

Metro DC Bikeshare System: Enhancing User Satisfaction and Growth

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Agenda:

1. Introduction to Metro DC's Bikeshare System

2. Ride Patterns

3. Bike Types and Usage Patterns

4. Ride Duration Discrepancies

5. Key Performance Indicators (KPIs)

6. Data Insights

7. Predictive Model Performance

8. Conclusion - Q & A

Capital Bikeshare Overview

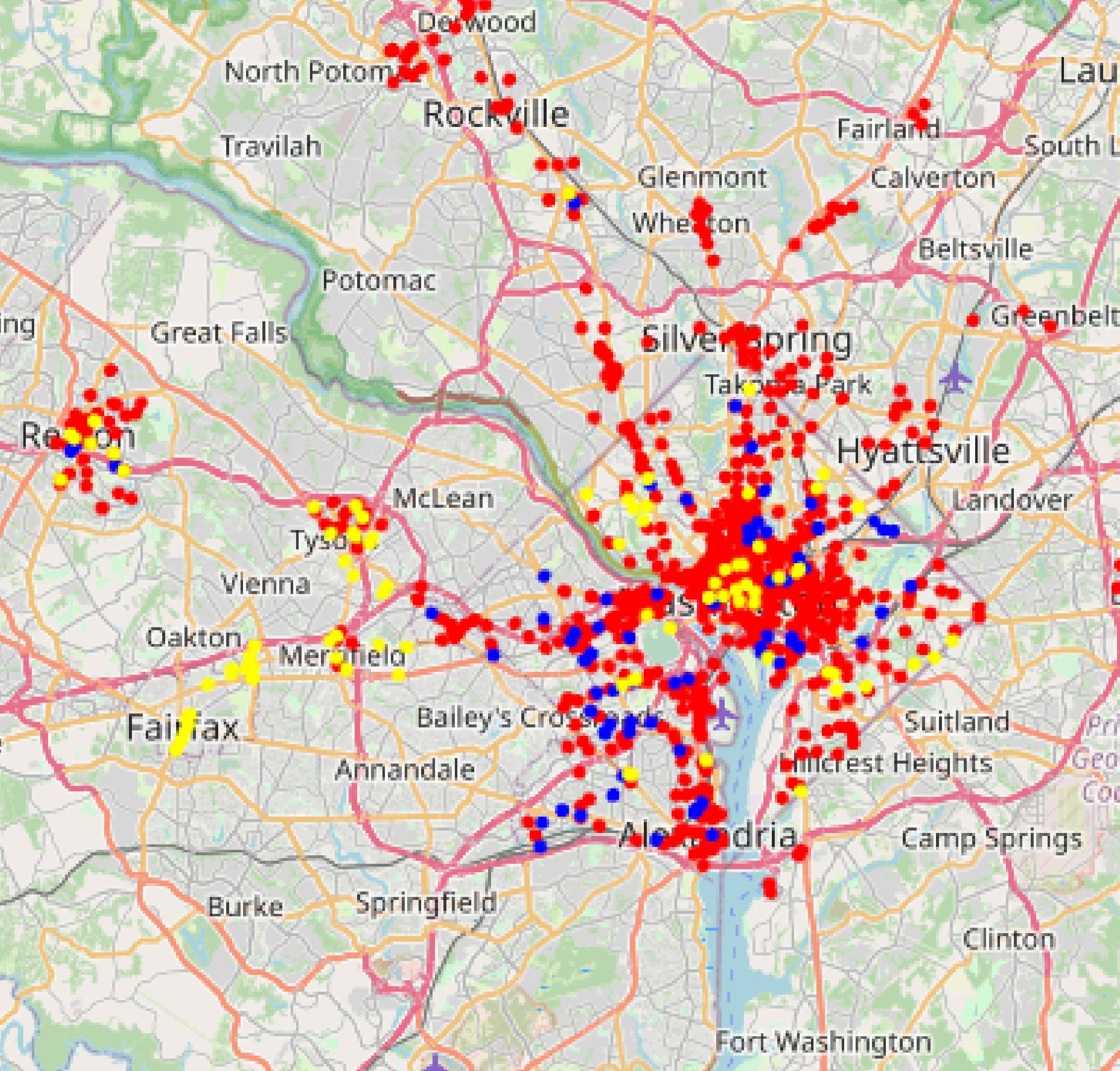
- Metro DC's Bikeshare System:
 - Over 6,000 bikes available across 700 stations in 7 jurisdictions.
- Key Features:
 - Convenient and affordable transportation for commuting, errands, appointments, and leisure.
 - Docking system: Bikes can be unlocked and returned at any station.
 - Supports one-way trips across the network.



- History:
 - Launched in 2010 as a regional system.
 - Expanded to 7 jurisdictions, starting with Washington, DC and Arlington, VA.
 - First bikeshare system in North America originated from SmartBike DC (2008).
- Operator:
 - Managed by Motivate, a global leader in bikeshare systems.
 - Motivate operates other major bikeshare programs like Citi Bike, Divvy, and Bay Wheels.

Locations:

Washington, DC; Arlington, VA;
Alexandria, VA; Montgomery County, MD;
Prince George's County, MD; Fairfax
County, VA; City of Falls Church, VA.



Daily and Hourly Data Keywords:

Casual: Non-member riders

Date: Time-based trends (day)

Member: Member riders

Total Rides: Ride volume

Apparent Temp: Perceived weather effect

Temp 2m: Actual temperature

Weather Code: Weather conditions

Windspeed: Weather impact

Hour: Time of day patterns

Dataset Shape:

