Zeru-Zhou-project9

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1 Project 9 – Zeru Zhou

TA Help: NA

Collaboration: NA

- Get help from Dr. Ward's videos

1.1 Question 1

```
[1]: import pandas as pd
```

```
[2]: dat = pd.read_parquet("/depot/datamine/data/disney/total.parquet")
     dat.head()
```

```
[2]:              datetime  SACTMIN  SPOSTMIN            ride_name  status
     0 2015-01-01 08:27:58      NaN       NaN  pirates_of_caribbean  closed
     1 2015-01-01 08:56:55      NaN       NaN  pirates_of_caribbean  closed
     2 2015-01-01 08:57:38      NaN       NaN  pirates_of_caribbean  closed
     3 2015-01-01 08:58:34      NaN       NaN  pirates_of_caribbean  closed
     4 2015-01-01 09:24:55      NaN       NaN  pirates_of_caribbean  closed
```

```
[3]: dat['status'].isna().value_counts()
```

```
[3]: False    3443445
     Name: status, dtype: int64
```

```
[4]: dat.groupby("ride_name")['status'].count()
```

```
[4]: ride_name
     7_dwarfs_train          321631
     alien_saucers           129876
     dinosaur                252403
     expedition_everest      275274
     flight_of_passage       184818
     kilimanjaro_safaris     257785
     navi_river              182121
     pirates_of_caribbean    301946
     rock_n_rollercoaster    277509
```

```
slinky_dog            135946
soarin                274770
spaceship_earth       277248
splash_mountain       287948
toy_story_mania       284170
Name: status, dtype: int64
```

Number of rows for each rides are listed above.

1.2 Question 2

[5]:
```
print(f"There are {dat['SPOSTMIN'].notna().sum()} rows that SPOSTMIN is not␣
 ↪null")
```

```
There are 3146086 rows that SPOSTMIN is not null
```

[6]:
```
print(f"There are {dat['SACTMIN'].notna().sum()} rows that SACTMIN is not null")
```

```
There are 96171 rows that SACTMIN is not null
```

[7]:
```
def sort_combine(dat):
    # Find the time before and after
    dat['time_after']=dat['datetime'].shift(-1)
    dat['time_before']=dat['datetime'].shift(1)

    # Find the SPOSTMIN before and after value
    dat['SPOSTMIN_after']=dat['SPOSTMIN'].shift(-1)
    dat['SPOSTMIN_before']=dat['SPOSTMIN'].shift(1)

    # Find the time difference
    dat['time_diff_after']=dat['datetime']-dat['time_after']
    dat['time_diff_before']=dat['datetime']-dat['time_before']

    # Find the shortest time
    dat['Previous_is_shorter'] = dat['time_diff_after'].
 ↪abs()>dat['time_diff_before'].abs()

    # Filter the NA value
    dat = dat.loc[dat['SACTMIN'].notna(), :]

    # Replace value
    dat.loc[dat['Previous_is_shorter']==True, 'SPOSTMIN'] = dat.
 ↪loc[dat['Previous_is_shorter']==True, 'SPOSTMIN_before']
    dat.loc[dat['Previous_is_shorter']!=True, 'SPOSTMIN'] = dat.
 ↪loc[dat['Previous_is_shorter']!=True, 'SPOSTMIN_after']

    # Time difference
    dat.loc[dat['Previous_is_shorter']==True, 'time_diff'] = dat.
↪loc[dat['Previous_is_shorter']==True, 'time_diff_before']
    dat.loc[dat['Previous_is_shorter']!=True, 'time_diff'] = dat.
↪loc[dat['Previous_is_shorter']!=True, 'time_diff_after']

    # Drop Variables
    dat = dat.drop(columns = ['time_after', 'time_before', 'SPOSTMIN_after',␣
↪'SPOSTMIN_before', 'time_diff_after', 'time_diff_before',␣
↪'Previous_is_shorter'])

    # Return data
    return(dat)
```

[8]:

```
reduced = dat.groupby('ride_name').apply(sort_combine).reset_index(drop=True)
reduced.head()
```

[8]:

```
             datetime  SACTMIN  SPOSTMIN       ride_name status  \
0 2015-01-01 08:05:30     54.0      60.0  7_dwarfs_train   open
1 2015-01-01 08:22:16     55.0      60.0  7_dwarfs_train   open
2 2015-01-02 12:20:00    160.0     120.0  7_dwarfs_train   open
3 2015-01-02 21:49:47     65.0      60.0  7_dwarfs_train   open
4 2015-01-03 00:44:09     19.0      60.0  7_dwarfs_train   open

          time_diff
0   0 days 00:03:17
1 -1 days +23:59:04
2 -1 days +23:56:49
3 -1 days +23:58:35
4 -1 days +23:55:22
```

New dataframe and columns are created.

