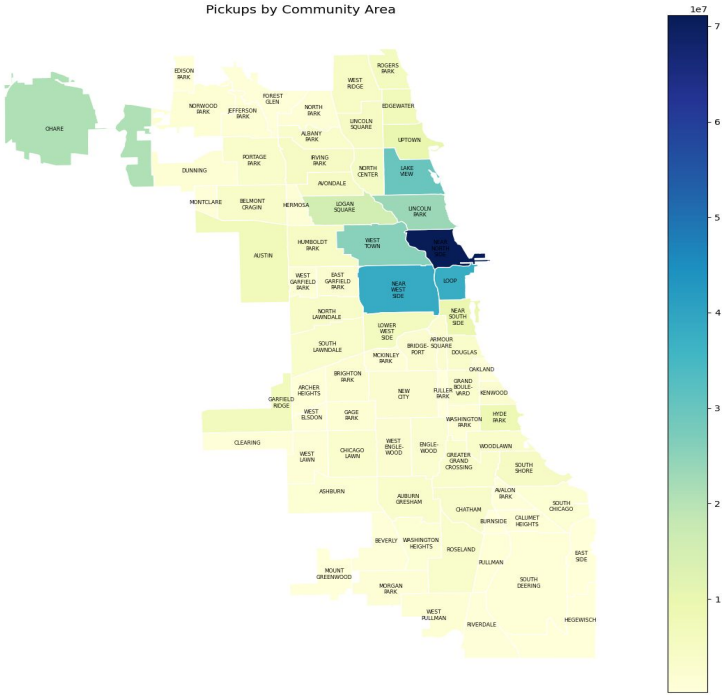
- Filtered to retain only complete trip records
- Split the dataset into 100 parts (~1 GB each)
- Used CHTC and HTCondor to run two parallel batch jobs:
  - Summarized total trips at each time point
  - Summarized total trips by pickup and dropoff location, grouped by year
- Merged all summarized outputs into a single file
- Visualized the results using Python, with Matplotlib

Weekly Total Rides Over Time



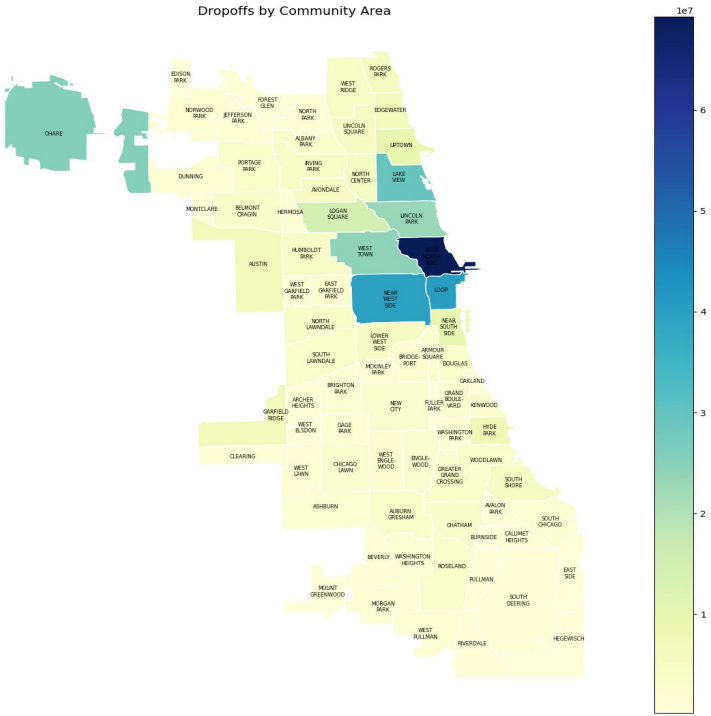
- Rides seem to have not recovered from COVID-19
- Could be due to decreased public activities overall (restaurants, bars, tourism, etc.)
- Rides significantly drop during the holiday season, with a slight drop in summer months as well

