HW2 - Exploring Social Networks

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Q1. Friendship Paradox on Facebook.

Answer

This Task is divided into multiple steps to get the required output

Step 1: What is the mean, standard deviation, and median of the number of friends that the user's friends have?

The friends count were already provided by the Professor in csv File. This code loads a dataset of friend counts from a CSV file using the pandas library, computes various statistical measures such as mean, standard deviation, and median of the friend counts, sorts the friend counts in descending order, plots the friend counts on a horizontal bar chart with the user's friend count marked in red, and displays the mean, standard deviation, and median of the friend counts.

```
import pandas as pd
import matplotlib.pyplot as plt

df = pd.read_csv('HW4-friend-count.csv')

num_friends = df['FRIENDCOUNT']

mean_friends = num_friends.mean()
std_dev_friends = num_friends.std()
median_friends = num_friends.median()

sorted_friends = num_friends.sort_values(ascending=False)

plt.barh(range(len(sorted_friends)), sorted_friends)

user_friends = 250
plt.axvline(x=user_friends, color='r')

plt.text(user_friends+10, len(sorted_friends)-20, 'U', fontsize=12)

plt.xlabel('Number of friends')
plt.ylabel('Friend number')
plt.title('Number of friends of user\'s friends')

plt.show()
```

```
26
27 print('Mean number of friends:', mean_friends)
28 print('Standard deviation of number of friends:', std_dev_friends)
29 print('Median number of friends:', median_friends)
```

Listing 1: Extract the URIs from the .JSON file

Figure 1 shows the mean, median and standard deviation.

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

PS C:\Users\prshn\OneDrive\Desktop\HW4> & C:/Users/prshn/AppData/Local/Programs/Python/Python310/python.exe c:/Users/prshn/OneDrive/Desktop/HW4/plot.py
Mean number of friends: 542.6734693877551
Standard deviation of number of friends: 539.4337385239659
Median number of friends: 396.0
PS C:\Users\prshn\OneDrive\Desktop\HW4>
```

Figure 1: Mean, Standard Deviation and Median of friends count

Figure 2 shows the graph of friends count

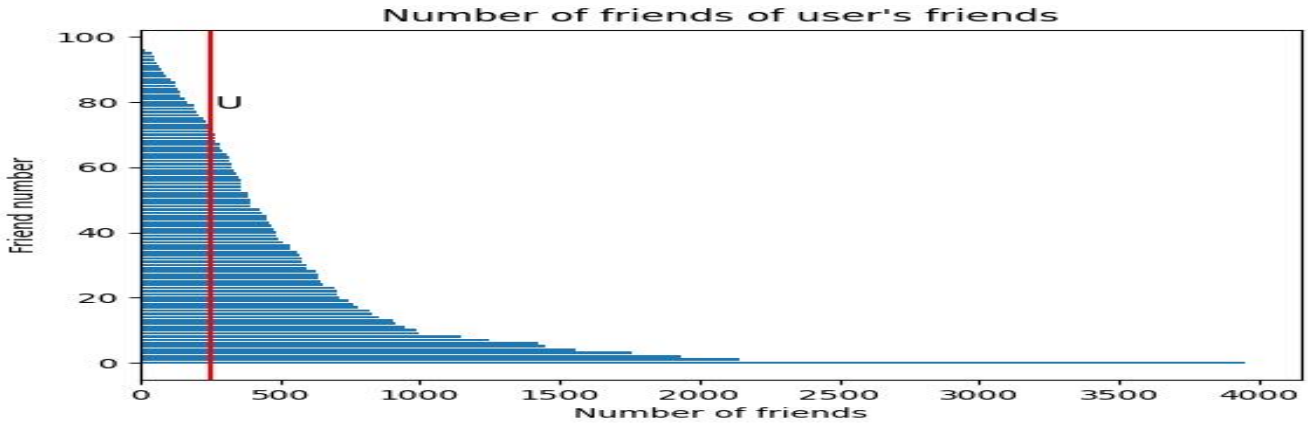

Figure 2: graph of friends count

Step 2: Does the friendship paradox hold for this user and their friends on Facebook?

I have observed the validity of the Friendship Paradox, which states that your friends tend to have more friends than you do. Upon examining some of my friends' Facebook profiles, I have discovered that the majority of them possess a greater number of friends than I do, although a few do no

References

*F*ollowing are the references which I used while doing my HW4, you can refer to some of links from where I took help.

- DataFrame operations, `https://pandas.pydata.org/docs/reference/frame.html`
- Numpy, `https://numpy.org/doc/stable/reference/generated/numpy.log2.html/`
- Github, `https://github.com/odu-cs432-websci/spring23-hw4-Badjedi04`
- Python requests, `https://docs.python-requests.org/en/master/`