

The Circle of Thrones: *A Song of Ice and Fire* GD 2018 Contest

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1 Problem Description

In this year’s Graph Drawing contest¹ one of the topics deals with *A Song of Ice and Fire*. The task is visualizing the relationship among a part of the characters of George R. R. Martin novels. Given are labeled nodes and labeled multiedges in the common *graphml* format. The data set consists of 84 nodes and 216 edges. Nodes store information like a character’s name, status (alive or dead), house birth and house marriage while edges fall in three big categories of family relationships, such as love, killing and allegiance.

Our graph visualization (see Figure 3) has a focus on showing the events in *GoT* and leverages the strong implicit family structures within the data set. The result is a radial layout with family clusters and generation layers with action edges through the center and allegiances on the outside.

2 Proposed Solution

Our approach is a placed-by-hand radial layout, which is beneficial for depicting the inherent and easily readable structure of the data set. In the following we report how we depicted the distinguishing features of each character and their relationships. We also describe the decisions that were made to minimize crossings and to achieve the final layout.

2.1 Layout

Our approach is a placed-by-hand radial layout, which is beneficial for depicting the inherent and easily readable structure of the dataset. Nodes are put onto

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¹<http://graphdrawing.de/contest2018/topics.html>

a circumference (with a few exceptions) with the inner part of the circle and outer space left for the edges. The circumference is split into several sectors that represent the great houses; the nodes are put inside each sector depending on their affiliation. We discuss in depth how we visualize nodes in Section 2.2. The circular ordering (i.e. the ordering of the houses) depends on the marriages. We put close together the houses with marriages in common. In this way, we could visualize part of the relationships with only a symbol rather than a line, clearing up the picture. Edges and relationships visualization is discussed in Section 2.3.

Characters which have no affiliation are put close to the circumference but outside of it. However, other constraints might give information about the context. The “Night King”, for example, which is placed in the top left corner of our visualization, roams far beyond the “Wall” (which is, in the book and tv show, a frontier made out of a tall wall of ice), then he is put well outside the radial layout next to a mountain of ice.

2.2 Nodes

To display nodes, we used portraits, frames, gray scale, glyphs and other contextual information (e.g., a symbol for “*The Hand*”). The portraits show the actors who interpreted the characters in the tv show. The frame surrounding them is used to display if he/she is/was king or queen. The gray scale is used to show if a character is dead (see Figure 2) with the frame color following the same principle. “Cersei’s” frame is different to differentiate her from the other kings (she is the one sitting on the “Iron Throne”).

We decided against putting names next to the portraits of the characters to reduce clutter. Our rationale is that names don’t hold any information for an audience unfamiliar with *A Song of Ice and Fire* anyway. On the other hand, people who watch the show will have no problem identifying the given portraits.

2.3 Edges and Multi-Edges

We visualized the different relationships into two ways: “explicit” edges, which are lines with a shield bearing a symbol representing their type, and “implicit” edges that are relationships represented by other visual cues rather than lines, like proximity, icons etc. Explicit edges are used to visualize the following relationships and are put both on the inside and on the space outside the circle:

- **Killings:** killings are represented by curved lines. Their symbol is a sword pointing to the victim. Some of the killings are represented in a more “atmospheric” way to give more context and to be more appealing to who is already familiar with the show: Cersei’s killings are visualized using a green hyperedge with a bomb (and not a sword) symbolizing the wildfire burning on “King’s Landing”. This choice also proved useful to reduce clutter and improve readability;
- **Romances:** romances are represented by curved lines with a heart symbol;
- **Allegiances:** allegiances are the most numerous relationships after the killings, so they were not put in the middle of the circle but on the outside