Rows: 10,683,632

Columns: 14

Data Lat and Log

Ride ID: Unique ride identifier

Rideable Type: Bike type preference

Started/Ended At: Ride duration and time trends

Start/End Station Name & ID: Popular stations

Start/End Lat & Lng: Geographical patterns

Member Casual: User type comparison

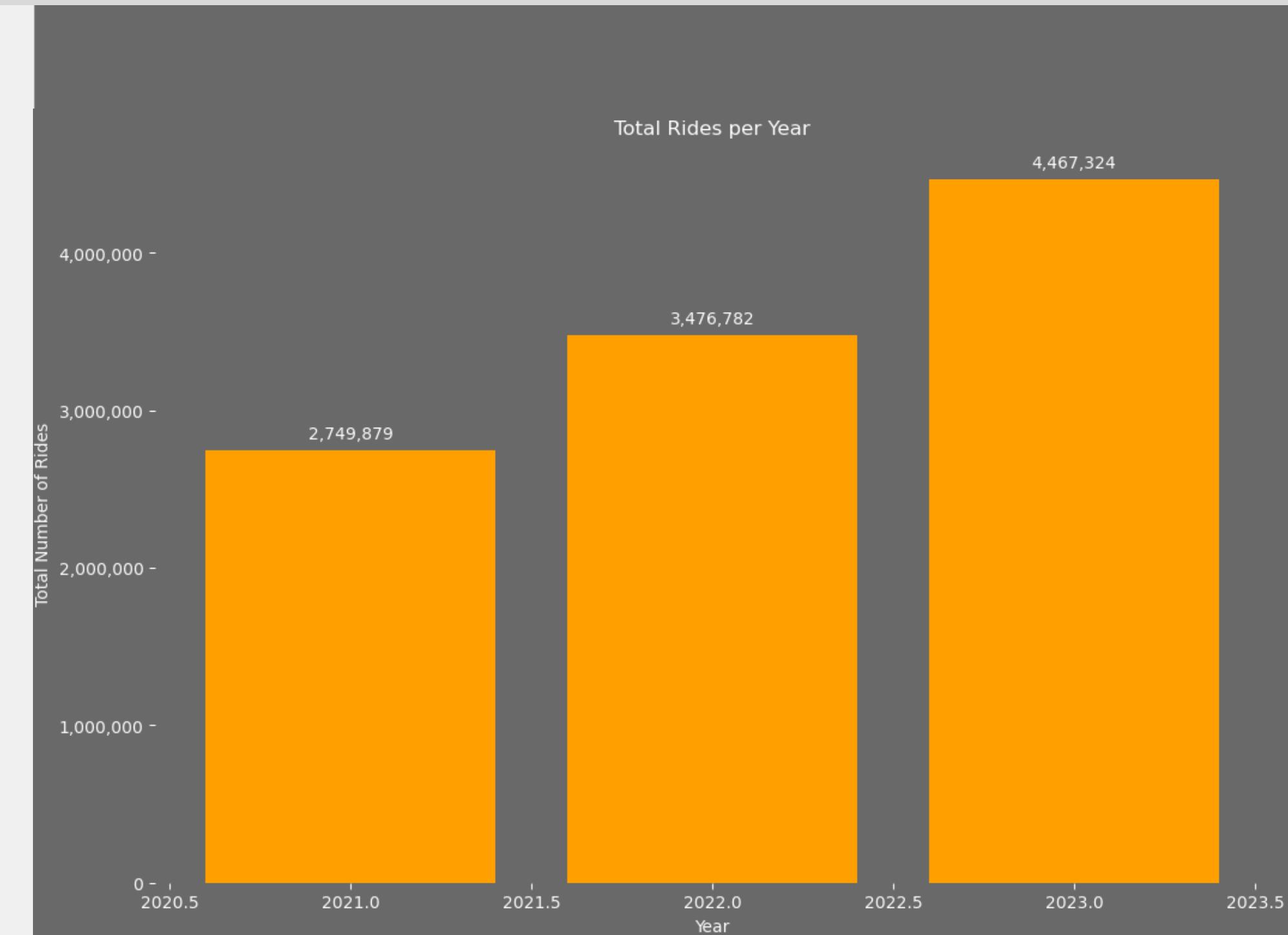
Dataset Shape:

Rows: 26,000 (hourly data), 1000 (daly)

Columns: 14 t

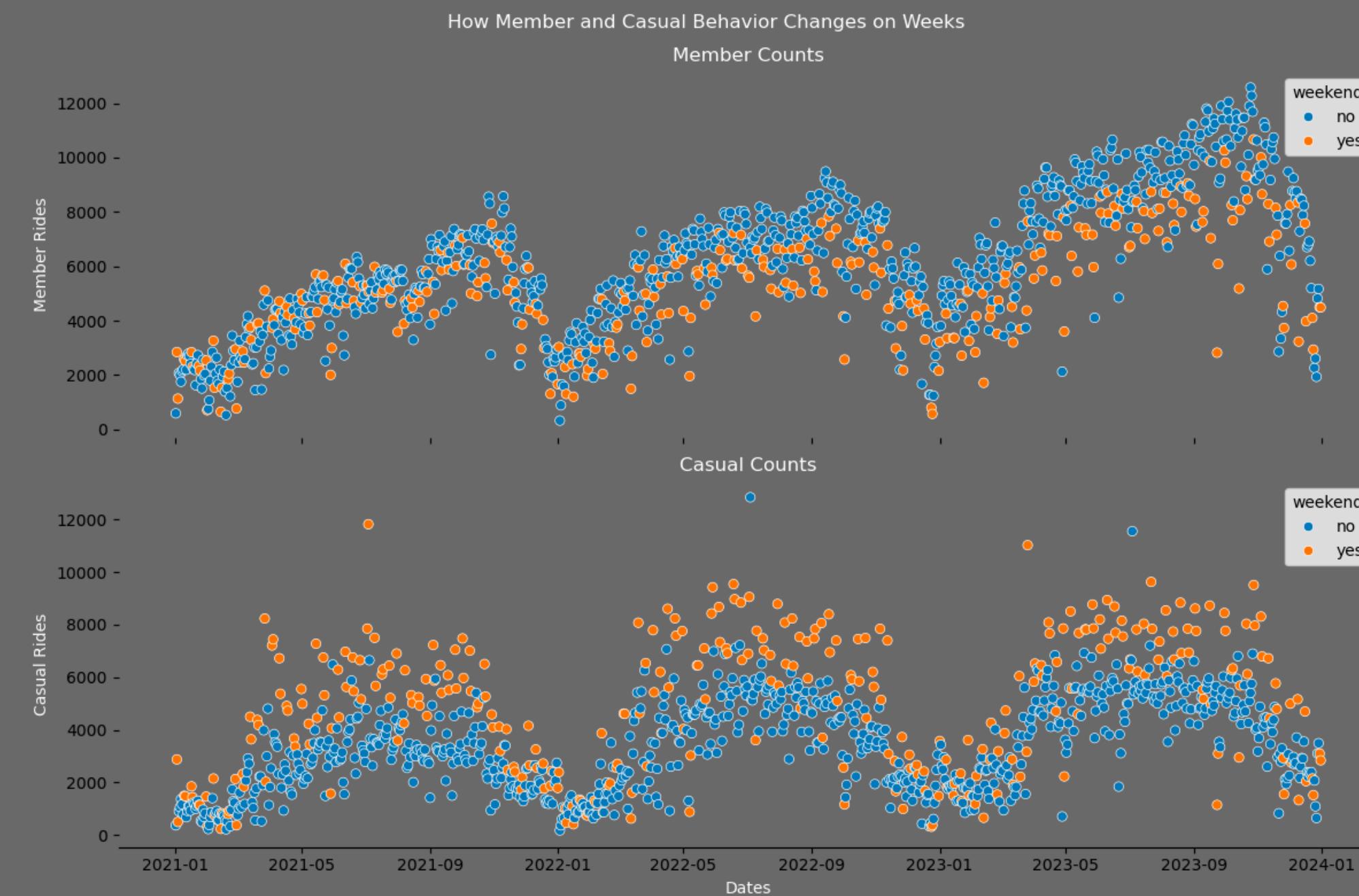
Paving the Path to a Million More Rides Each Year!

