The Likelyhood of Survival in The Game of Thrones Series Utilizing Bayesian Network

Israel Nolazco
israelnolazco@lewisu.edu
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Artificial Intelligence 2
Lewis University

I. Introduction

Game of Thrones tv series is a popular fantasy show that is inspired by the book A Song of Ice and Fire and was written by American novelist and screenwriter George R. R. Martin. Both the tv series and book are quite popular in their own regard. However, one of the few outstanding characteristics of the fantasy story is the complex politics, grand battle scenes, descriptive landscape, and nail-biting story. Although, it is uniquely known for the number of characters dying within each page. Additionally, it goes without saying that fans typically fantasize about the possibility of living in their beloved book series. Therefore, in this document, we will explore the likelihood of a person surviving in the Game of Thrones universe by utilizing Bayesian Networks. Bayesian Networks is a probabilistic graphical model that is used to calculate the conditional probabilities of two variables given the dependency of one another [1]. The software Netica is a free online tool that specializes in the development of Bayesian Networks. However, its free version has limitations as to the number of nodes and data being able to load[2]. Therefore, we will primarily focus on two of the most known families in the Game of Thrones Series. The House of Baratheon the most powerful house in Westeros, with the most tragic and fascinating story and known to be the most entertaining to watch. The House of Stark one of the major protagonists in the first series and therefore most popular[1]. Lastly, given the computational limitations of the software Netica; the data were trimmed down to the first two years of the book series, year 298 and 299. Also, the dataset is only made out of the first eight battles both the House of Baratheon and the House of Stark engage within the aforementioned time series.

II. Methods

As previously mentioned in order to take full advantage of the Netica software; The data was compiled and gathered from the website Kaggle[3]. The dataset contained three different datasets, for this analysis, only two datasets were used. The dataset containing Battle metrics and Character Deaths. the dataset Battle was trimmed down to only the first eight battles along with only focusing on the Kings Joffrey/Tommen Baratheon from the House of Baratheon and King Robb Stark from the House of Stark. Additionally, in order to get a broader view of the likelihood of survival in this universe; we decided to tally the number of times a “major capture” and a “major death” were recorded for either house. The eight battles occurred in the years 298 and 299; therefore, our Character Deaths dataset was just trimmed down to those two years and only categorizing the deaths by gender. Given the information above, the analysis provided seven nodes which ultimately connected to a node that will provide a probability of death by gender.

III. Analysis

The Netica software provided a graphical representation of the Bayesian Network created with the data collected. As mentioned previously, there are a total of seven nodes. As seen in Figure 1. Robb Stark Battle’s Victory and Joffrey/Tommen Baratheon Battle’s Victory are part of a joint probability of Characters Death by Gender. However, within each victory there is a cost. Therefore, a separate node was created to represent the captures and deaths within each victory.

Interestingly enough, Figure 1. already shows that there is a higher likelihood of males dying in the Game of Thrones universe. Additionally, as seen by our network Kings Joffrey/Tommen Baratheon and Robb Stark have a high probability of victory within each battle. Although, it is clear with King Joffrey/Tommen Baratheon’s allies will be less likely to get captured but have almost a fifty-fifty chance of dying in battle. As for King Robb Stark, there is almost a fifty-fifty chance of dying in battle and being captured.