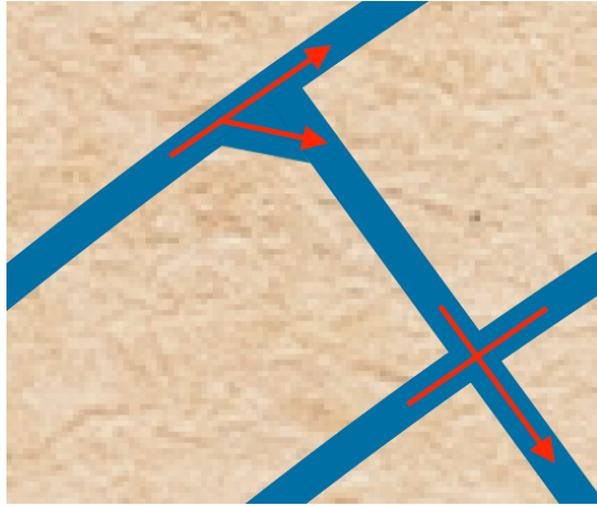


Figure 1: A close-up on the corners used to depict the direction of edges. If the corner is absent, the two edges just cross.

to reduce the cluttering. Such edges are represented by a combination of curved and straight lines. The turn directions for each edge are indicated, to prevent misreadings at crossing lines as shown in Figure 1. The color of such edges is blue, and the different kinds of allegiances are represented by different symbols. The “Hand of the king” is represented by a stylized hand, the “Kinsguard/Queensguard” allegiance is represented with a crown and the pledge with a shield. The “pet” allegiance is represented implicitly as described further in the paper.

Moreover, where edges cross into the colored region of a house, the lines become dotted to further improve readability.

The relationships visualized using implicit edges are the following:

- **Family Relationships:** the characters are arranged in the respective sectors according to their family tree. The characters belonging to the same generation are arranged on the same “level”, with the eldest generations on the outer part of the sector and the younger ones arranged going inwards. Therefore, siblings share a level, as well as spouses. Since the hierarchical radial layout already conveys an impression for family structure and generations, we feel comfortable leaving explicit family relation edges. Our visualization focuses more on the story, i.e. killings, romances, so we decided against including the very detailed family tree relations, while still providing the general information about it (see e.g., Figure 2);
- **Spouses:** weddings are represented by a couple of rings that “holds” together two nodes (e.g., see Figure ;
- **Pets:** pets pledge their allegiance to their owners (except for “Viserion”, see Section 2.7.3). For this reason, we placed them touching the base of their owner’s node and be given special symbol, like dogs and dragons (see e.g., Figure 2).

2.7.1 Status Uncertainty

Everybody is *alive* or *dead*, except for “Beric Dondarrion”, whose status is *uncertain*. Here half the picture is colored (indicating aliveness) the other half is desaturated (indicating death). The intended meaning is that he can be dead or alive.

2.7.2 Marriage and Spouses

We tried to put all *spouse* relationships next to each other and link them with the *double ring* symbol for marriage. But “Sansa Stark” is married to “Ramsey Bolton” and “Tyrion Stark”, where it doesn’t make sense to put them all close together. In other cases like “Ned” and “Catelyn Stark” this works fine. Marriages put whole houses next to each other in the radial layout. This is problematic if adversarial houses have some kind of bond in marriage. To avoid the visual clutter in the graph and to not mix up temporal information, we opt to display the last marriage or spouse relationship. That means we only depict the most recent spouse relationships.

2.7.3 Temporal Information

There is also some temporal information within the data set, such as: (i) John Snow kills and is killed by his brothers of the Night’s Watch and (ii) the dragon Viserion is allegiant to “Daenerys” before and to the Night King after its death. We tried to show this shift of allegiance by simulating the “motion” of the dragon icon from Daenerys to the Night King. It is difficult to convey a sequence of actions in what is otherwise a snapshot of the character landscape.

2.7.4 Small semantic differences

It is often debatable if the reader gains meaningful information from differentiating the different kinds of allegiance. The options are to group some (or all) together for better readability or insert even more different types of edges. We chose to group a part of them as generic “allegiance” relationship, while keeping kings/queensguard and Hand of the King separate. We chose this solution because is the one that still bears the most information without excessively encumbering the visualization.

3 Conclusion

With our entry we think we captured the overall structure as well as intricate details of the given data set in a visually pleasing and very readable way, while dealing with errors and exceptions as well. We made good use of the inherent structure of the data set and used many different layout, design and aesthetic tricks to organize the complex relationships between the characters in *A Song of Ice and Fire*.