total_change	year	
	2021	0.0 0.000000
726903.0	2022	26.433999
990542.0	2023	28.490196



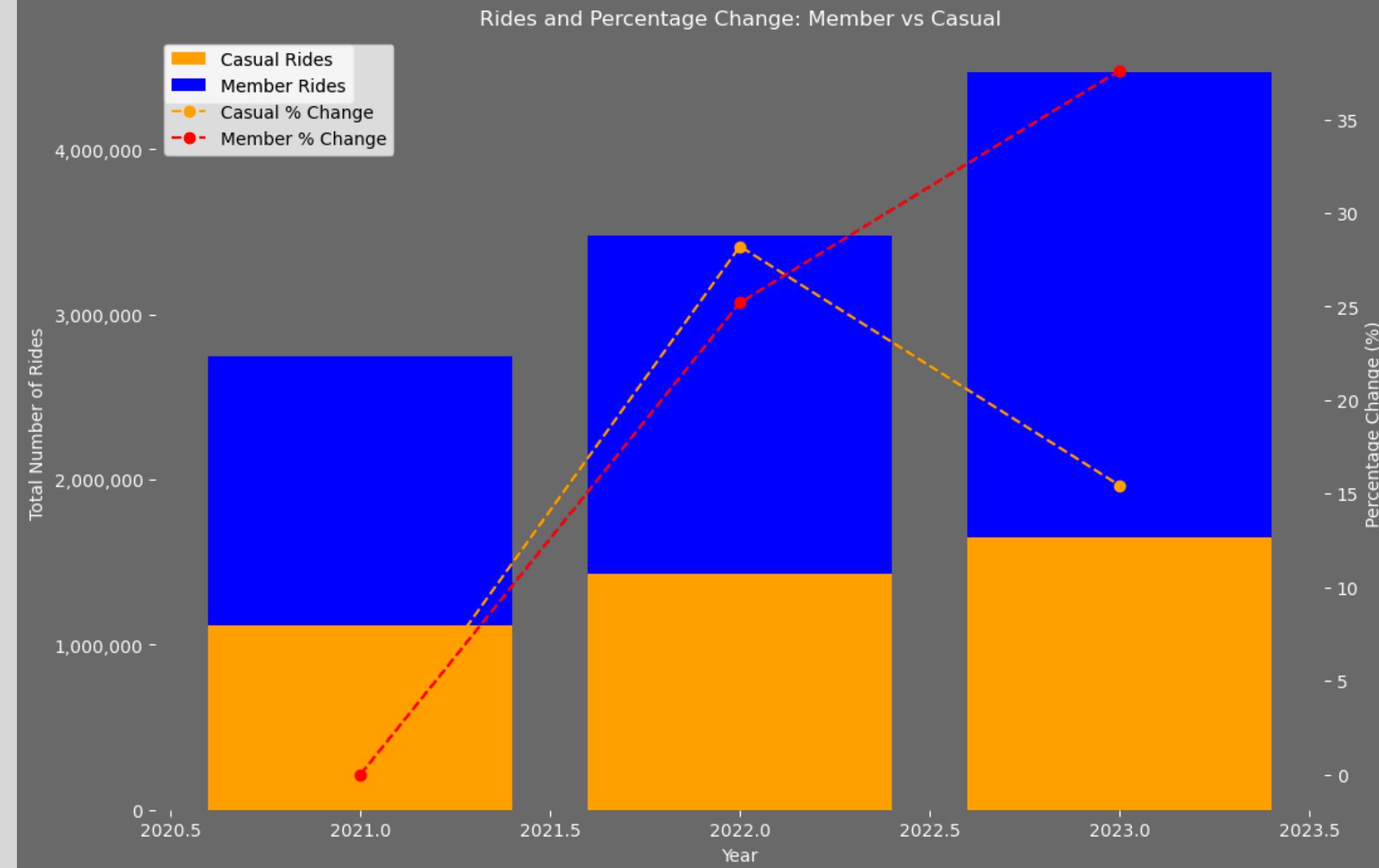
Seasonal Patterns and Weekend Effects on Member and Casual Rides Over Time

- Seasonal variations: Peaks in warmer months, declines in winter.
- Weekend influence: Higher ride counts on weekends.
- Member growth: Steady increase, more consistent usage.
- Casual peaks: Spikes during summer months.
- Yearly declines: Both member and casual rides drop in winter.



