

Analysis of Social Networks Report

Project 1

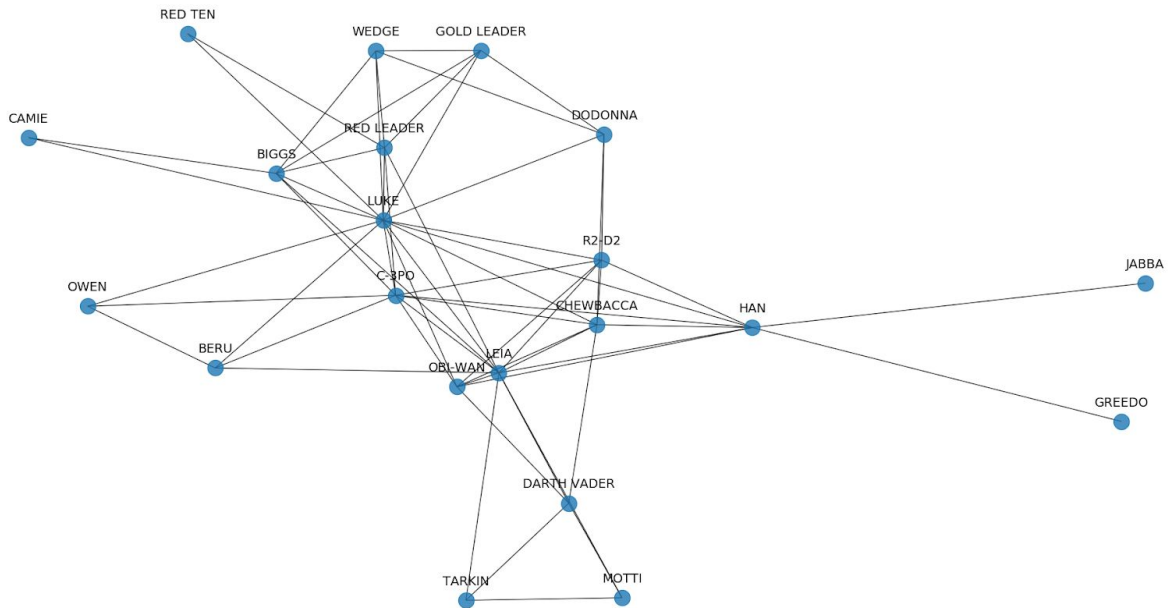
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ADJACENCY LIST

A sample of a small undirected graph can be found in the folder **input_graph**. The visual representation of the graph used can be found inside the folder **draw_graph** along with the python script used.

DISPERSION CALCULATIONS

For this part of the report I used a graph which I had submitted for **Homework 1**. In the graph I found on Github someone had gathered the connections between characters of **Star Wars Episode IV** based on the manuscripts. The graph image and the .csv along with the code that generated them can be found at the folder. The graph is the following:



For my dispersion calculations I am going to focus on the **Darth Vader** node.

Darth Vader's neighbors list:

$$u_{Darth\ Vader} = \{Chewbacca, Leia, Motti, Tarkin, Obi - Wan\}$$

The neighbors list of each of Darth Vader's neighbor nodes:

- $u_{Chewbacca} = \{R2 - D2, Obi - Wan, C - 3PO, Luke, Han, Leia, Darth Vader, Dodonna\}$
- $u_{Leia} = \{R2 - D2, Chewbacca, C - 3PO, Luke, Beru, Obi - Wan\}$
- $u_{Motti} = \{Tarkin, Leia, Darth Vader\}$
- $u_{Tarkin} = \{Motti, Darth Vader, Leia\}$
- $u_{Obi-Wan} = \{R2 - D2, Chewbacca, Luke, C - 3PO, Leia, Han, Darth Vader\}$

Getting the common nodes for Darth Vader Node and its neighbors:

- $C_{Darth Vader, Chewbacca} = \{Leia, Obi - Wan\}$
- $C_{Darth Vader, Leia} = \{Chewbacca, Motti, Tarkin, Obi - Wan\}$
- $C_{Darth Vader, Motti} = \{Leia, Tarkin\}$
- $C_{Darth Vader, Tarkin} = \{Leia, Motti\}$
- $C_{Darth Vader, Obi-Wan} = \{Leia, Chewbacca\}$

Using the algorithm given, we get the pairs for each node in the C sets declared above:

- $dispersion_{Darth Vader, Chewbacca} = 0$
 - $(Leia, Obi - Wan)$ are directly connected.
- $dispersion_{Darth Vader, Leia} = 4$
 - $(Chewbacca, Motti)$ increases dispersion by one.
 - $(Chewbacca, Tarkin)$ increases dispersion by one.
 - $(Chewbacca, Obi - Wan)$ are directly connected.
 - $(Motti, Tarkin)$ are directly connected.
 - $(Motti, Obi - Wan)$ increases dispersion by one.
 - $(Tarkin, Obi - Wan)$ increases dispersion by one.
- $dispersion_{Darth Vader, Motti} = 0$
 - $(Leia, Tarkin)$ are directly connected.
- $dispersion_{Darth Vader, Tarkin} = 0$
 - $(Motti, Leia)$ are directly connected.
- $dispersion_{Darth Vader, Obi-Wan} = 0$
 - $(Chewbacca, Leia)$ are directly connected.

SCRIPT

The python script is named **dispersion.py**. There are multiple prints for each major step taken in the algorithm so as to understand better the execution.

RESULTS

Results can be found in **results.txt**.

GITHUB LINK

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