

EDA OF CAPITAL BIKE SHARE

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Capital Bike Share
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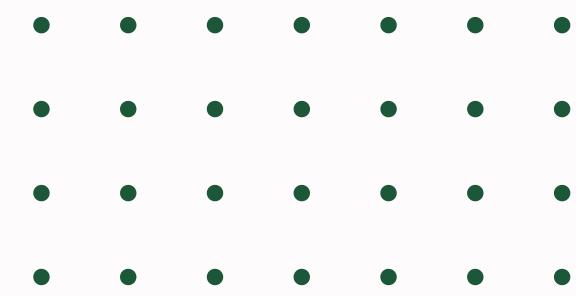
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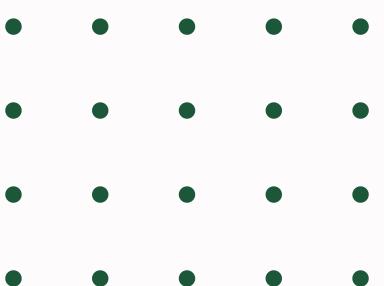




About Capital Bike Share

Capital Bikeshare (CaBi): A bike-sharing service in D.C., VA, and MD, offering eco-friendly, affordable urban transport since 2010

- **Founded:** 2010
- **Coverage:** Washington, D.C., Arlington, Alexandria, Montgomery County, and Fairfax County.
- **Membership Options:** Annual, monthly, or pay-as-you-go.
- **Mission:** Promote eco-friendly, affordable urban transport.

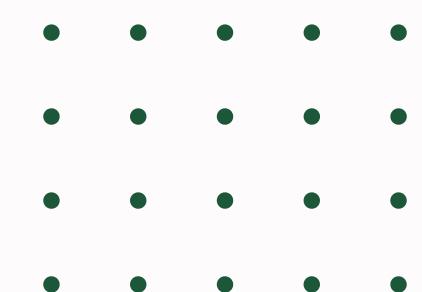




Fleet Optimisation

What is fleet optimisation ?

Maximize fleet efficiency, cut costs, and boost productivity through data-driven management.



Targets of Fleet Optimisation

Target #1



Maximize Asset Utilization
