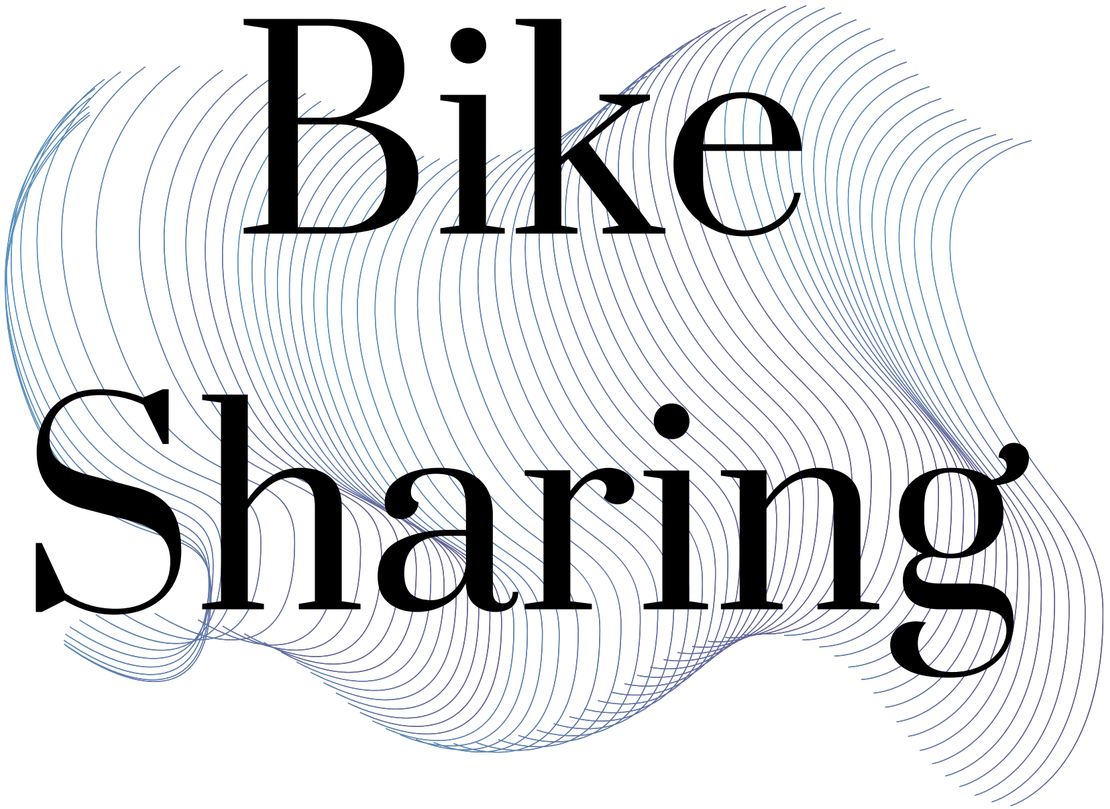
Bike Sharing



This Data Analysis is for the “introduction to data science” course

Overview

This project focuses on descriptive analysis of a bike-sharing dataset, specifically analyzing patterns, trends, and insights from the usage data. The primary goal was to provide actionable insights to the bike-sharing company, helping them enhance their services and marketing strategies. The analysis was performed on two datasets: day.csv and hour.csv.

Objectives:

1. Analyze bike-sharing usage patterns.
2. Identify factors affecting bike rentals.
3. Provide insights to improve marketing strategies and increase revenue.

