

Machine learning algorithm predicts who will be left standing in 'Game of Thrones'

April 11 2019



The screenshot shows a dark-themed website interface. At the top left, there is a large image of Sandor Clegane in his iconic spiked armor. To his right, the text reads: "HAS SANDOR CLEGANE HAD HIS LAST CHICKEN?" followed by "Click on this character to see some statistics about how we calculated their **Predicted Likelihood of Death** of **48 %**." Below this, it asks "How does being a man affect his chances at surviving in the world of Westeros?" and includes a quote: "*Killing is the sweetest thing there is*".

In the center, a section titled "A SONG OF ICE AND DATA: WESTEROS AND MACHINE LEARNING" explains: "Our in-house developed machine learning algorithm predicts likelihood of death based on various features that we extracted for each of the more than 2000 characters in George R. R. Martin's *A Song of Ice and Fire* series." A link says "Read more about our prediction algorithm."

At the bottom right, there is a smaller image of Brienne of Tarth with a "RIP 26%" sign. At the bottom left, a "RIP 48%" sign is visible over Sandor's image.

Below the main content, a black bar contains a countdown timer: "THE NEXT EPISODE AIRS IN" followed by "06 08 00 37" with labels "DAYS HOURS MINUTES SECONDS". To the right, it says "DISCOVER YOUR FAVORITE CHARACTER'S CHANCE OF SURVIVAL NOW!".

At the very bottom, a horizontal carousel shows four character portraits: Tyrion Lannister, Cersel Lannister, Arya Stark, and Brienne of Tarth, with left and right navigation arrows.

The main page of <https://got.show> presents two main characters and their predicted likelihood of death in the TV show. Credit: GoT-Team 2019 / TUM

Shortly before the curtain drops on the hit HBO show *Game of Thrones* (GoT), students attending a computer science seminar at the Technical University of Munich (TUM) embarked on an unusual scientific mission: predicting which character has the best chance to sit the coveted Iron Throne.

Students at the Technical University of Munich developed an application that scours the web for data about *Game of Thrones*, then crunches the numbers using a set of artificial intelligence algorithms that they created to predict the survival chances of each of the *Game of Thrones* characters.