Optimize bike distribution based on demand patterns.
Use predictive analytics and dynamic rebalancing to reduce idle assets.

Target #2



Minimize Operational Costs
Apply predictive maintenance to prevent breakdowns.
Optimize rebalancing routes to cut fuel and labor expenses.

Target #3



Enhance User Experience
Ensure bike availability in high-demand areas.
Offer diverse ride options (e.g., electric bikes) where needed

Overview

01



fixed missing values, standardised formats, added Ride Duration, Time of Day, and Day of the Week.

Analyzed ride duration trends by time and user type, highlighting member vs. casual rider patterns.



02

03



Ride duration by day/user type and weekly trends with sorted visuals, clear annotations.

Uncovered rider patterns and usage trends, highlighting operational and marketing opportunities.



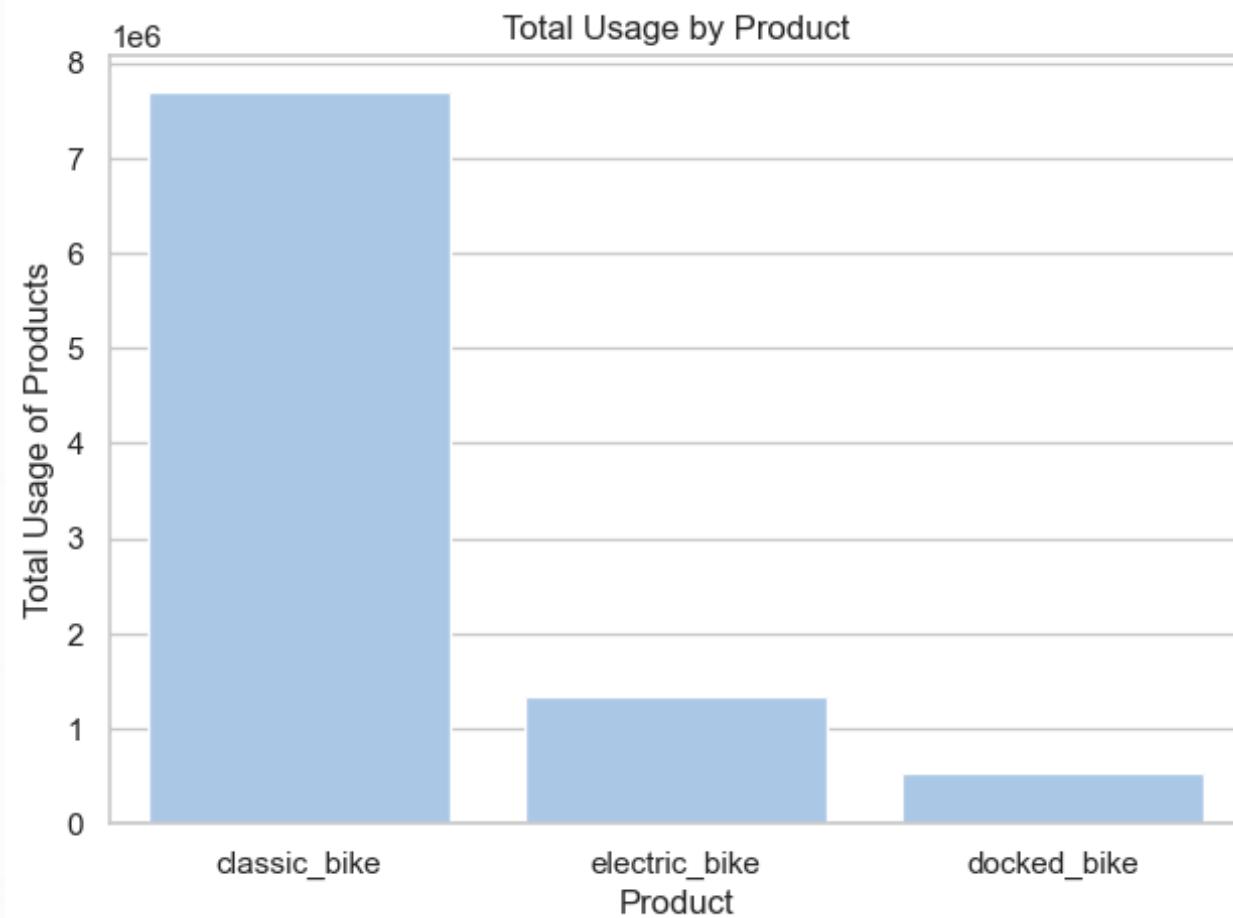
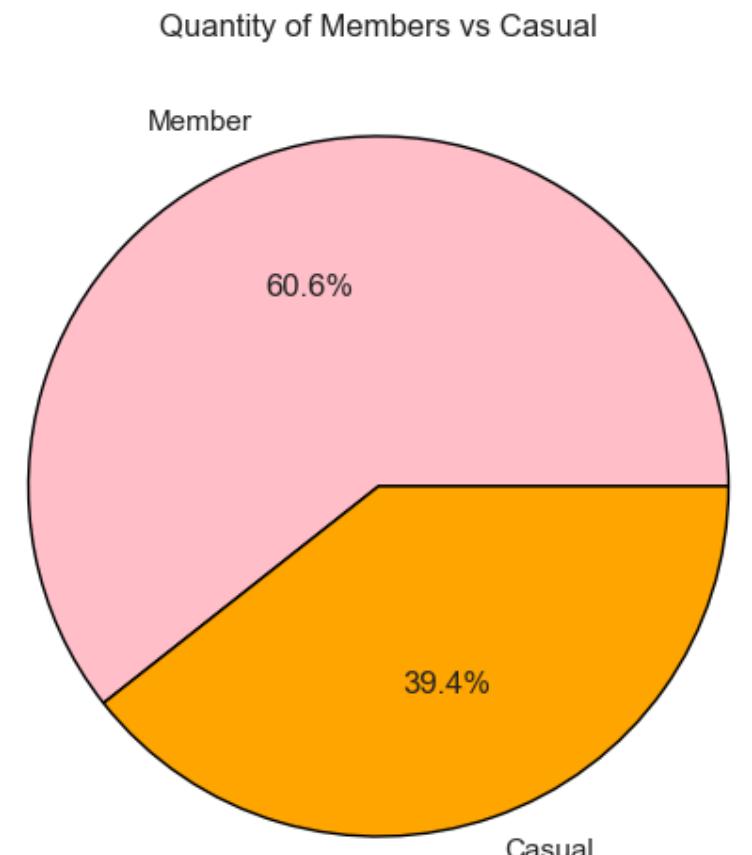
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Data Overview

