

1. Networks basic analysis

	Marvel network	Games of Thrones network	Collaboration songs network
Nodes	6421	84	23
Edges	167112	216	18

Table 1: Number of nodes and edges of the Marvel, Game of Thrones, and Collaboration songs networks.

2. *Marvel* network

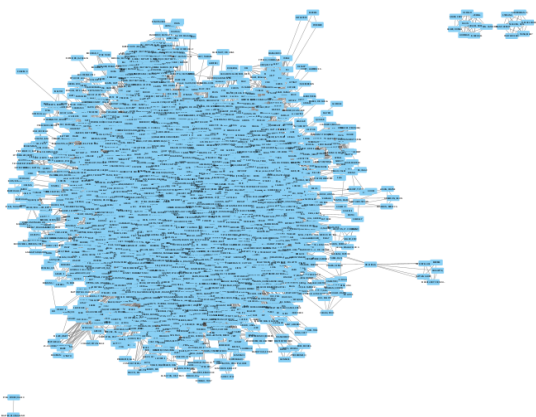


Figure 1: Marvel graph.

The top 20 nodes with larger degree are -from highest to lowest degree- Captain America, Spider-Man/Peter Parker, Iron Man/Tony Stark, Thing/Ben Grimm, Mr. Fantastic/Reed Richards, Wolverine/Logan, Human Torch/Johnny S, Scarlet Witch/Wanda, Thor/Dr. Donald Blak, Beast/Henry & Hank & P, Vision, Invisible Woman/Sue, Hawk, Wasp/Janet Van Dyne, Ant-Man/Dr. Henry J., Cyclops/Scott Summer, She-Hulk/Jennifer Wa, Angel/Warren Kenneth, Storm/Ororo Munroe S, and Dr. Strange/Stephen.

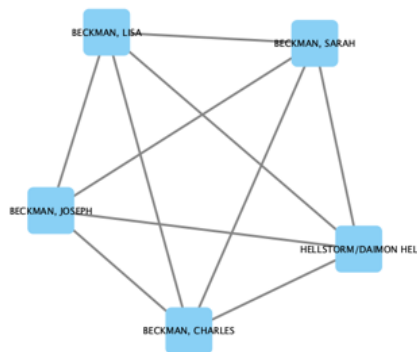


Figure 2: Subgraph of the Marvel network containing the neighbouring nodes -and respective edges- of the Charles Beckman character, following the Prefuse Force Directed Layout using edge betweenness as a weight.

Figure 2 shows a community structure formed by the neighboring nodes of Charles Beckman, with 5 nodes and 10 edges, where every pair of nodes is connected. Judging by the name of the nodes -4 of the 5 nodes represent characters whose surname is Beckman-, the community shows familial relations.

3. *Game of Thrones* network

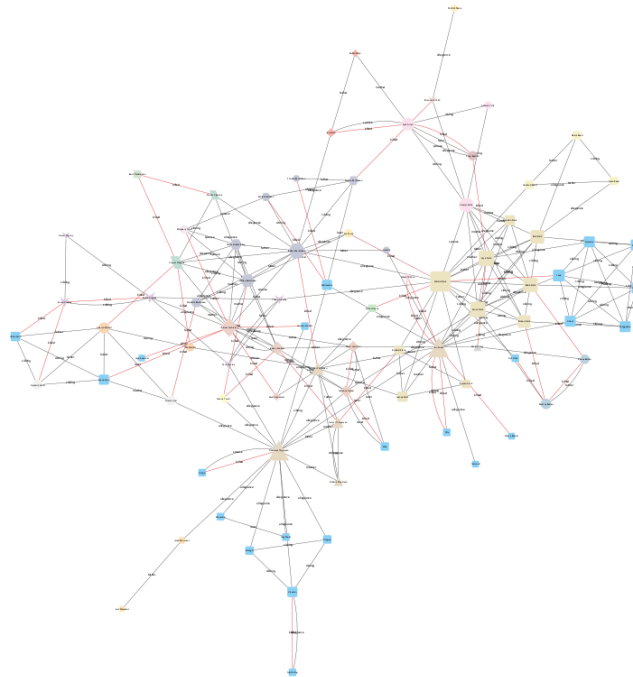


Figure 3: Game of Thrones graph. Nodes with the same shape and the same color represent characters that share the house of birth. For instance, House Stark is illustrated by blue round rectangles.

As shown in Figure 3, House Stark, Targaryen, Lannister, and Baratheon build the epicentre of the graph and hence they must play a key role in the series. In addition, most houses are kept separate from other houses -for example, House Stark, represented by light brown rounded rectangles, is rather a robust group-.



Figure 4: Clique subgraph in the Game of Thrones network, showing the sibling relationship between Nymeria, Summer, Lady, Grey Wind, Ghost and Shaggydog.