Pickups by Community



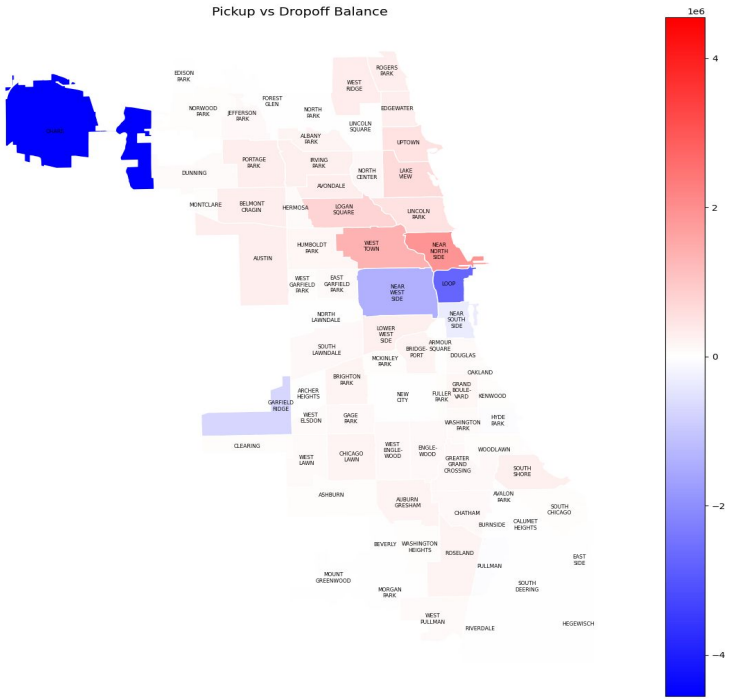
- Pickups mostly focused around downtown, Near North Side, and O'Hare
- This was expected

Drop Offs by Community



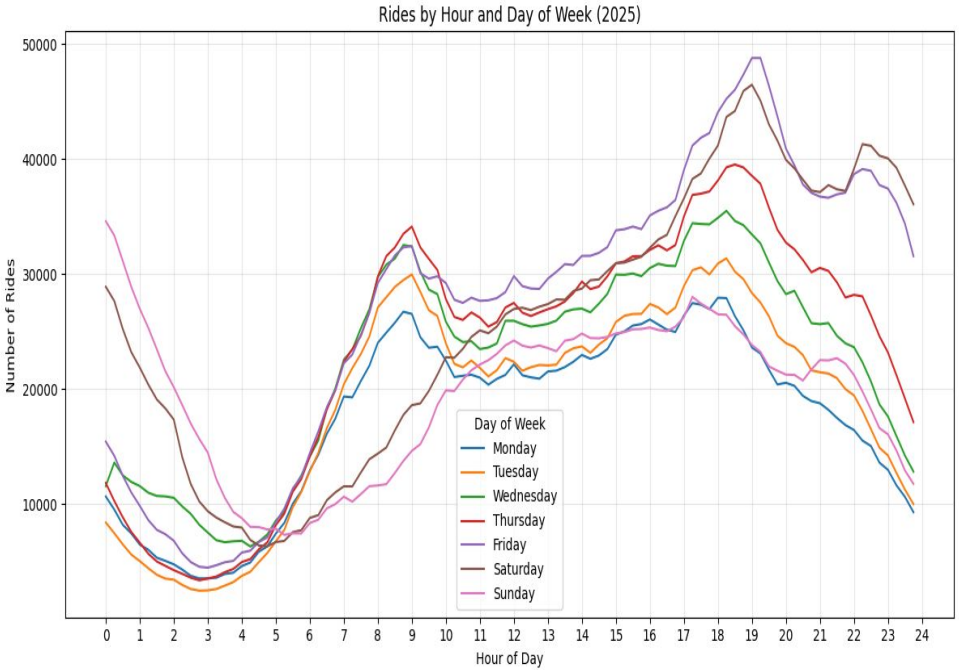
- Drop offs are nearly identical to pickups
- Most of the rides are concentrated around downtown, Near North side, and O'Hare