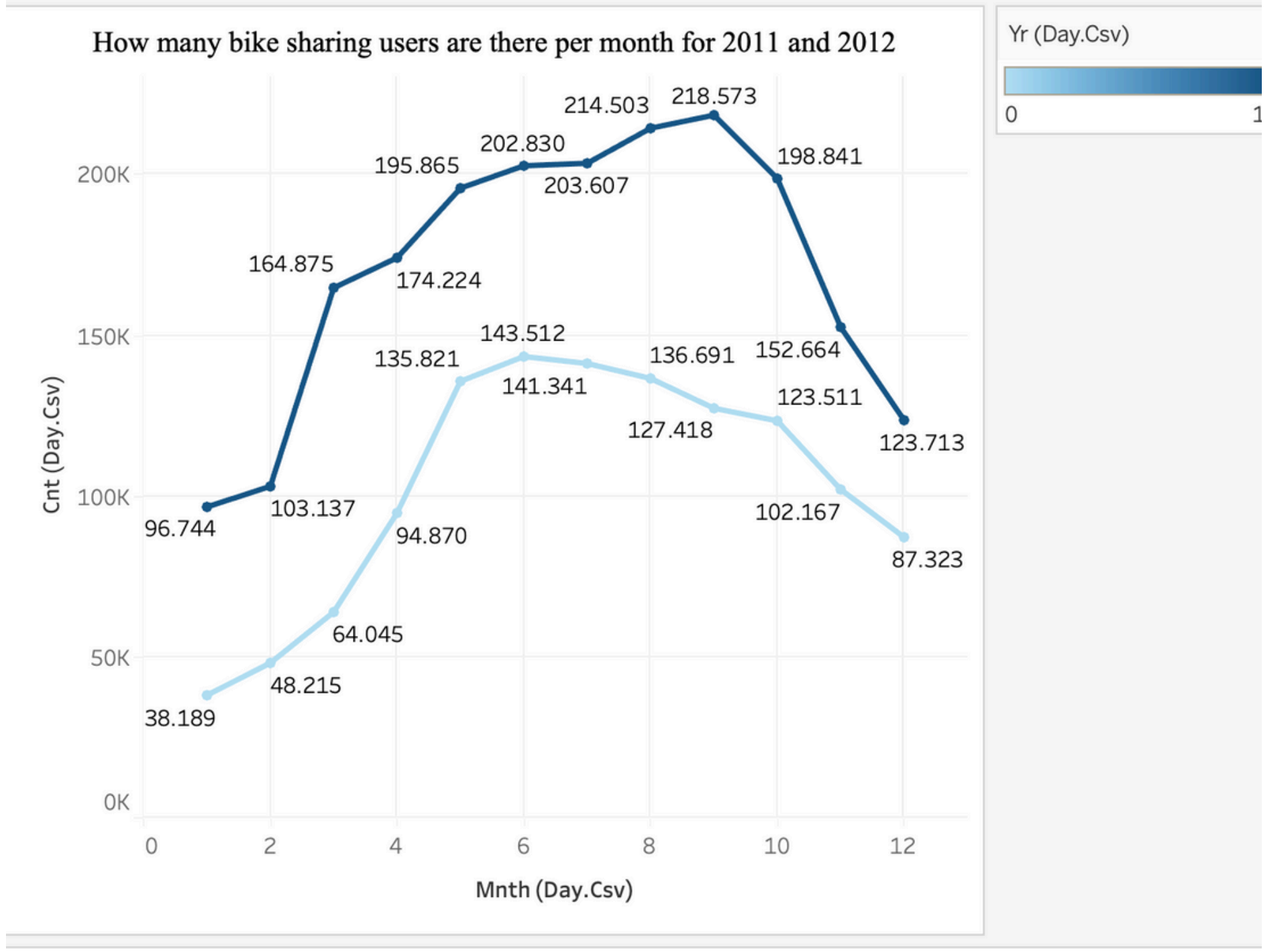
Hypothesis

1. How many bike sharing users are there per month for 2011 and 2012?
2. The use of bike sharing services is influenced by seasonal changes.
3. Sunny weather (1) has a higher bicycle loan rate than foggy weather (2).
4. The majority of bike borrowers are registered users, not casual users.
5. The attribute that has the highest correlation with the cnt attribute (total bike loans) is the temp attribute, not the atemp attribute, hum attribute, wind speed attribute.
6. Bicycle borrower type and year at 5% significant level are dependent.

1. Monthly Usage Trends (2011-2012)

- **2011**: Peak usage in June with 143,000 users; a declining trend towards the year's end.
- **2012**: Peak usage in September with 218,000 users; similar decline as 2011 post-peak.