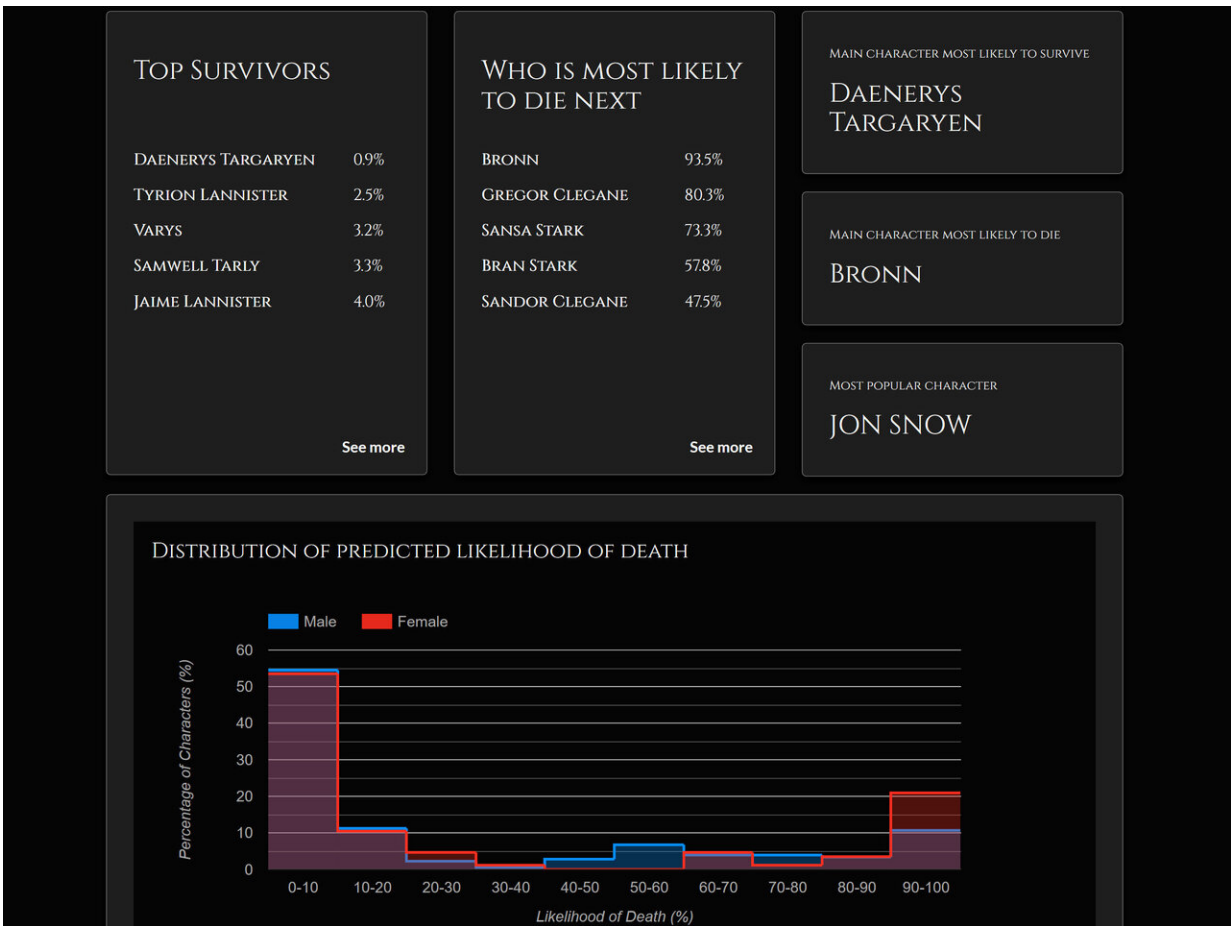
Back in 2016, and just before the airing of Season 6, students of the same course created an algorithm that accurately predicted Jon Snow's resurrection.

Similar algorithms are used in medicine and finance

The algorithms developed now by the students predicts that Daenerys Targaryen has the highest chance (99 percent) of surviving the harrowing GoT world. Her Hand of the King, Tyrion Lannister, also has a promising 97 percent survival rate.

Survival rates are predicted using longevity analysis—a technique similar to scientific studies that examine the effects of treatments and complications on cancer patients. The full list of characters and their survival chances are available online at <https://got.show>.

Savvy GoT fans can get an in-depth look into the main reasons for the algorithm's predictions. For instance, being born in Winterfell to the House of Stark as well as only being married once seems to increase the chances of Sansa Stark to be eliminated in the upcoming season; her predicted likelihood of death is 73 percent.



A snap shot of the "Ranking & Statistics" page which summarizes some of the project's key findings, such as the list of the 5 characters who are likeliest to survive. Credit: GoT-Team 2019 / TUM