Pickup vs Drop Off Balance



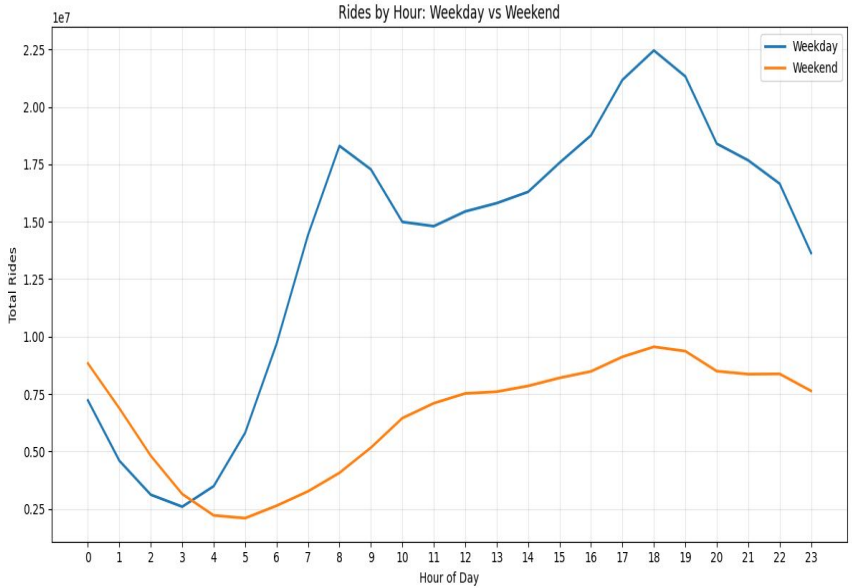
- Red: more pickups than drop offs
- Blue: more drop offs than pickups
- Pickups and drop offs are mostly the same aside from a few key areas
- Very interesting that O'Hare has more pickups than drop offs

Rides by Hr/Day of the Week



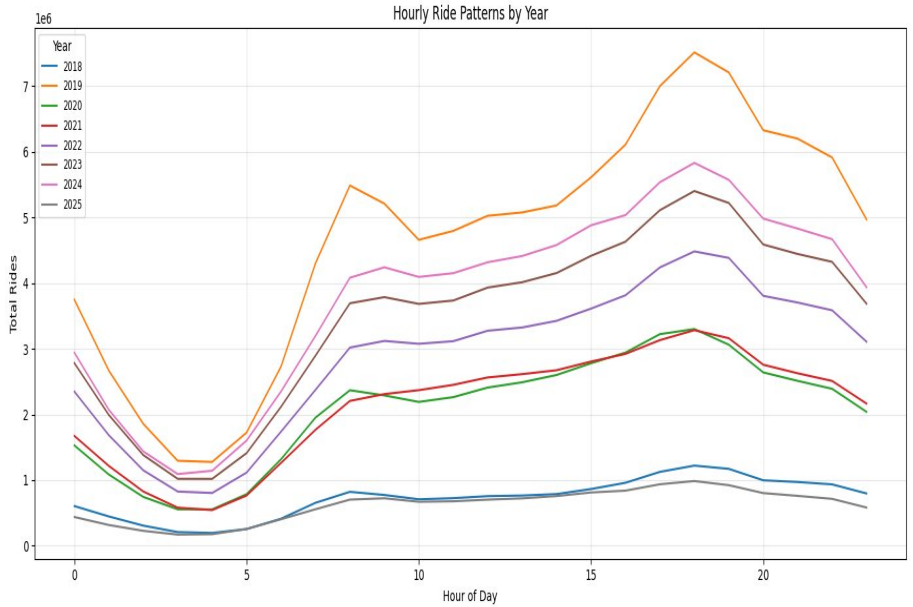
- Rides from Midnight-2AM high on weekends (bar close)
- Peaks at 8-9AM and 5-7PM (Getting to and from work)
- As the week goes on more rides to and from work