The data shows a clear breakdown of our user base and bike usage patterns.

Members make up the majority of riders, with casual riders forming a smaller, yet significant, segment.

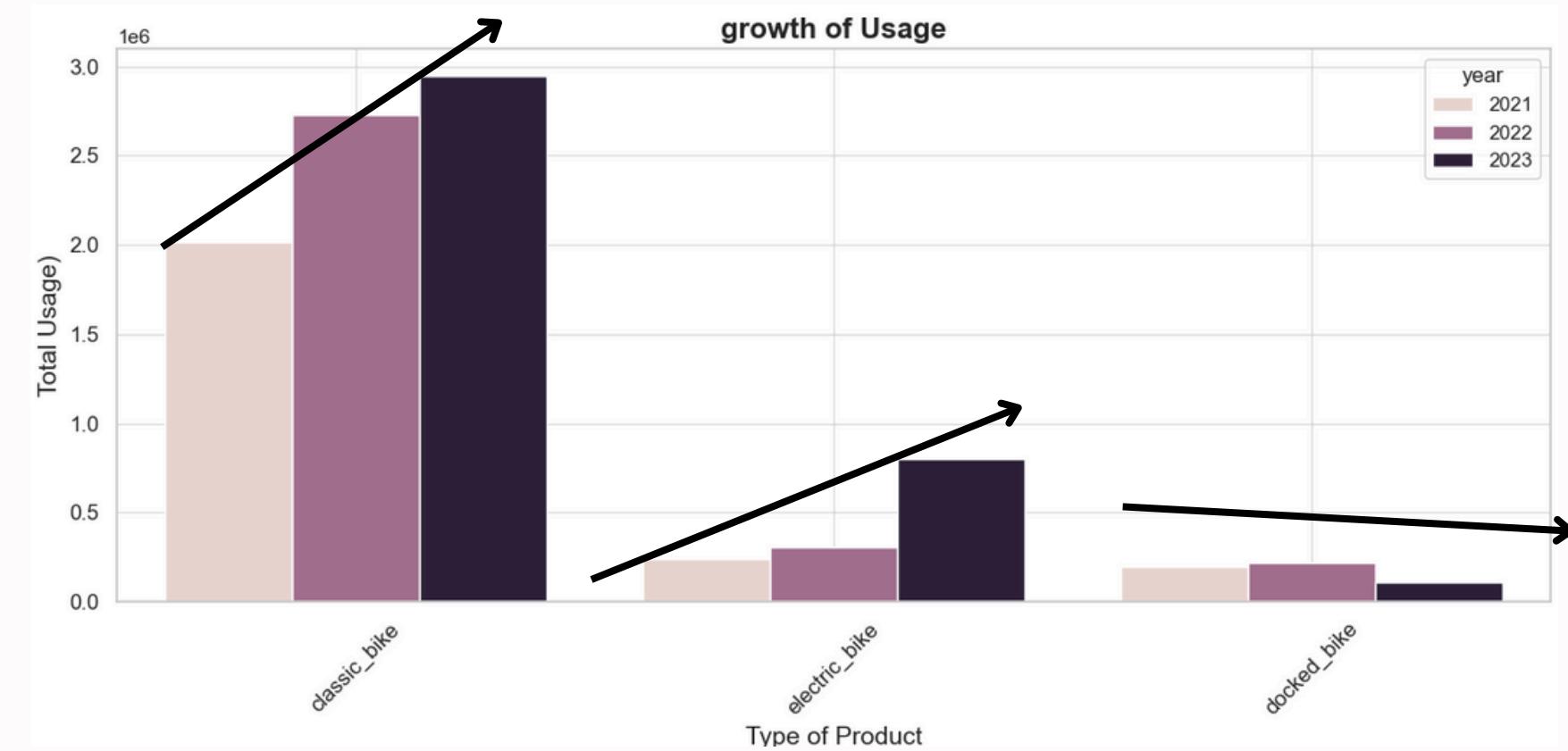
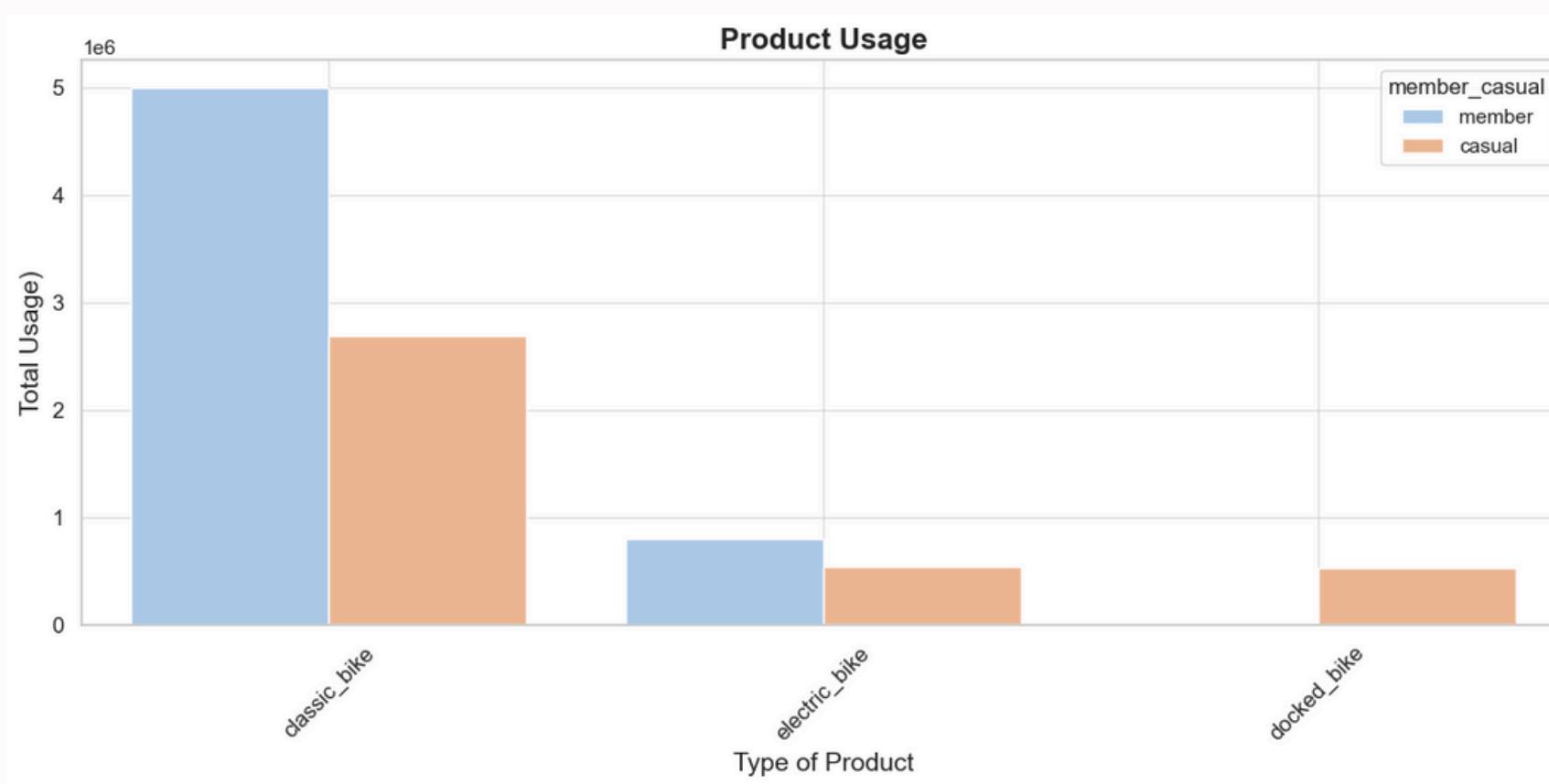
In terms of bike types, we see a mix of classic bikes, electric bikes, and docked bikes, with usage varying across the fleet.