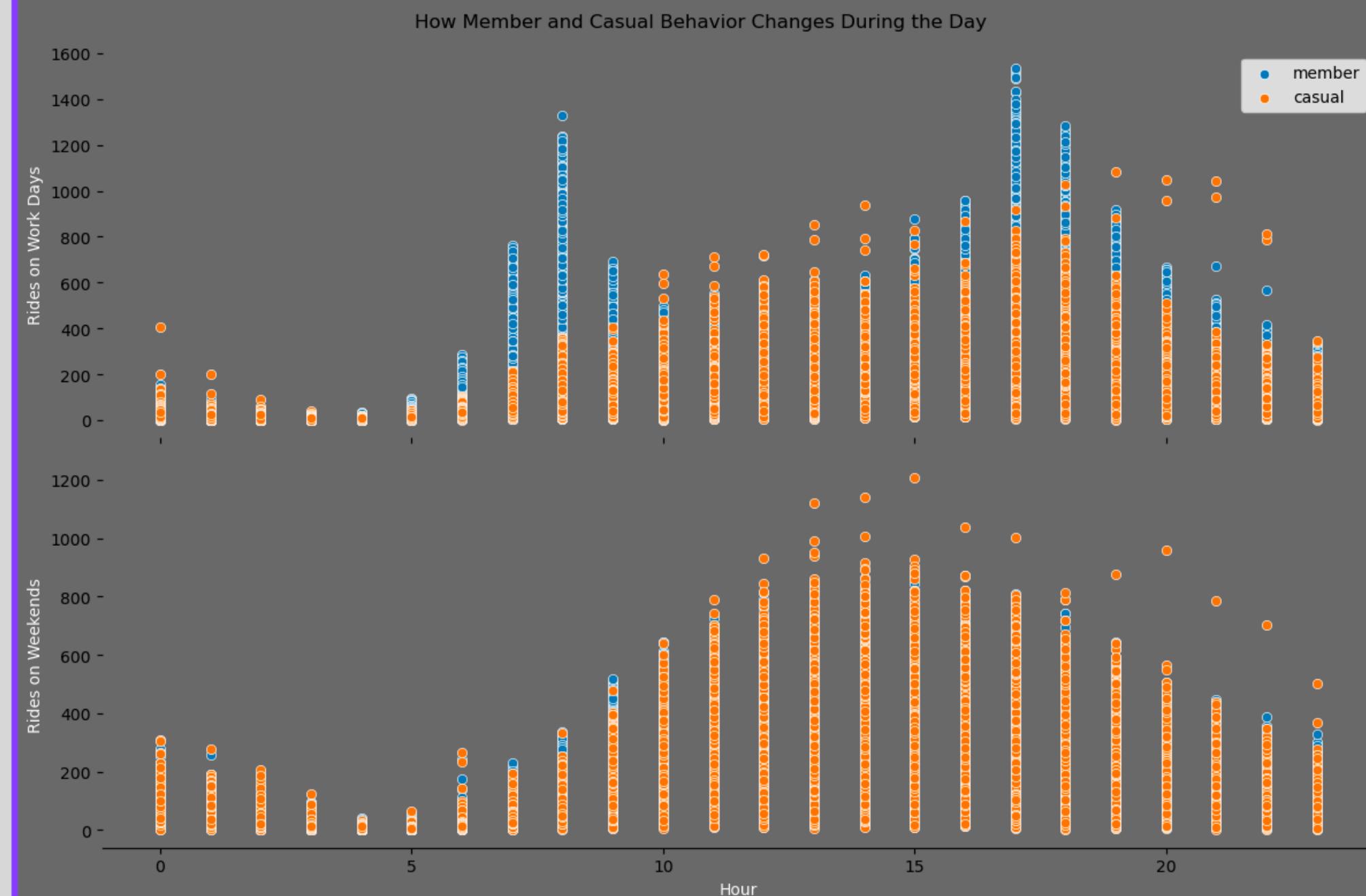
Trends in Ride Growth: Member Surge vs. Casual Slowdown

- Total Rides Growth: Both member and casual rides increase, with member rides leading.
- Diverging Trends: Casual rides drop in growth by 2023, while member rides continue to grow.
- Despite the initial growth, the recent trend suggests casual users are leveling off.



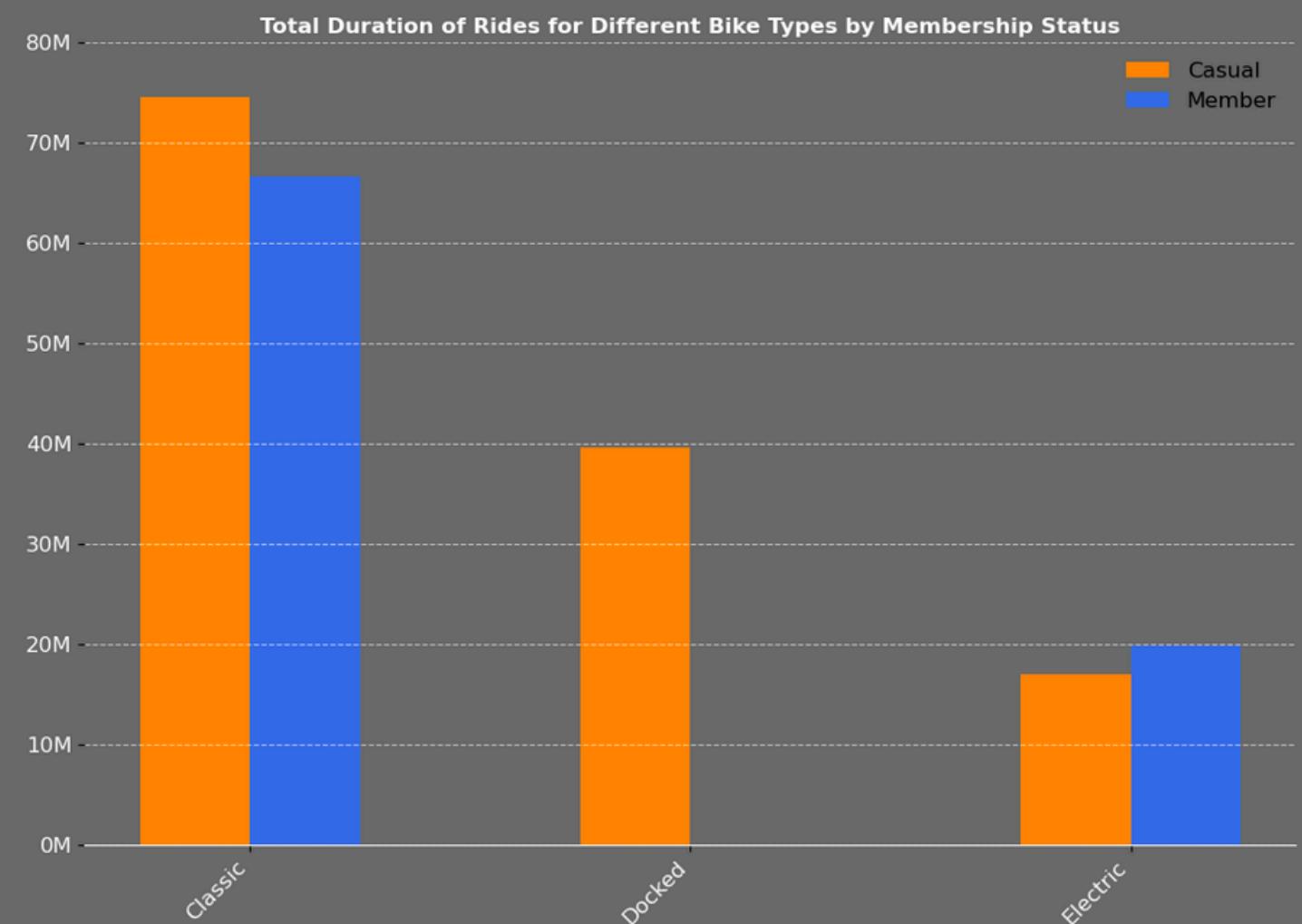
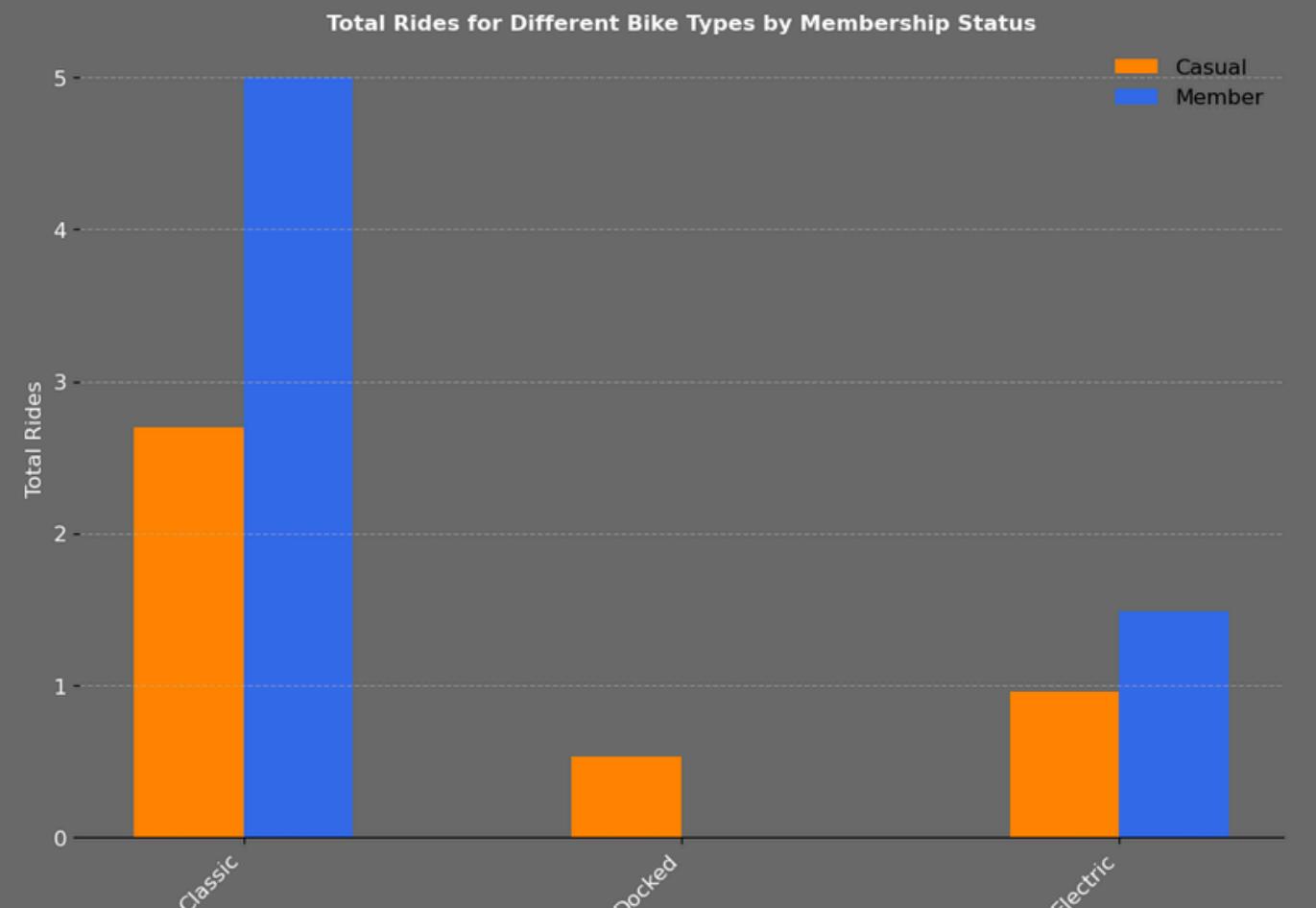
Daily Ride Patterns: Weekday Peaks vs. Weekend Steadiness