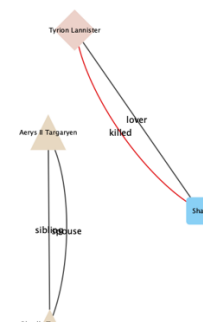


Figure 5: Two 2-node multi-edge subgraphs of the Game of Thrones network: on the left, Aerys II Targaryen and Rhaella Targaryen are at the same time siblings and a married couple; on the right, Tyrion Lannister loved Shae though he also killed her.

4. Collaboration songs network

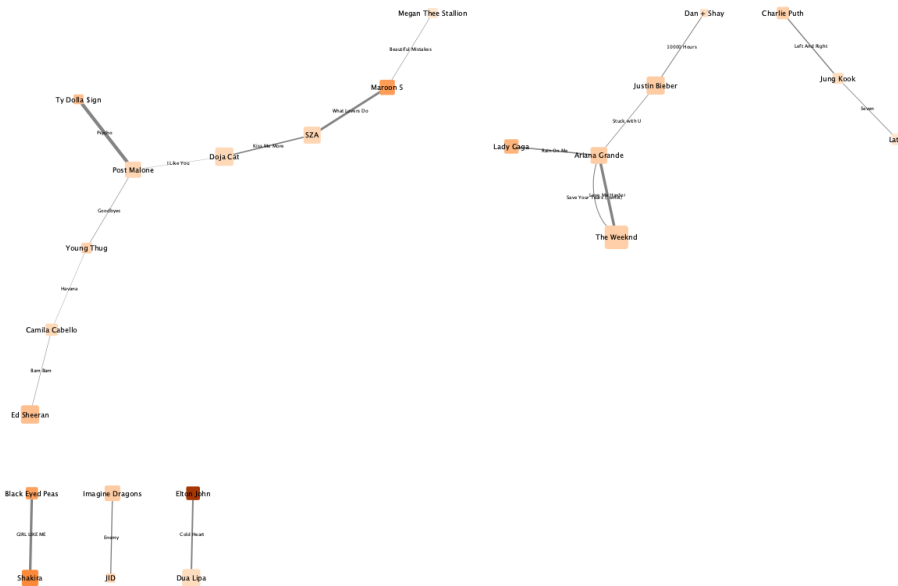


Figure 6: Collaboration songs graph.

The graph depicted in Figure 6 illustrates some of the most-viewed YouTube collaboration songs between 23 selected artists.

Each artist is represented by a node, the size of which is proportional to the number of monthly listeners that such artist has on Spotify. In addition, the colour of the nodes varies from light orange to dark red depending on how many years the artists have been in the music industry - being the light orange the newest artists and the dark red the most experienced ones.

On the other hand, the edges illustrate the existence of a collaborative song between two artists and are labelled with the song title. Furthermore, the thickness of the edge is directly proportional to the number of YouTube views of the collaboration song. Note that artists who have collaborated more than once -The Weeknd and Ariana Grande- are connected by more than one edge.

5. Appendix

id	Artist name	Years in the industry	Spotify monthly listeners
0	Elton John	61	47731578
1	Dua Lipa	10	73559128
2	Jung Kook	10	31625271
3	Latto	7	34565014
4	Charlie Puth	14	39608991
5	Post Malone	12	62543828
6	Doja Cat	11	75230159
7	The Weeknd	14	106335522
8	Ariana Grande	15	65325301

9	Imagine Dragons	15	59042483
10	JID	13	20301260
11	SZA	12	67957829
12	Camila Cabello	11	38405734
13	Ed Sheeran	19	74889692
14	Maroon 5	29	57126283
15	Megan Thee Stallion	7	26242032
16	Black Eyed Peas	28	39259543
17	Shakira	35	64751649
18	Dan + Shay	10	13460667
19	Lady Gaga	22	52039277
20	Ty Dolla \$ign	19	25501538
21	Young Thug	13	30135101
22	Justin Bieber	15	73986682

src	dest	Name	YouTube views
2	3	Seven	231800000
0	1	Cold Heart	480400000
4	2	Left And Right	369600000
5	6	I Like You	113400000
7	8	Save Your Tears (Remix)	283800000
9	10	Enemy	355500000
6	11	Kiss Me More	432100000
12	13	Bam Bam	167200000
14	15	Beautiful Mistakes	168100000
16	17	GIRL LIKE ME	746800000
8	22	Stuck with U	219800000
18	22	10000 Hours	274000000
8	19	Rain On Me	398000000
5	20	Psycho	1000000000
12	21	Havana	125500000
14	11	What Lovers Do	688400000
7	8	Love Me Harder	805400000
5	21	Goodbyes	182800000

I hereby declare that all of the text, tables, and figures in this report were produced by myself.