Macro Fleet Usage

Understanding the Distribution

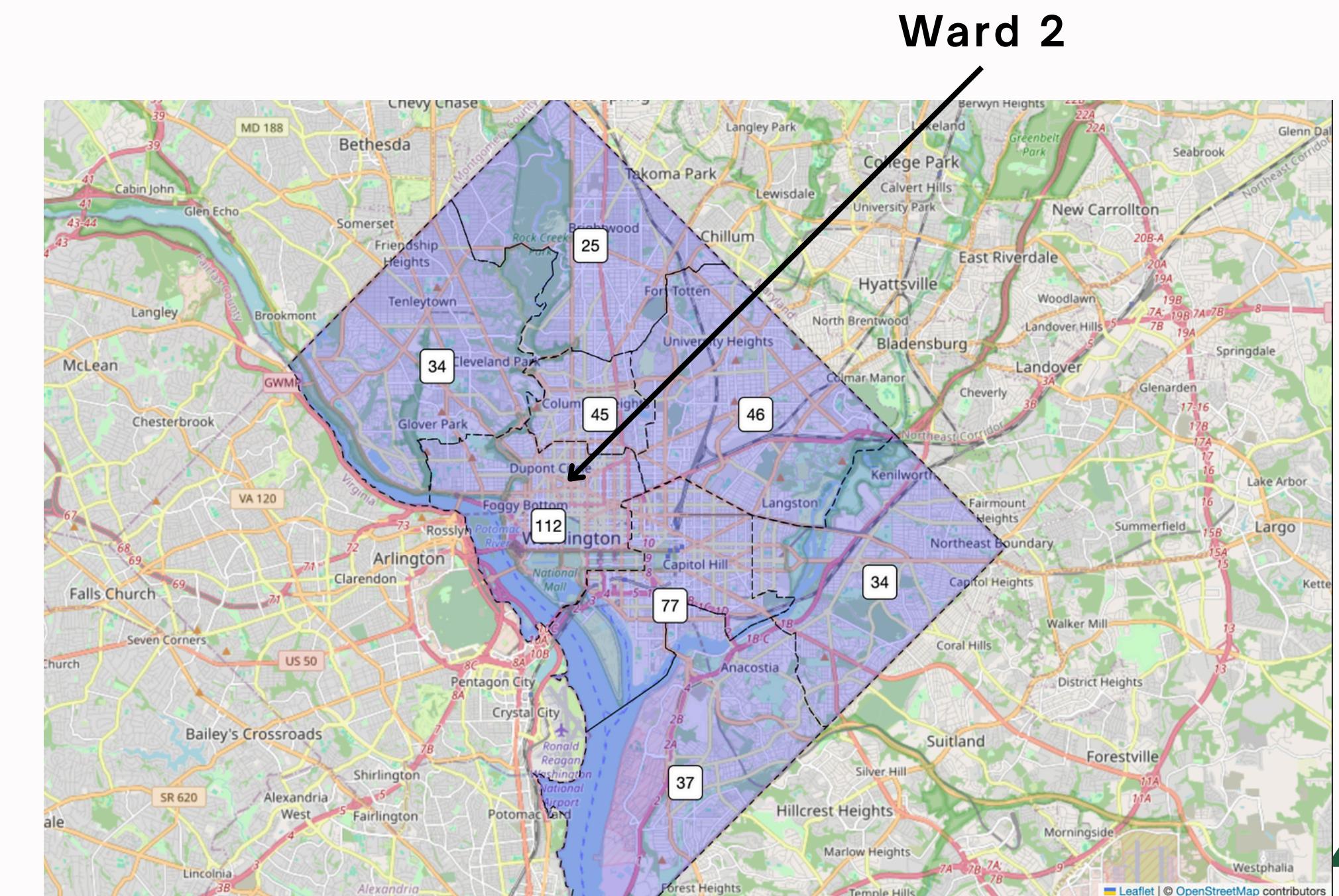
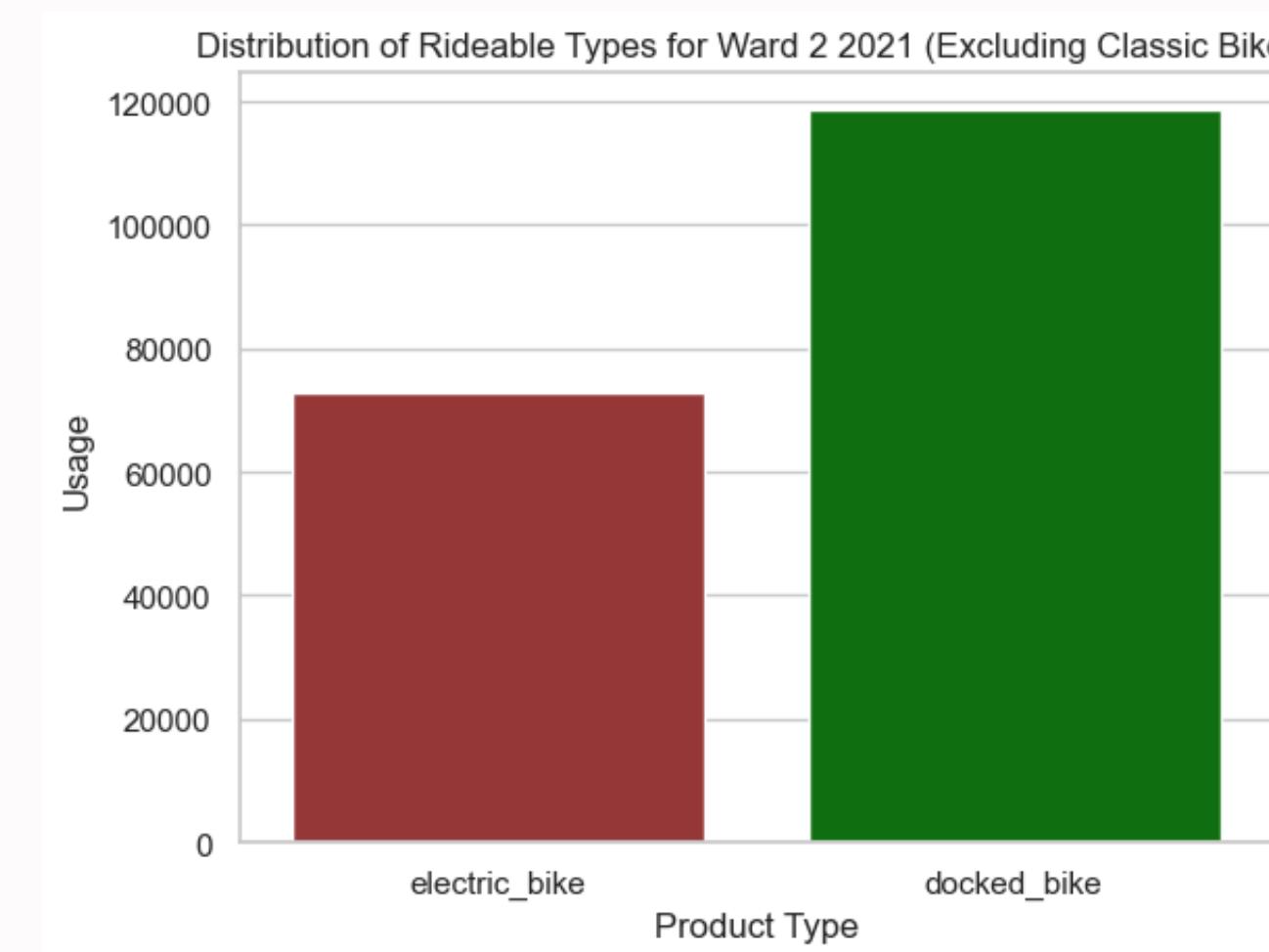
- What is the distribution between Members vs Casuals?
- What is the current distribution and growth of the bike types in Capital Bike Share's fleet.