- Weekday peaks: morning and evening
- Member dominance: commuting hours
- Weekend balance: casual users active
- Low activity: early mornings



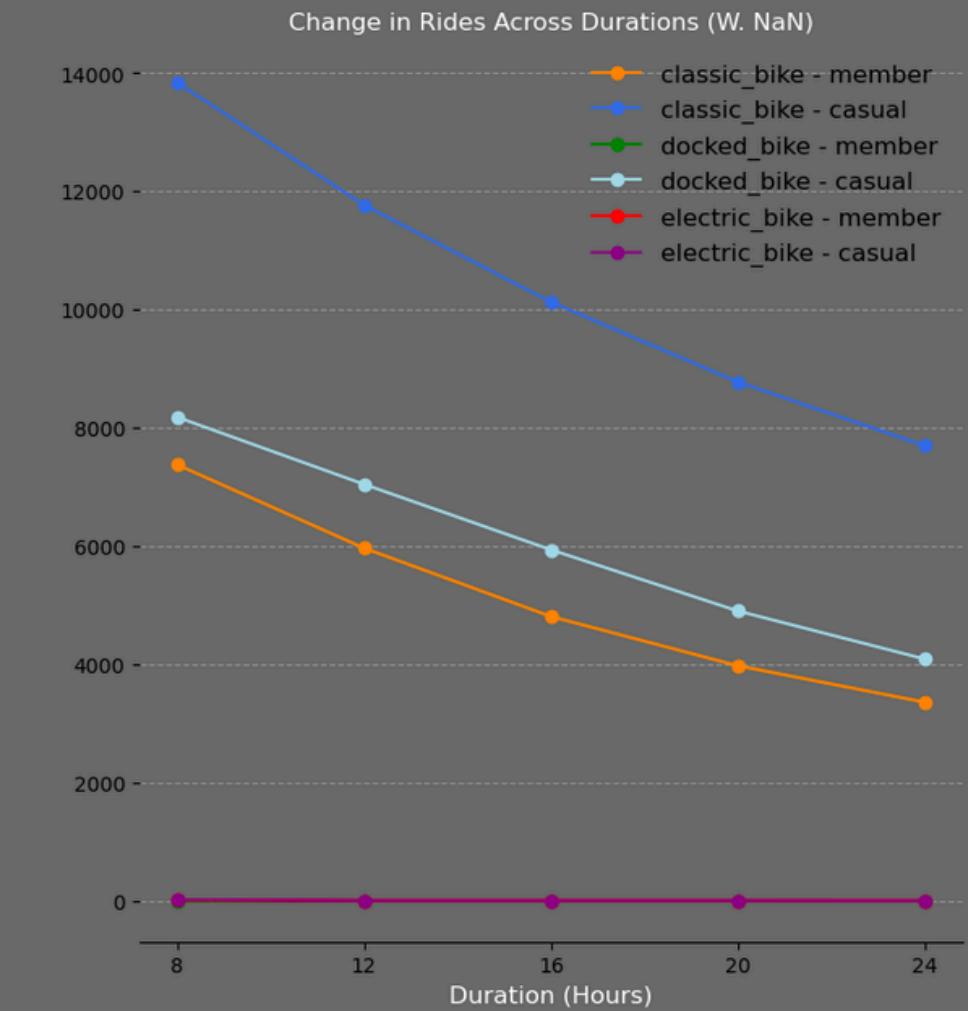
Unexpected Ride Duration Discrepancy: Casual Riders Outlast Members Despite Fewer Rides

- Total rides: Members have nearly double the rides of casual users.
- Total duration: Casual users exceed members in overall ride time.
- Average duration: Casual rides last longer on average.
- Unexplained gap: Large duration difference despite fewer casual rides.



