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Task 6.1

Sourcing Open Data

Data Source

The dataset I have chosen for this achievement is about the New York Citi Bike system, sourced from Kaggle.com at this location. The data was collected and aggregated using the Citibike service and information collected from its use. This is an internal data source, as it is collected, used, and shared by the New York Citibike service for analysis. The data was collected by usage, as the trips taken with the bike rental service are recorded as they occur. The data set lists all the trips purchased within the service, and include the time and day of the trip, start and end locations, trip duration, and basic customer demographic information like birth year, gender, and whether they are a subscriber to the service or not.

Data Cleaning

Mixed-type data: The column for 'gender' was a mixed-typing after import to Jupyter. After reviewing the column, it has a key for gender instead of the gender written out. I have changed the column to a string-type for this reason.

Missing data: The 'birth_year' information is missing from the dataset in 6,979 records. This accounts for almost 14% of the records, taking out the possibility of simply removing them. I will keep them blank for the time being, as it should not affect analysis.

Duplicated data: No duplicate records were found.

Data Understanding

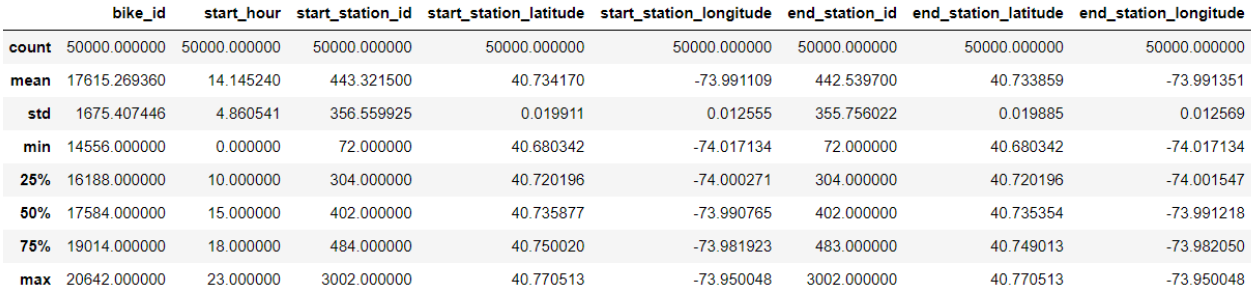
Variables

- Trip_id – unique code to indicate trip
- Bike_id – identifying label for each individual bike
- weekday – day of the week of the trip
- start_hour – hour the trip has started
- start_time / end_time – exact time and date of the trip start and end
- start_station_id / end_station_id – ID number of the bike station the trip started and ended on
- start_station_name / end_station_name – name of the starting and ending location
- start_station_latitude / start_station_longitude / end_station_latitude / end_station_longitude – latitude and longitude of the starting and ending station
- trip_duration – total time of trip, from start to end, in seconds
- subscriber – indicates whether the trip was done by a subscriber to the service or not
- birth_year – birth year of the customer
- gender – indicates gender of the customer; 0 is Unknown, 1 is Male, 2 is Female

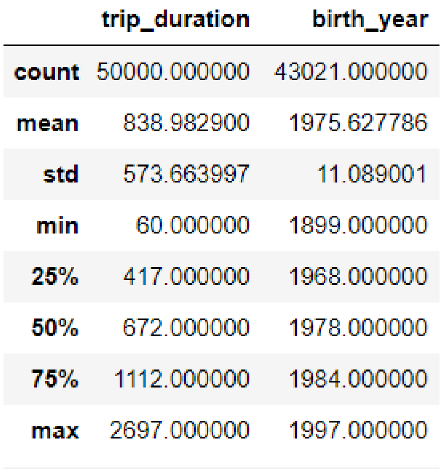
Descriptive Analysis

- Summary

  - The dataset is 50000 records long, with 18 variables
- Descriptive Analysis



	bike_id	start_hour	start_station_id	start_station_latitude	start_station_longitude	end_station_id	end_station_latitude	end_station_longitude
count	50000.000000	50000.000000	50000.000000	50000.000000	50000.000000	50000.000000	50000.000000	50000.000000
mean	17615.269360	14.145240	443.321500	40.734170	-73.991109	442.539700	40.733859	-73.991351
std	1675.407446	4.860541	356.559925	0.019911	0.012555	355.756022	0.019885	0.012569
min	14556.000000	0.000000	72.000000	40.680342	-74.017134	72.000000	40.680342	-74.017134
25%	16188.000000	10.000000	304.000000	40.720196	-74.000271	304.000000	40.720196	-74.001547
50%	17584.000000	15.000000	402.000000	40.735877	-73.990765	402.000000	40.735354	-73.991218
75%	19014.000000	18.000000	484.000000	40.750020	-73.981923	483.000000	40.749013	-73.982050
max	20642.000000	23.000000	3002.000000	40.770513	-73.950048	3002.000000	40.770513	-73.950048



	trip_duration	birth_year
count	50000.000000	43021.000000
mean	838.982900	1975.627786
std	573.663997	11.089001
min	60.000000	1899.000000
25%	417.000000	1968.000000
50%	672.000000	1978.000000
75%	1112.000000	1984.000000
max	2697.000000	1997.000000

- Qualitative Data
  - Trip ID
    - Values count: 50,000
    - Mode: N/A
  - Weekday
    - Values count: 7
    - Mode: Monday
  - Start station name
    - Values count: 330
    - Mode: W 20th St and 11th Ave
  - Subscriber
    - Values count: 2
    - Mode: Subscriber
  - Birth Year
    - Values count: 77
    - Mode: NA
  - Gender
    - Values count: 3
    - Mode: 1
- Data Integrity
  - Everything appears to be within logical parameters

Limitations and Ethics

One limitation that immediately pops out is the accuracy of the demographic information. Being entered by the customer, not only is it prone to being incorrectly entered but also runs the risk of them not giving the correct answer for the sake of security (the birth year, for example).

Ethically, I don't see any information that is PII, or could connect any of the trips to an individual person. However, even though the data set does not have direct information, it does provide exact coordinates of the bike and time/date information of the trip. If put into the wrong hands, this could lead to some issues with security. As long as the service has a term of service which shares that they collect location information, we should be ok legally.

Questions to Explore

Some possible questions that can be explored through the data:

- Marketing: What times and days are customers, both subscribers and non-subscribers, most active? Are there certain areas within New York that see the most usage of the service? What is the age demographic of the most common customers? Are holidays a popular time for customers to use the service?
- Operations: Where are the most trips starting? Where are most bikes being left at the end of the trip? Is there a correlation between age and how long the trip is? Are there certain bikes that are used much more than others? Is there seasonality with the trips taken?