Rides by Hr: Weekday vs Weekend



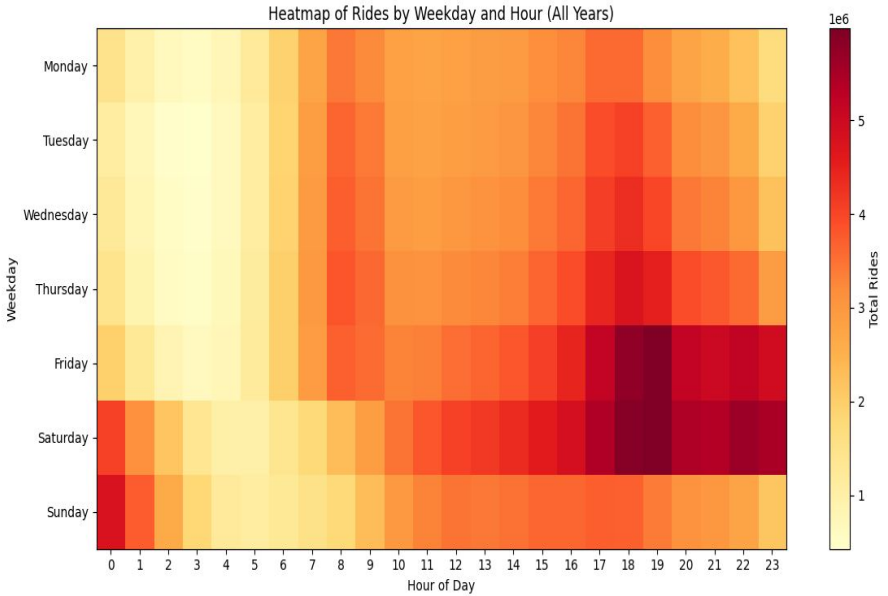
- More people out and about during the week
- More time to walk/bike/train on the weekend
- This was expected

Hourly Ride Patterns/Yr



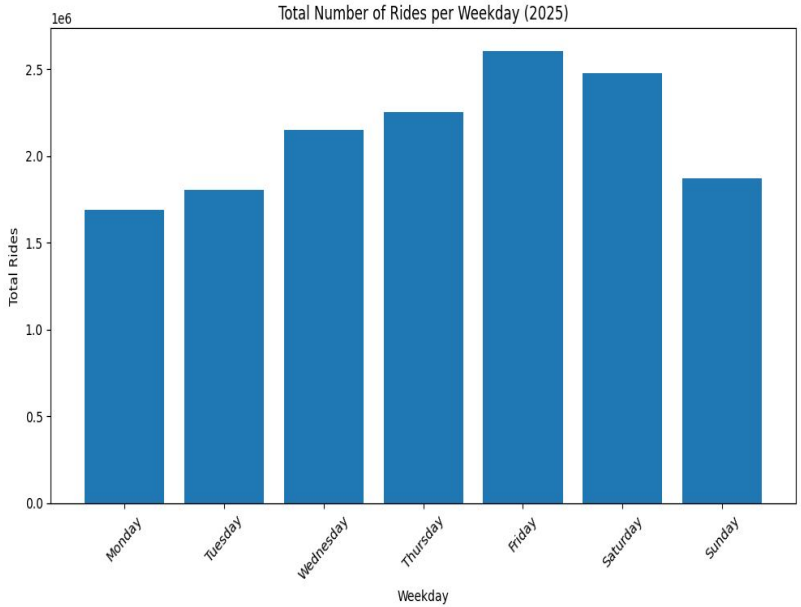
- Rides have been increasing in frequency over the past 8 years
- 2019 exceptionally high (due to…)
- Mostly same trends, just shifted up as years increase