1.3 Question 3

[9]:

```
reduced.shape
```

[9]:

```
(96171, 6)
```

[10]:

```
dat.shape
```

[10]:

```
(3443445, 5)
```

[11]:

```
3443445-96171
```

[11]:

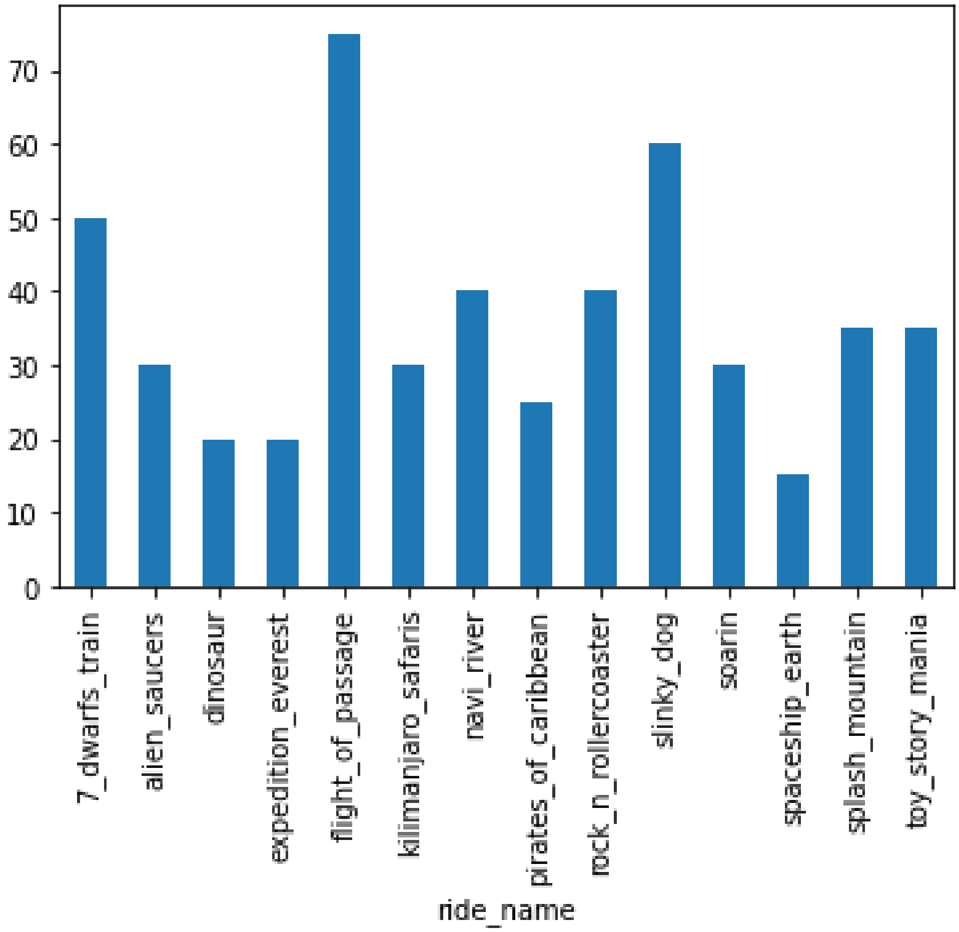
```
3347274
```

```
[12]: reduced.groupby('ride_name').median().sort_values('SACTMIN', ascending=True)
```

```
[12]:                       SACTMIN  SPOSTMIN
      ride_name
      spaceship_earth           7.0      15.0
      expedition_everest       13.0      20.0
      pirates_of_caribbean     16.0      25.0
      dinosaur                 17.0      20.0
      kilimanjaro_safaris      18.0      30.0
      alien_saucers            21.0      30.0
      soarin                   22.0      30.0
      splash_mountain          22.0      35.0
      toy_story_mania          23.0      35.0
      navi_river               24.0      40.0
      rock_n_rollercoaster     26.0      40.0
      7_dwarfs_train           31.0      50.0
      slinky_dog               37.0      60.0
      flight_of_passage        53.0      75.0
```

```
[13]: reduced.groupby('ride_name')['SPOSTMIN'].median().plot.bar()
```

```
[13]: <AxesSubplot:xlabel='ride_name'>
```



Reduced dataframe is 3347274 rows less than the original one. The median is closer in compare to the original one. It is close enough to be able to draw compariations because we could see that the time differences are at most few minutes.