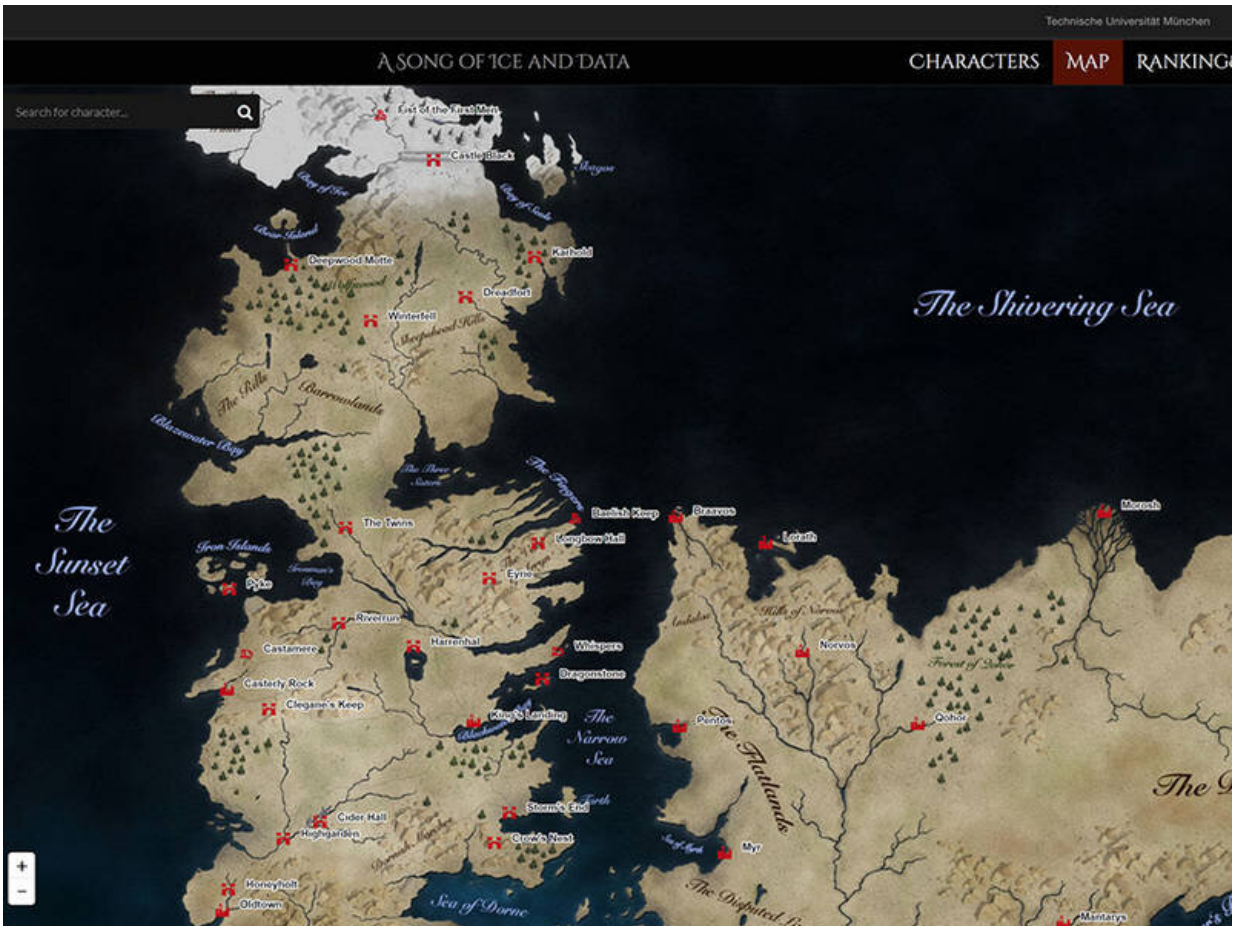
Fans interested in exploring the differences between the plot of the TV show and the story told by the books underlying the TV series, can find a side by side comparison of details about characters, including age, status (dead vs. alive) and longevity prospects.

Popular series drives passionate learning

The work on the survival chances [algorithm](#) is part of a JavaScript seminar given each semester at the Technical University of Munich computer science department. During the course, students learn how to design, develop and deploy intelligent computer systems.

Lead mentor of the class, Dr. Guy Yachdav, says, "While the task of predicting survival chances for Game of Thrones characters relies on data taken from the world of fantasy, the exact same artificial intelligence techniques are used in the real world and are having a powerful impact on our everyday lives."

Professor Burkhard Rost, heading the Chair for Bioinformatics at TUM's Informatics faculty, says, "The combination of passion and teaching is a brilliant way to create new tools that matter. In our course at TUM we found a fun way to teach students how to use this technology and prepare them to build the next big thing once they graduate."



Screenshot of the interactive map of the world of Game of Thrones as presented on the got.show website. The map allows users to explore the geography of the GoT world as well as track the voyages of GoT characters. Credit: GoT-Team 2019 / TUM

Provided by Technical University Munich

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