Rides by Weekday/Hr



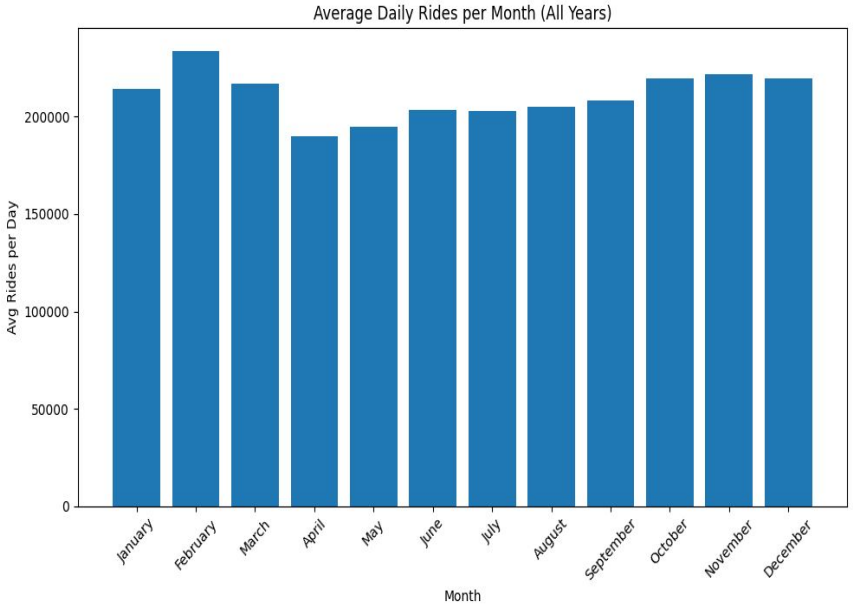
- Monday-Thursday peaking at start/end of work day
- Friday and Saturday peak during happy hour/bar time (heaviest at 7PM)
- Saturday busy all day
- Monday is the lightest day

Total # Rides/Weekday (2025)



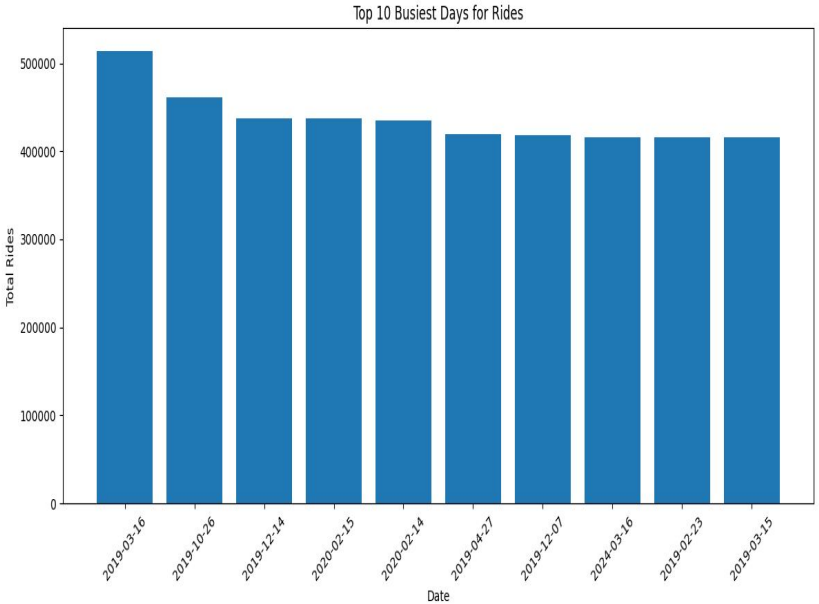
- Ride volume increases steadily from M-F
- Friday - highest # of rides (about 2.6 million)
- Sunday and Monday fewest overall rides
- Commuting during weekdays/social activity on weekends

Avg Daily Rides/Month



- Feb has the highest avg daily ride count
- Summer months have lower avg daily rides (vacations, walking, public transportation, etc.)
- Winter months have generally a higher demand (cold weather, holidays, etc.)

Busiest Days



- Busiest single day was March 16, 2019
- Many top days are close to holidays or large events (e.g., St. Patrick's Day in March, winter holidays in December)
- No summer months appear in the top 10, suggesting less reliance on ride services during that time
- Major events/seasonal celebrations