1.4 Question 4

[20]:
```
reduced = reduced.loc[reduced['time_diff'].abs() <= '0 days 01:00:00']
reduced.shape
```

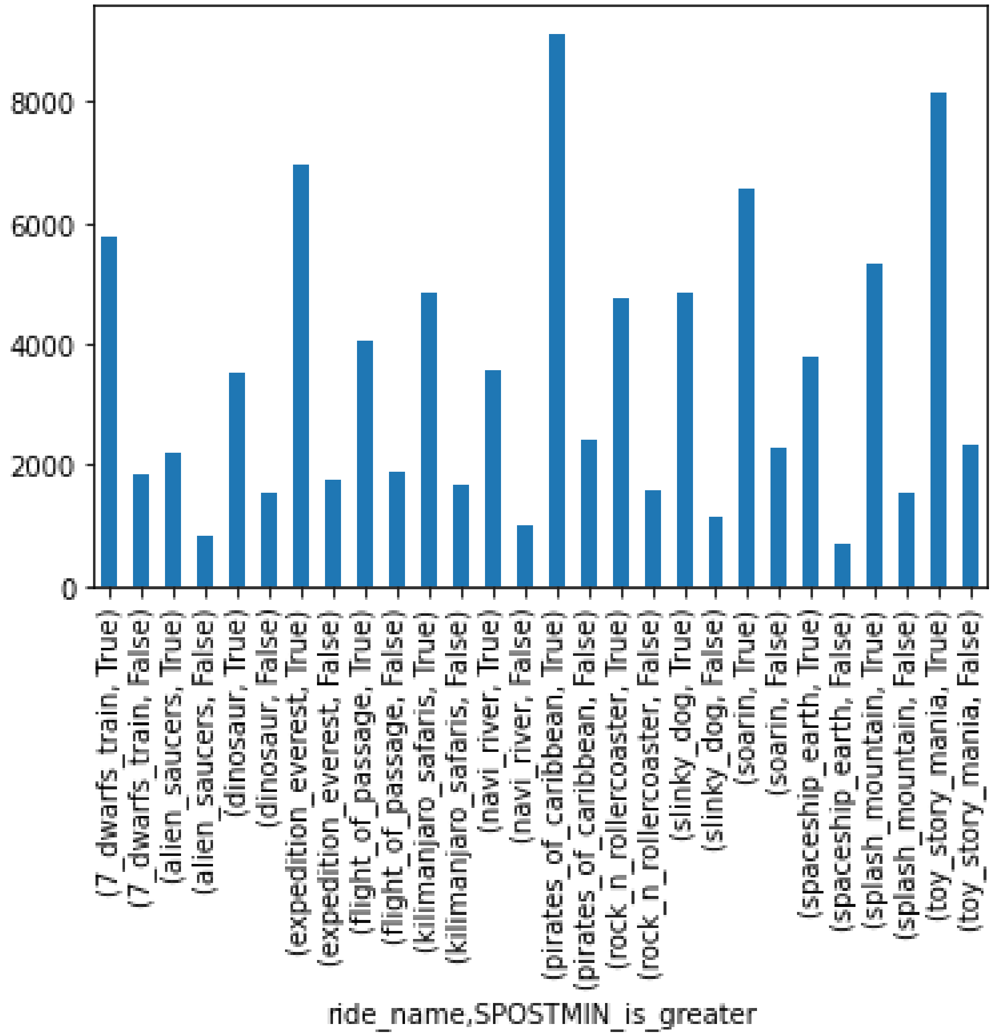
[20]:
```
(95947, 6)
```

[21]:
```
reduced['SPOSTMIN_is_greater']=reduced['SPOSTMIN']>reduced['SACTMIN']
```

[23]:
```
Count = reduced.groupby('ride_name')['SPOSTMIN_is_greater'].value_counts()
```

[24]:
```
Count.plot.bar()
```

[24]:
```
<AxesSubplot:xlabel='ride_name,SPOSTMIN_is_greater'>
```



Question: For different ride names, how many of rows are the SPOSTMIN greater than SACTMIN? Hypothesis: In most cases SPOSTMIN would be greater than SACTMIN. The graph is drawn above, and we found that indeed in most cases, SPOSTMINs are greater than SACTMINs.

1.5 Pledge

By submitting this work I hereby pledge that this is my own, personal work. I've acknowledged in the designated place at the top of this file all sources that I used to complete said work, including but not limited to: online resources, books, and electronic communications. I've noted all collaboration with fellow students and/or TA's. I did not copy or plagiarize another's work.

> As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – We are Purdue.