Micro view Fleet Usage

Ward 2

Ward 2 was selected due to its high usage rates, large number of trips, central location within the city, and the high number of unique stations it serves.



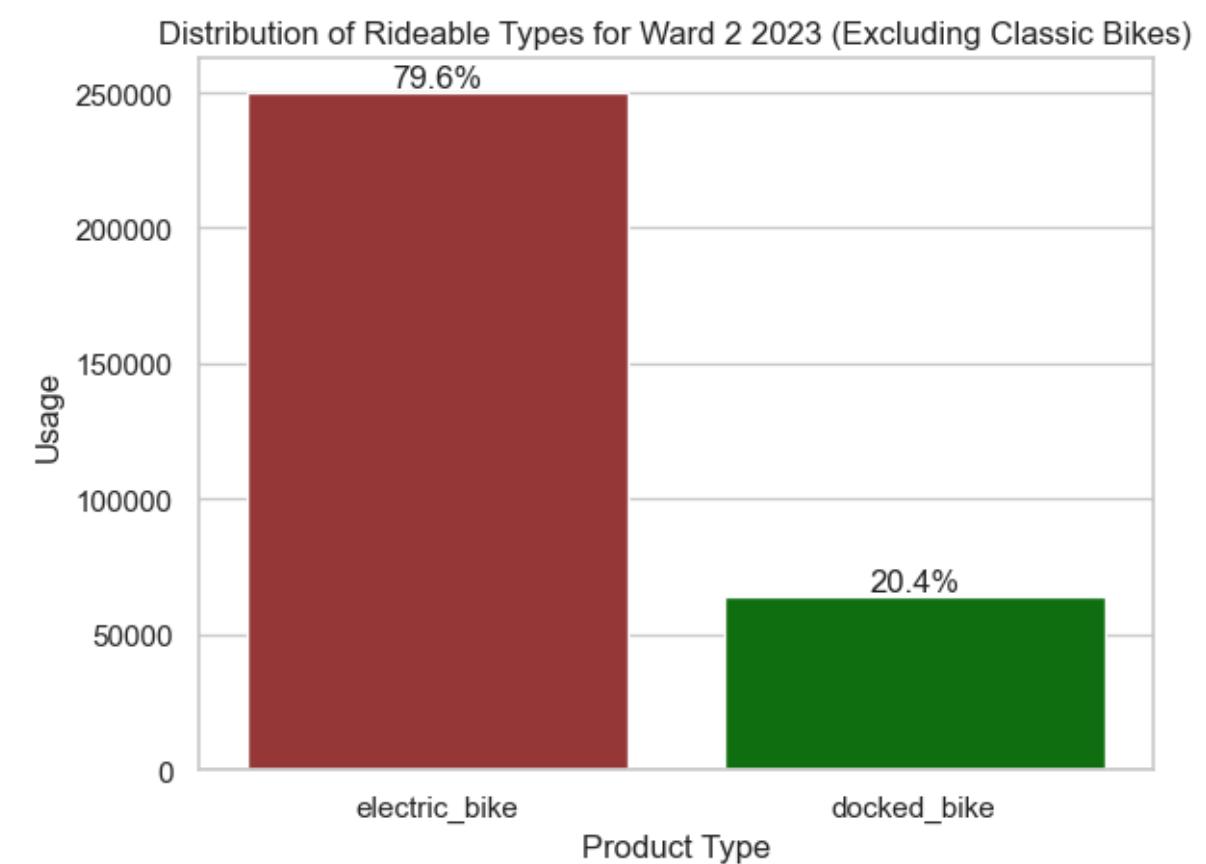
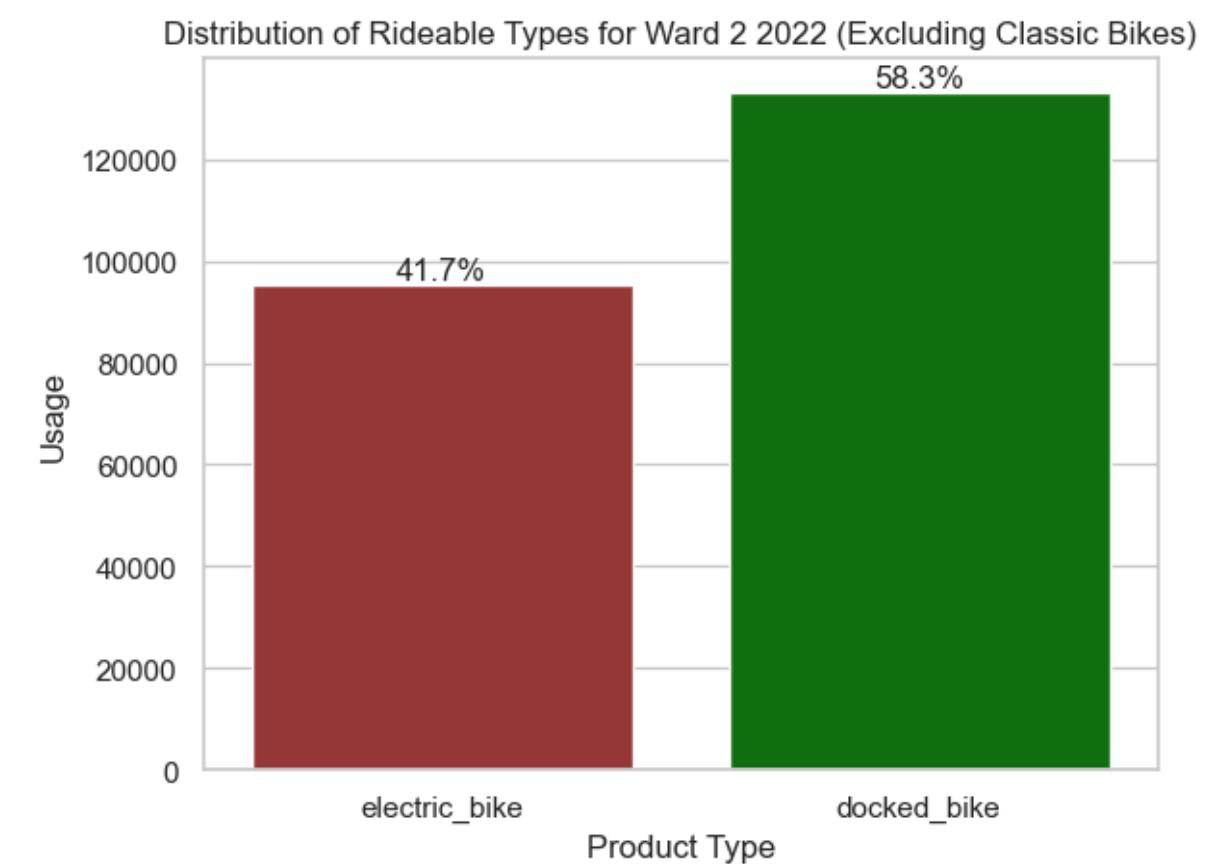
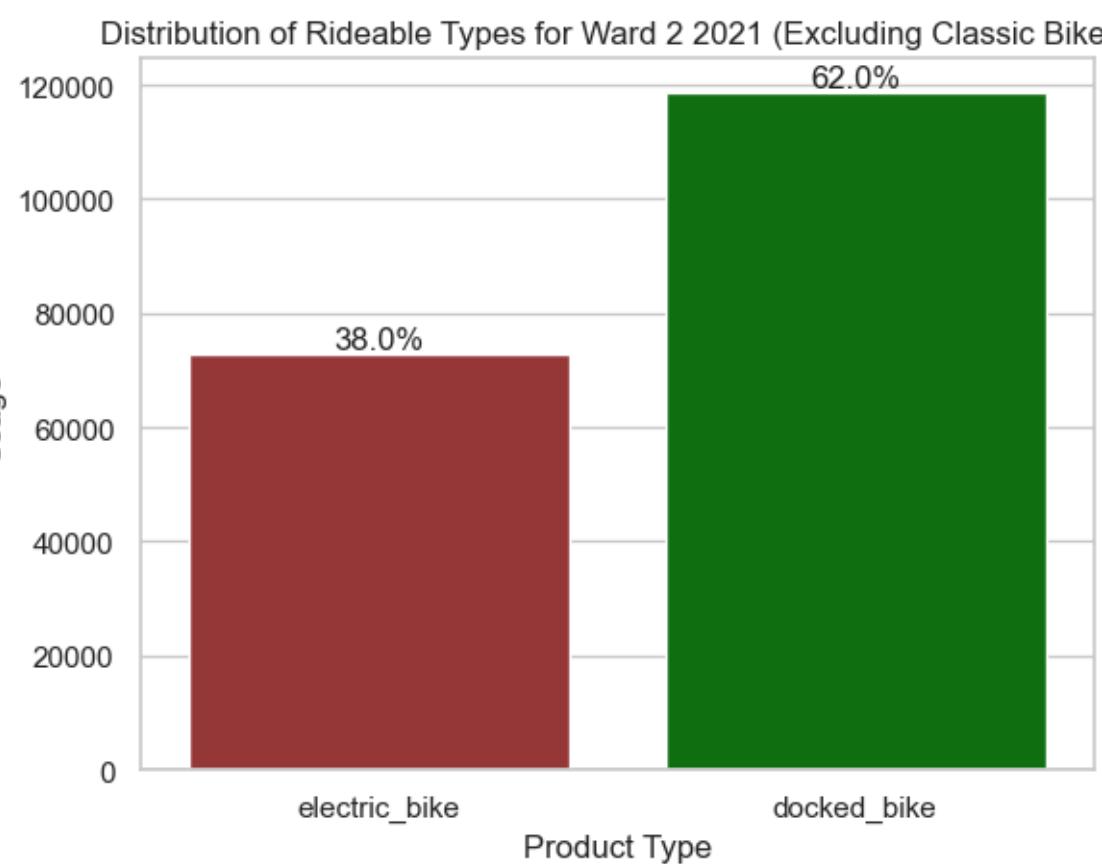
Micro Growth