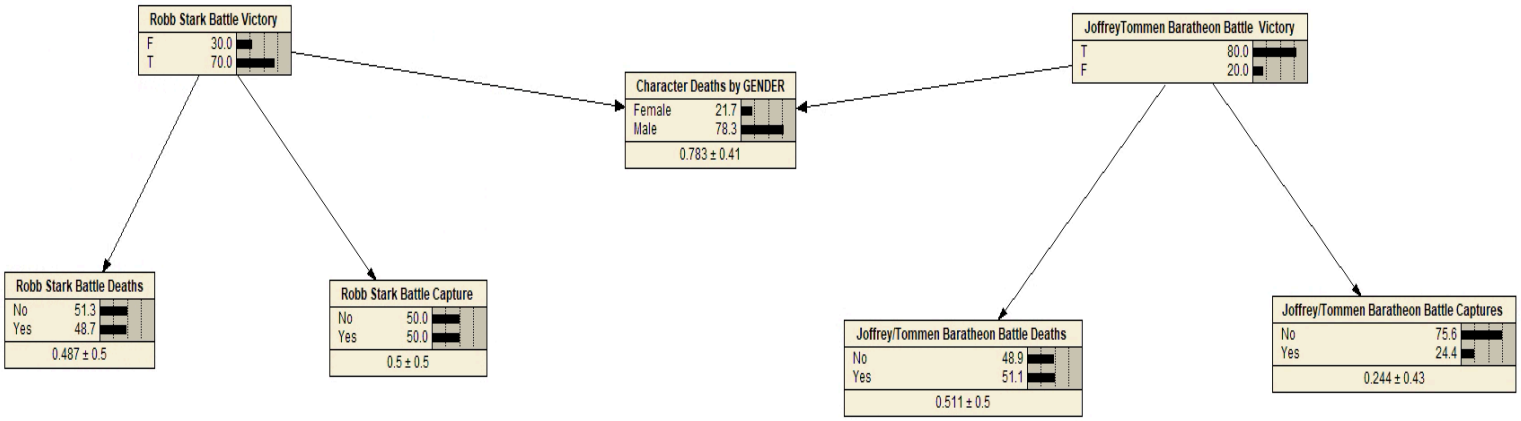

Figure 1. Bayesian Network for Game of Thrones

Thus far the analysis shows a promising outcome for the female gender. However, Netica's true potential is shown by computing the alternative probabilities within different scenarios. This feature of Netica lets us explore how different outcomes in victories, deaths, and captures affect the likelihood of survival in the Game of Thrones universe. As an example, we explored the outcome of victories by guarantying that all female characters die; while all-male characters survive. This is shown in Figure 2 and we quickly realize that King Robb Stark's victory ratio fell dramatically to almost a sixty-forty ratio. Moreover, the same occurs with King Joffrey/Tommen Baratheon. The reason behind this sudden drop in the wining ratio can be accounted for by the sudden presence of the male population within other houses. Given that all males have survived in a battle, it is reasonable to conclude other houses will have more men to fight with; which will then extend the number of battles present in the universe.

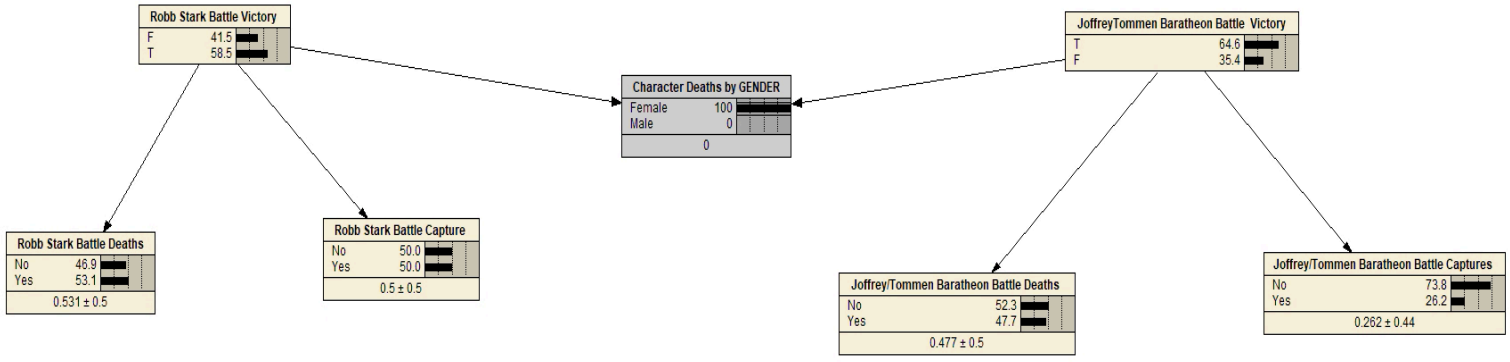

Figure 2. Bayesian Network showing all female characters dying and Male surviving