Impact of Lost Bikes on Ride Duration Trends Across Bike Types

- Classic bikes: Significant drop after removing incomplete data.
- Lost bikes: Likely explanation for missing data.
- Docked bikes: Decrease after NaN removal.
- Data cleaning: Highlights rides without location data.



Traveler rating



Wendy T
New York

8 2

●○○○○ Reviewed October 13, 2023

Walk instead

Walk, don't bike. Docking stations don't work. I was charged \$250 for a bike I returned but didn't register with their malfunctioning docking station. They accused me of stealing the bike. I just filed a claim with the BBB. Their customer service is nonexistent. Now fighting this with my credit card. Also app tells you there's space at a docking station when there is none. I rode to 3 different stations. Don't use!

Date of experience: September 2023

Ask Wendy T about Capital Bikeshare

1 Thank Wendy T

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Jeffrey S
Waynesboro, Virginia

2 3

●○○○○ Reviewed September 4, 2023

Unexpected Robbery in the Capital.

I loved the convince of the bikes and their availability. But what gets me is how they keep giving me bogus charges. Even now that I'm home in another area 3 hours away, I keep getting charges. It seems the docks don't recognize the bikes some times and they send parking fees of \$25. I've had I've \$50 of non legit charges. They have refunded \$25 so far but don't want to recognize all the bad charges.

●●●○○ Reviewed May 19, 2024 via mobile

Easy and Cheap, but check your bike and be beware of the lack of docking stations at the popular stops.

The bikes are no longer in great shape, so make sure you select your bike carefully. The docking stations are sometimes full and then you cannot end your ride. We ended up paying for the time that we visited the Library, then did another ride and found an open dock. But generally quite easy (and cheap \$8 for 24 hrs).

Date of experience: May 2024

Ask Traveller_Oldie about Capital Bikeshare

Overcharged.

I Was charged \$50.00 for 1 hour of bike ride. 5 Bike stations were full, before finding an open spot.

Date of experience: February 2023



Virginia

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●○○○○ Reviewed June 9, 2023

Beware of "lost bikes" after you return them - excessive fees

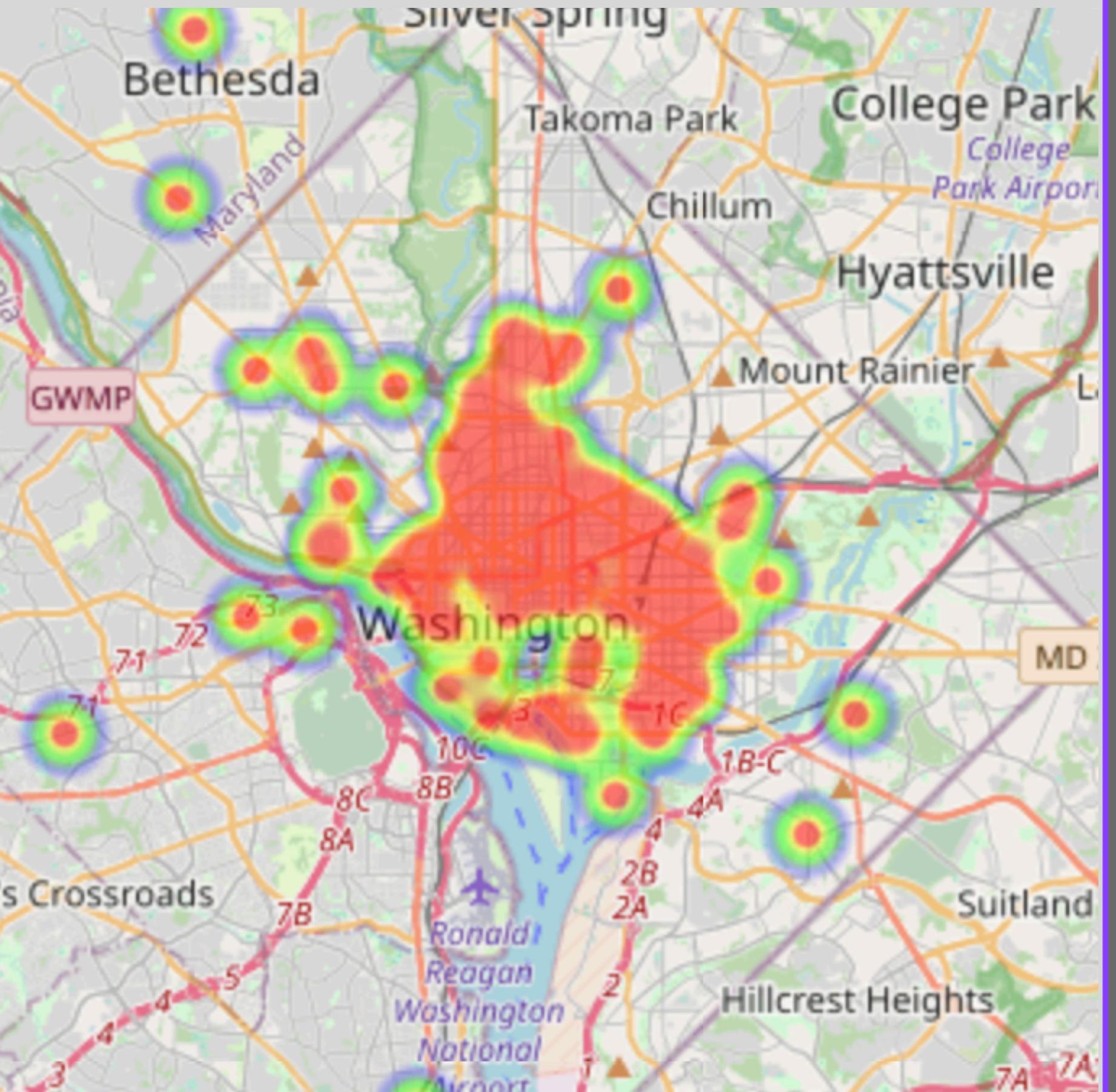
It's a good concept that is poorly (unethically?) managed. I rented 2 bikes with a friend. She did a couple single trip rentals whereas I did a day rental. Everything worked well except when we went to return the bikes. We returned them to a docking station but 2 weeks later got charged \$250 per bike because they said they were never returned. I thought that once you heard the click, got the green light and couldn't pull them back out then you could be certain they were locked in place. Apparently not. I don't know if the docking station was broken or someone tampered with it but Capital Bikeshare reported they never received the bikes! I'm still fighting it through my bank. It's a great way for them to make money off of unsuspecting visitors. I will never use this service again...and since they are part of Lyft, I won't use Lyft either.