Objective

Evaluating the year-to-year changes in usage.

Electric bikes over three years have had an average decrease of 109.47% and a compounded growth of 44.8%.

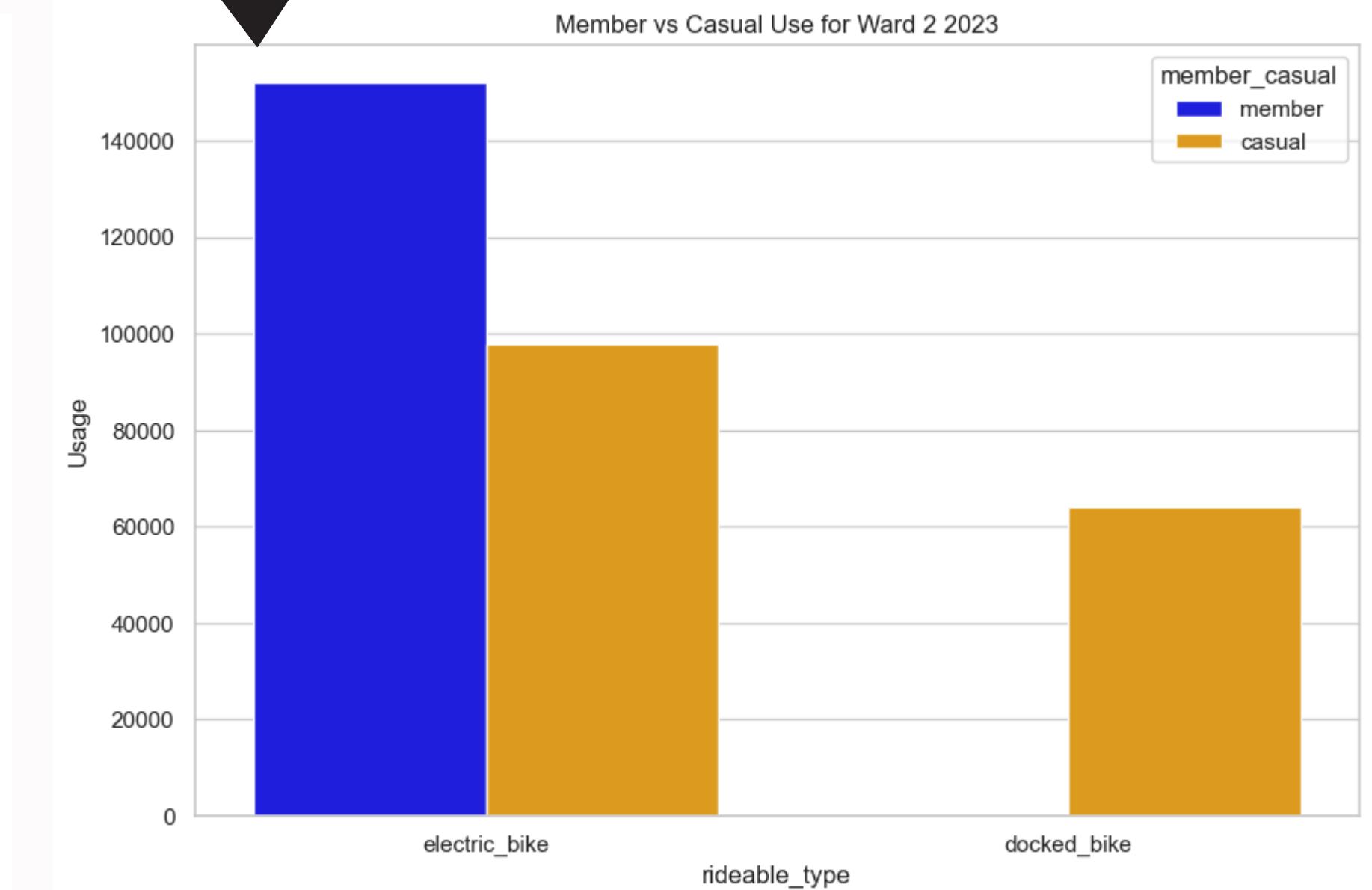
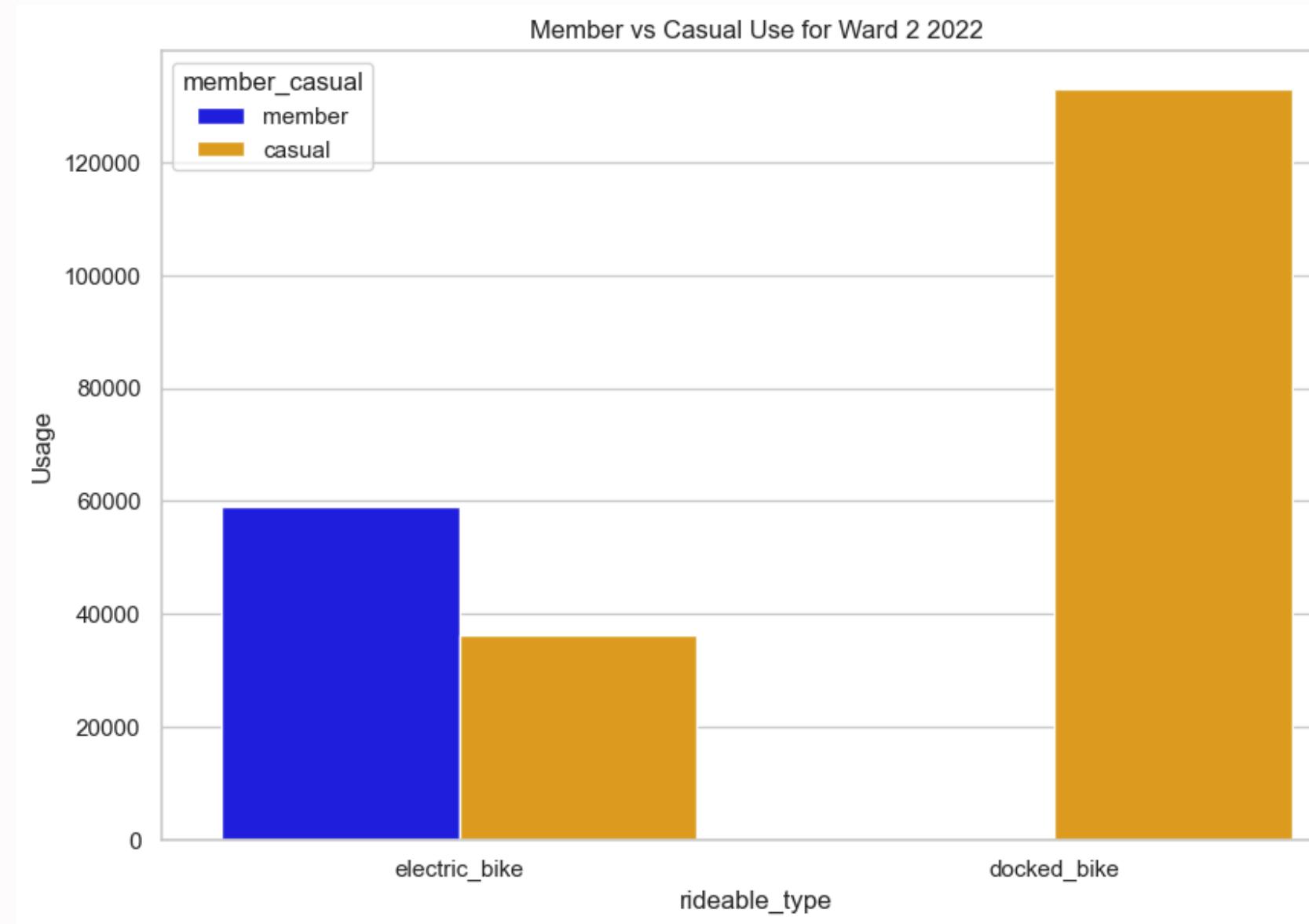
Docked bikes over three years have had an average decrease of -67.1% and a compounded growth of -42.63%.