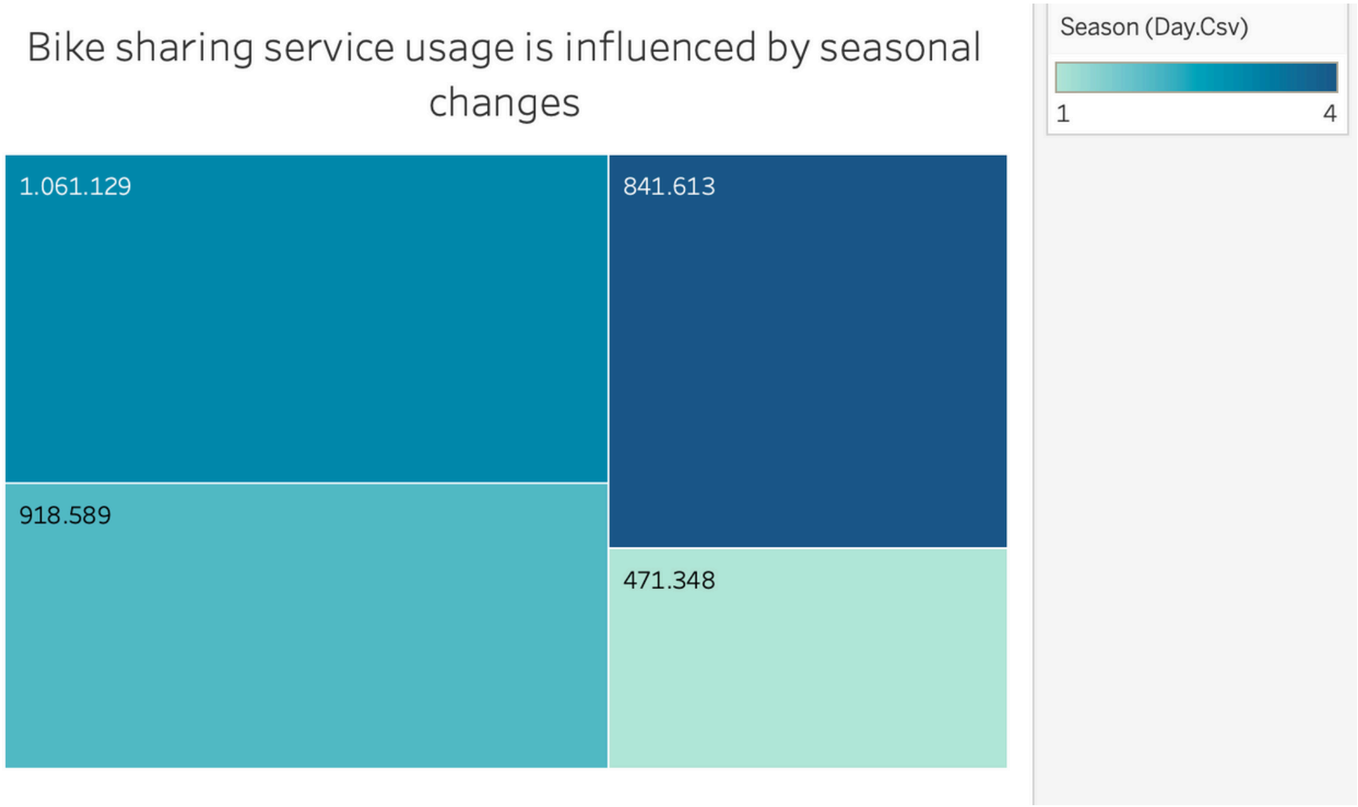
Insight: Bike-sharing services see increased usage mid-year, with a notable decline towards the end of the year, likely due to seasonal changes.



2. Impact of Seasons

- **Autumn** (3): Highest usage with 1,061,129 users.
- **Summer** (2): Next highest.
- **Spring** (1): Moderate usage.
- **Winter** (4): Lowest usage.