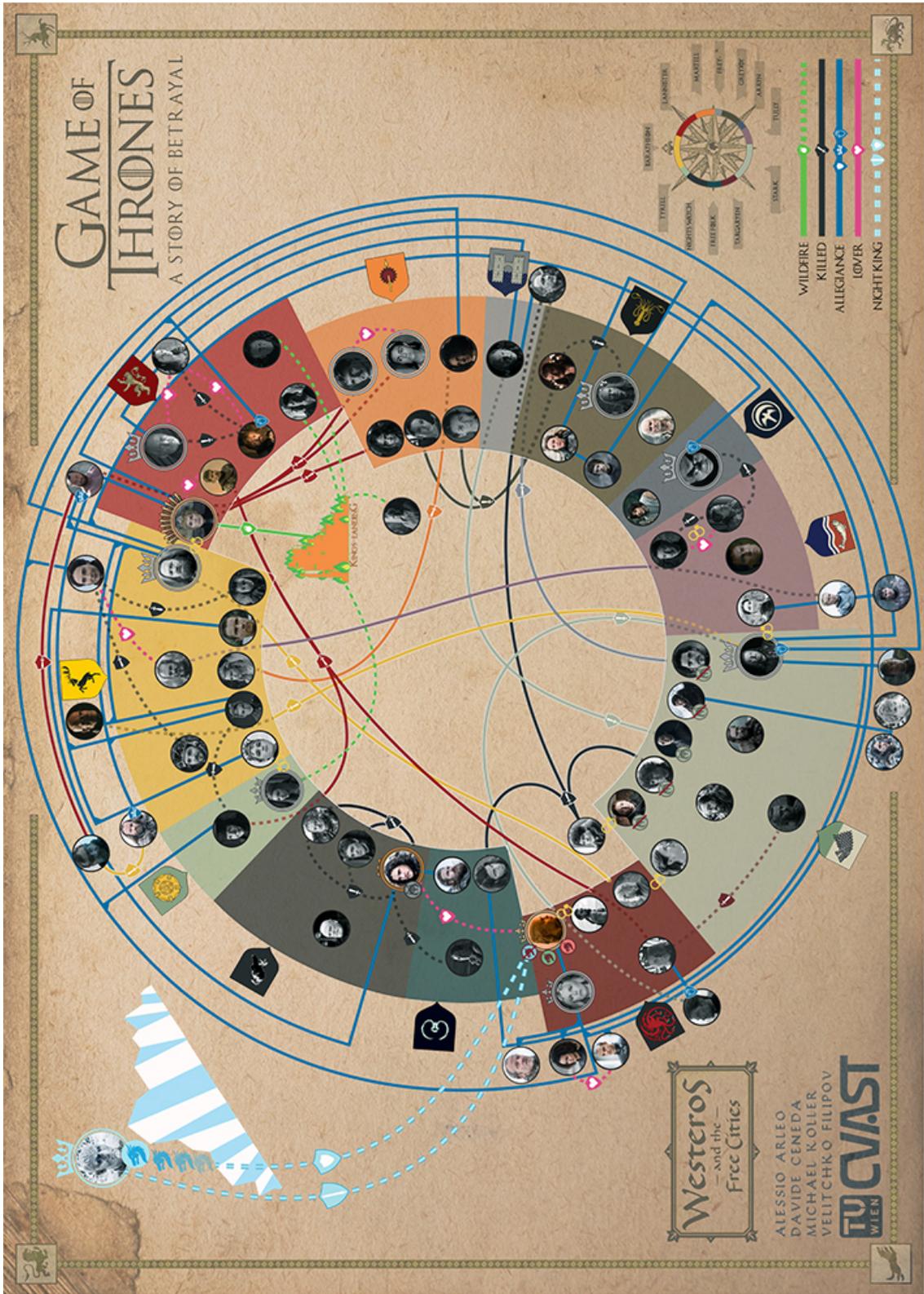


Figure 3: The complete visualization.