Member vs Casual

Objective

Why was there such a dramatic shift between 2022 and 2023?





KPI / Fleet Optimisation

What is Fleet Optimization?

- Strategic management of the bike fleet to maximize availability, efficiency, and customer satisfaction.
- Focused on aligning fleet composition with demand trends while minimizing costs.

Why It Matters

- Rising e-bike demand reflects faster, flexible options. Docked bike use declines, highlighting shifting habits and cost-saving opportunities.

KPI Goals

- Leverage data analytics to align bike supply with demand across all wards.

Next Steps

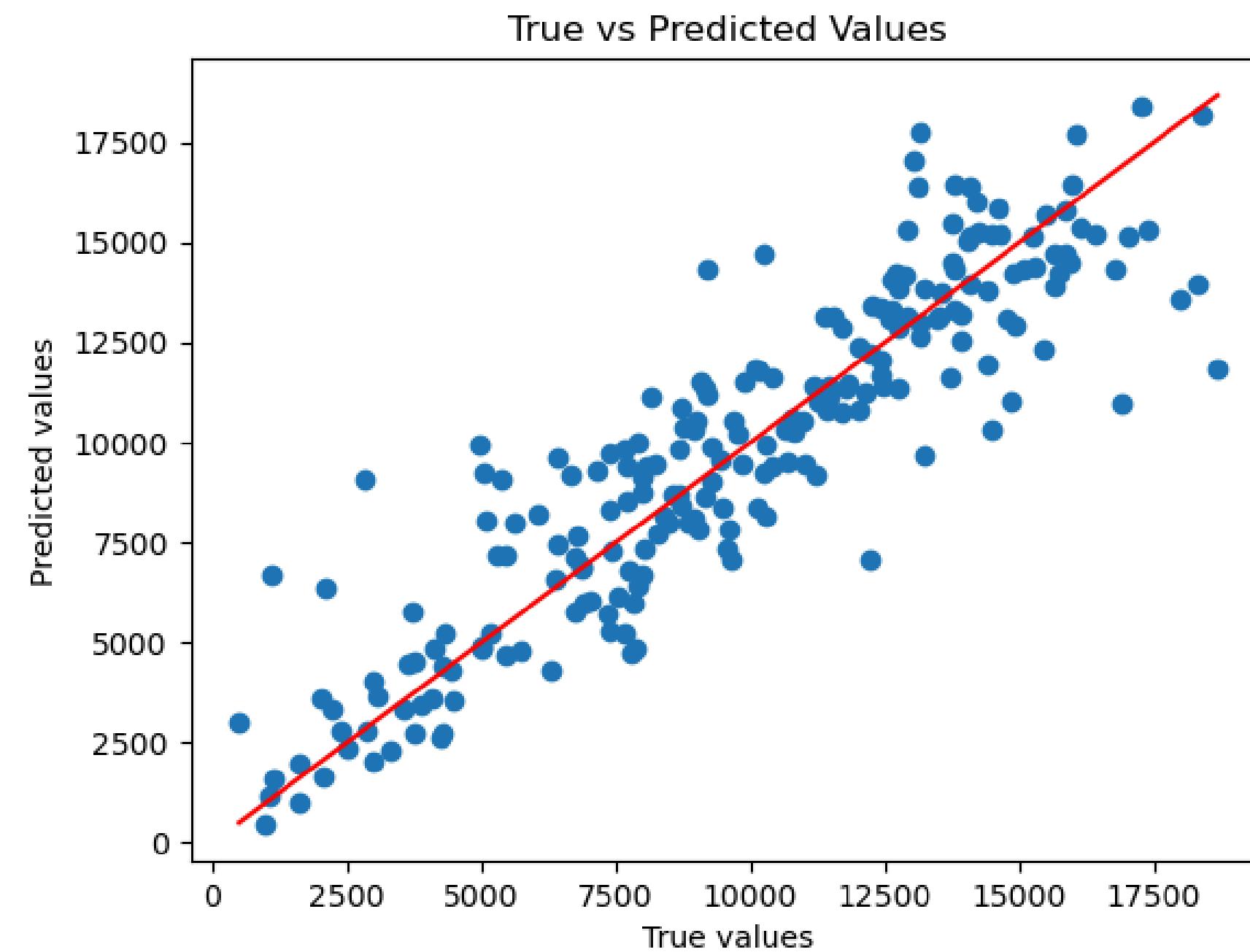
- Expand the electric bike fleet in high-demand areas.
- Reposition docked bikes to recreational or low-demand zones.
- Track performance monthly to refine the strategy. for a 1 year goal

Machine Learning



Performance of Model

Mean Squared Error: 3596854.3877221807
R-squared: 0.8024063529925862



Conclusion

- **Fleet Optimization is Key:** Efficiently managing the bike fleet ensures we meet rider demand while minimizing costs.
- **Electric Bikes Are the Future:** With their growing popularity, they should be prioritized in expansion and maintenance efforts.
- **Docked Bikes Require Reassessment:** Declining usage suggests we need to reconsider their placement and scale.
- **Member & Casual-Centric Strategy:** The high proportion of members highlights the importance of consistent availability and service quality.
- **Data-Driven Adjustments:** Regularly analyzing trends will allow us to stay adaptive and responsive to user needs.