Conclusion: Seasonal changes significantly influence bike rental patterns, with autumn being the most popular season. Strategies should focus on increasing usage during winter.

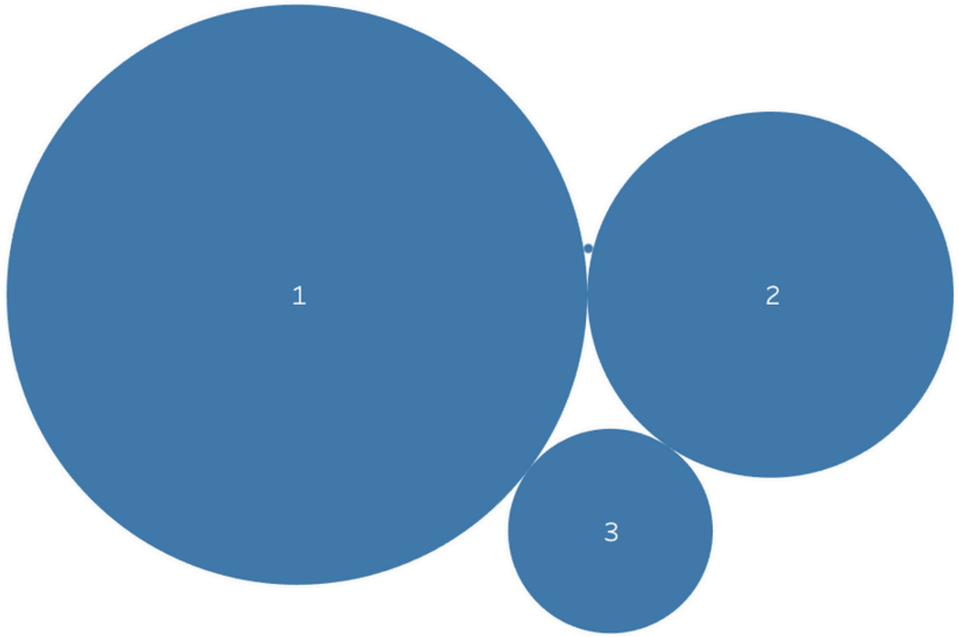


3. Weather Influence

Sunny weather (1) has a higher bike loan value than foggy weather (2)

- **Clear Weather** (1): Higher bike rental rates than foggy weather (2).