Now, let us consider the opposite situation, by increasing the probability of males dying to one hundred percent of the time while having no female deaths. This scenario is shown in Figure 3. The image shows us that in fact that the higher the probability of men dying, the higher the probability of a victory for both King Joffrey/Tommen Baratheon and King Robb Stark. Furthermore, a quick glimpse at the "Battle Captures" shows a slight increase for King Joffrey/Tommen Baratheon. As for King Robb Stark, we have noticed thus far the "Battle Captures" probability has not changed throughout this analysis. This anomaly is due to the limited data used in this network. The data utilize was only for the first eight battles and the data showed a fifty-fifty probability of being capture in battle; therefore, regardless of the extreme situation our dataset is presented with, the "Battle Capture" ratio will not change.

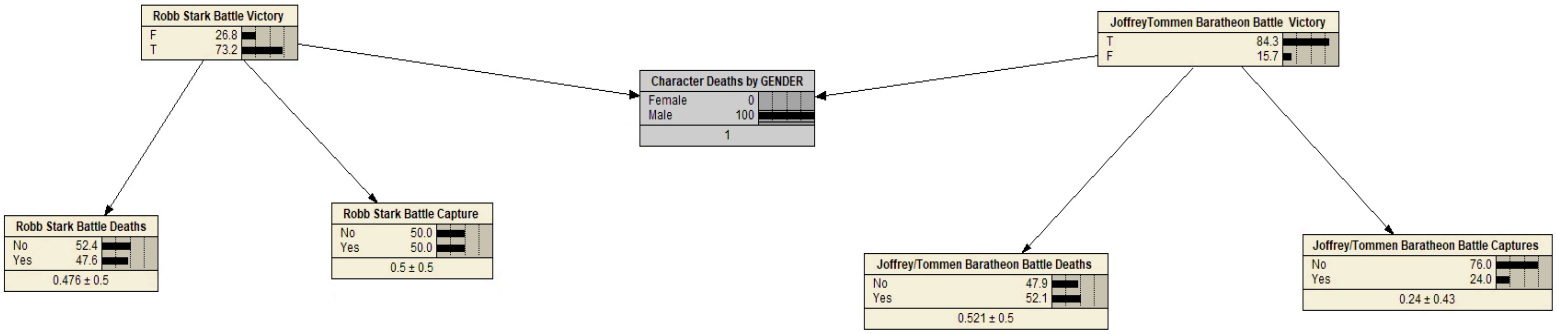

Figure 3. Bayesian Network Showing all Male characters dying and Female surviving

Our analysis until now has explored how the victory ratio change according to the survival of each gender; however, as the infamous proverb by Senator William Learned Marcy of New York spoken in 1832[4], "to the victor belong the spoils," and if we are going to risk life in the Game of Thrones universe at the very least let us analyze our odd within each house. Figure 4 and Figure 5 are a representation of such scenarios. Unfortunately, our results show us there is not much of a difference between either house. Although, males are more likely to survive with a victory from the House of Baratheon than with the House of Stark. However, females are more likely to survive with a victory from the House of Stark than with the House of Baratheon.