Date of experience: May 2023

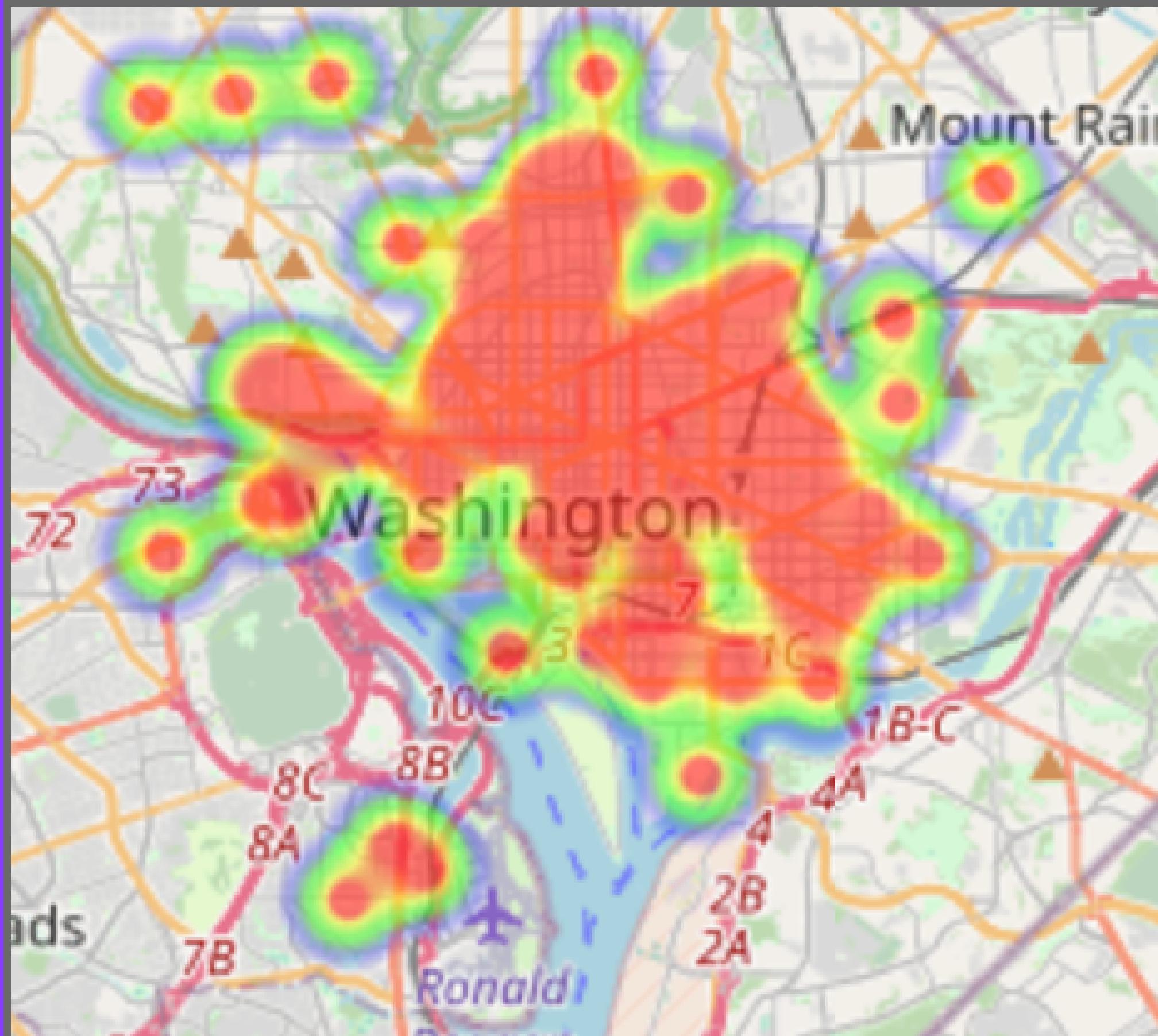
Can't park anywhere!

Terrible set up! They fill up every single dock so there's nowhere to park your bike (and you have to park it in one of their docks or you get charged astronomical fees). There were two docks right outside where we wanted to go, but they were all filled up and we had to ride around past six docking stations before we found one more than ten blocks away where we could park. Not worth it!!