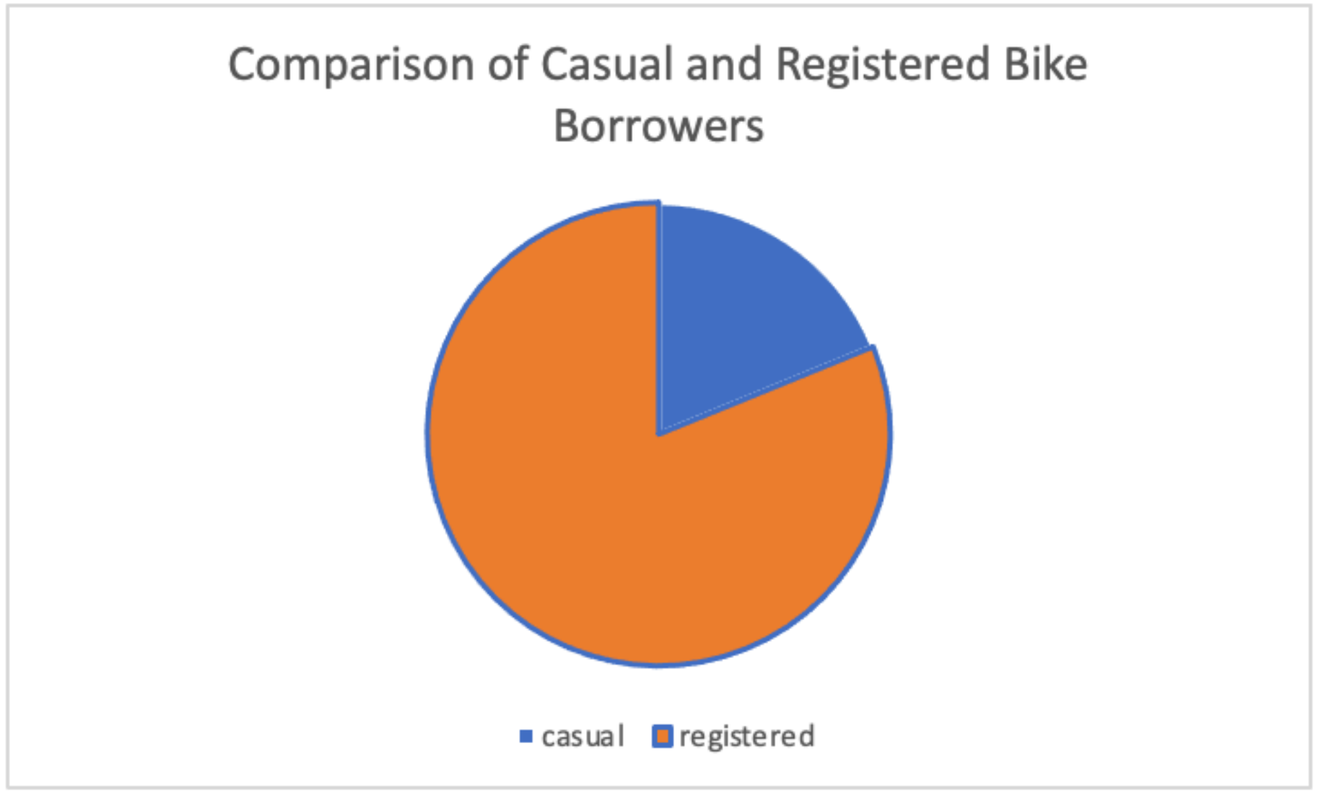
Conclusion: Weather conditions impact bike rentals. Clear weather encourages more bike usage, highlighting the potential for weather-based promotional strategies.



4. Registered vs. Casual Users

- **Registered Users**: Majority of bike rentals.
- **Casual Users**: Significantly fewer rentals.

Conclusion: Registered users dominate bike rentals. Marketing efforts could focus on converting casual users to registered users.



5. Correlation with Bike Rentals

	temp	atemp	hum	windspeed	casual	registered	cnt
temp	1						
atemp	0,33157589	1					
hum	-0,0259801	-0,0445297	1				
windspeed	-0,016129	-0,0652494	-0,0610408	1			
casual	0,25273609	0,32725354	-0,1096582	0,07920161	1		
registered	0,17289094	0,24028629	-0,102479	0,06883402	0,5066177	1	
cnt	0,2129664	**0,2894593**	-0,1153202	0,07896664	0,69456408	0,97215073	1

- **Atemp (Adjusted Temperature)**: Highest correlation with bike rentals (cnt), but weak correlation at 0.2894.

Insight: Temperature affects bike rentals, but other factors may have a more substantial impact. Further investigation into these factors is needed.

6. Dependency of User Type and Year

Observed			
	casual	Registered	Total
2011	247252	995851	1243103
2012	372765	1676811	2049576
Total	620017	2672662	3292679

Expected			
	casual	Registered	Total
2011	234078,3881	1009024,612	1243103
2012	385938,6119	1663637,388	2049576
Total	620017	2672662	3292679

x^2	1467,368309
degree	1
Critical value x^2 with degree 1	3,841

Hypothesis Test: Casual and registered users are dependent on the year at a 5% significance level.

Conclusion: User type distribution changes over years. Promotions might need adjustment based on annual trends.

Conclusion and Recommendations

Based on the findings, the following recommendations are proposed:

1. **Seasonal Strategies**: Implement promotional campaigns in winter to increase rentals during low-demand periods.
2. **Weather-Based Offers**: Develop dynamic pricing models based on weather conditions to maximize rentals.
3. **User Conversion**: Focus on strategies to convert casual users into registered users to boost consistent usage.
4. **Further Research**: Investigate additional factors influencing bike rentals, such as urban events or economic conditions.