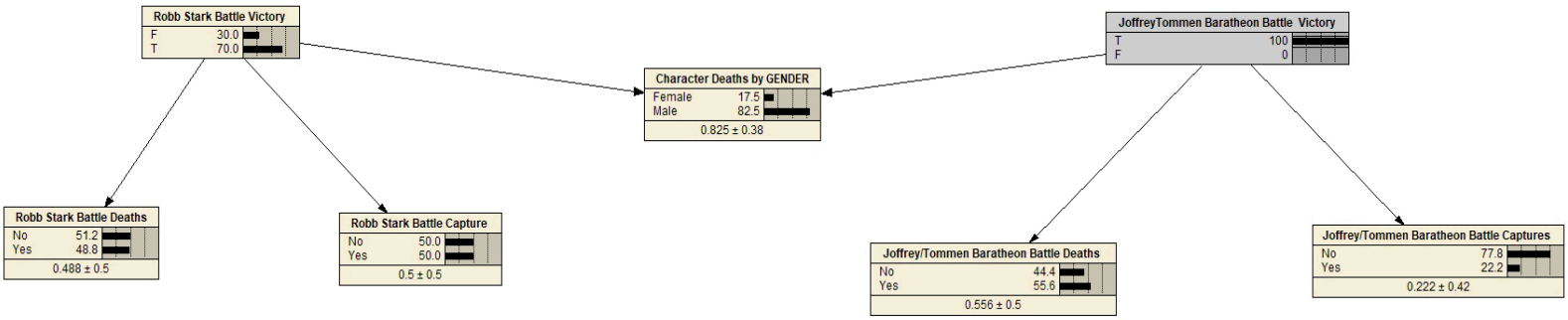

Figure 4. Bayesian Network showing probability of characters death by gender in the case Joffrey/Tommen Baratheon wins all of its battles.

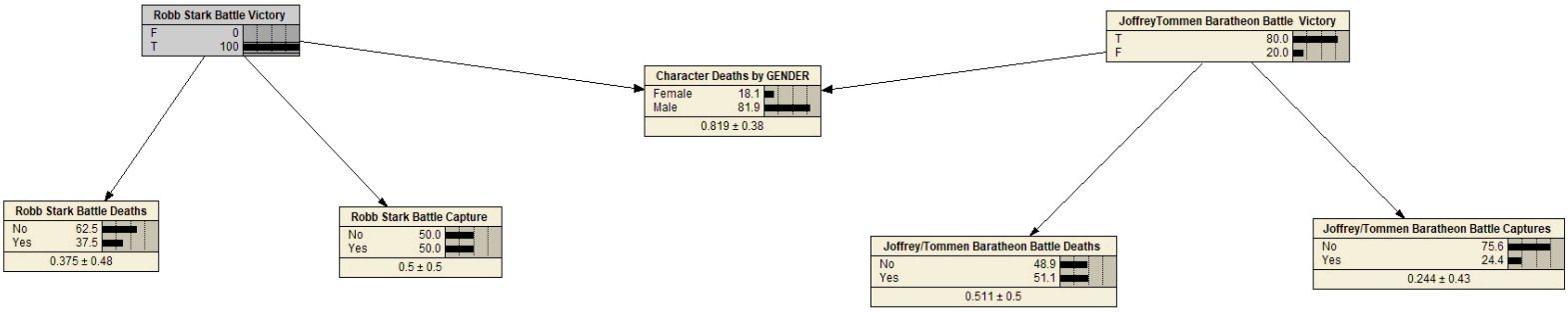

Figure 5. Bayesian Network showing probability of characters death by gender in the case Robb Stark wins all of its battles.

IV. Conclusion

The Game of Thrones series is a prominently entertaining series, both the tv show and book series have captivated and gained the praises of many people around the world. It is only reasonable to assume there is an individual out there who wishes to live in the Game of Thrones universe and thanks to Bayesian Networks, this document has explored the chances of survival if the aforementioned individual were to live in the Game of Thrones series. If male, then the odds of survival are slim to none. There is a higher probability of being killed in battle than being captured alive. However, for females, the odds are relatively steady regardless of the factions' win ratio. In fact, the higher the probability of a female character survival the lower the victory ratio for either house. Although, it is clear further research is necessary due to that the software limitations of Netica and how it greatly affected how the "Capture" ratio is calculated. Moreover, the Game of Thrones series has about seventeen houses [5], each with several different kings within the time frame the story took place in. A far more accurate Bayesian Network will need to include all the houses along with all the years the story has taken place in.

References

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