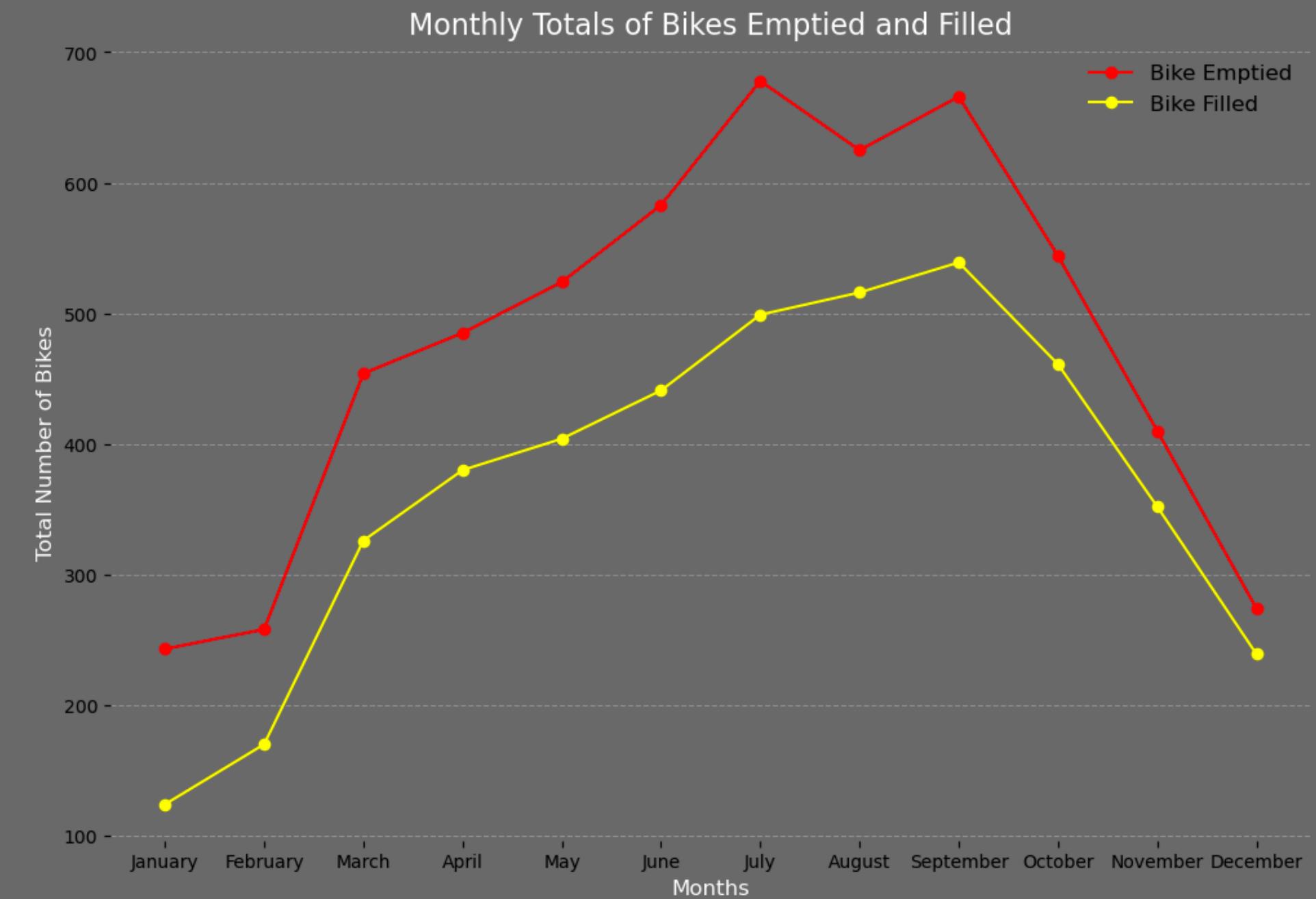
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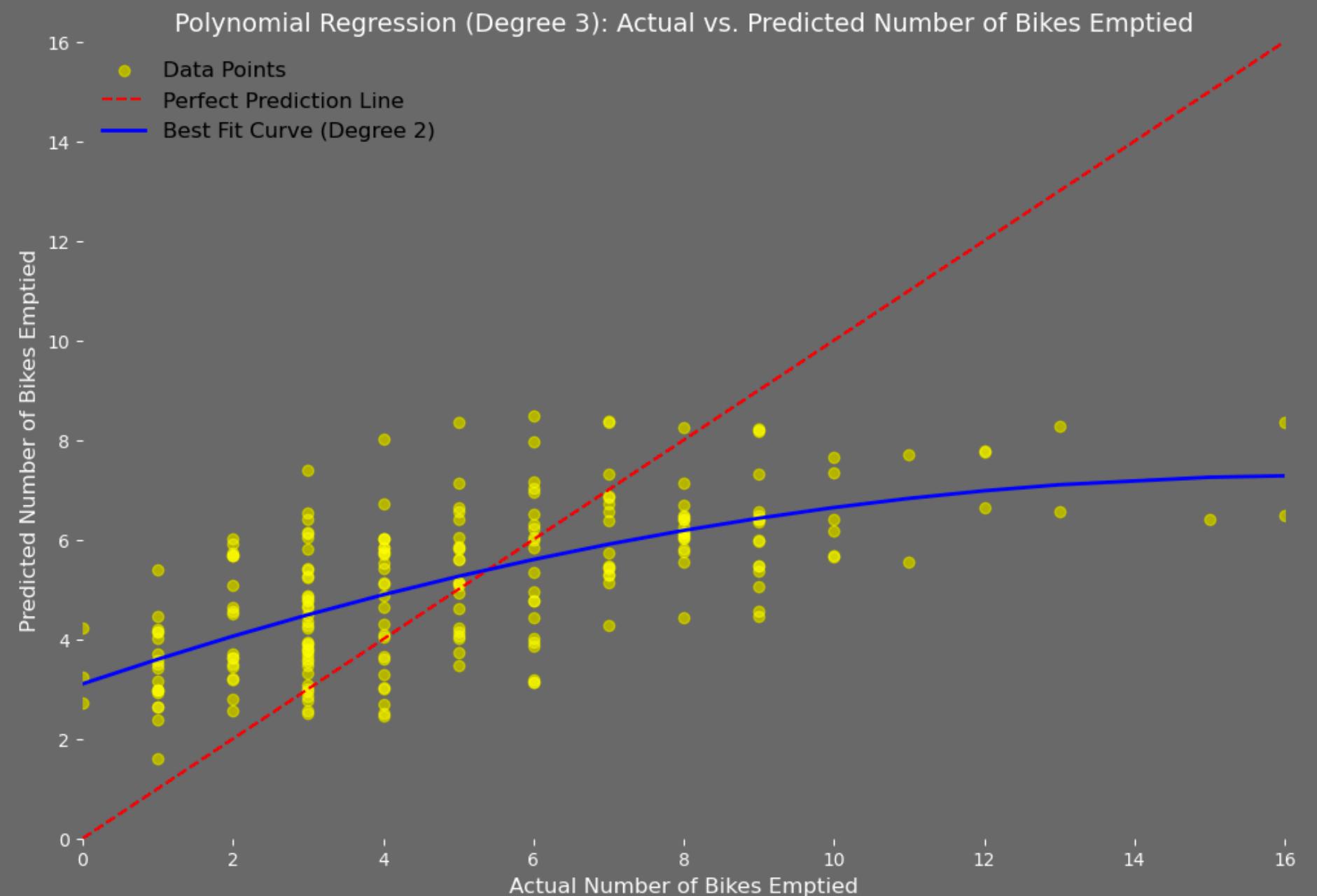


- 20 Station
- Estimated Dock Station Capacity: 30
- Empty the station when it's full.
- Create a model that predicts station fullness or the need to empty the station.



Polynomial Regression: Summary of Predictions

- This model predicts how many bikes will be emptied at a station.
- On average, it misses by about 2 times.
- While not perfect, it explains about 37.5 % of the bike-emptying pattern.
- Some factors are missed by the model, leading to errors.
- Overall, the model is somewhat useful but has room for improvement.



Conclusion & Recommendations

- Casual users are key to growth, with longer ride durations and potential for membership conversion.
- Dock station issues, especially full stations, lower satisfaction and harm Capital Bikeshare's image.
- Increasing station capacity and improving bike redistribution will boost user satisfaction and membership.
- Our model can forecast peak days, enabling proactive management of busy stations.
- Improving casual user experience will drive membership growth and strengthen the system's reputation.