New study examines depictions of computer science in TV and film content

September 4 2017

Movies and television may give us the impression that technology can do anything, but who is shown using tech on screen? A new report, released today, examined portrayals of computer science across media. The results demonstrate that while the uses of tech may seem to be unfettered, there are still limits as to who can be shown on screen using computer science.

The study, conducted by Professor Stacy L. Smith and the Media, Diversity, & Social Change Initiative at USC Annenberg and funded by Google's Computer Science in Media team, examined television content and movies. The result is a sweeping investigation that examines how many characters use computer science, the demographic attributes of those characters, and the nature of those depictions.

The study sheds light on how media portrayals may present a skewed vision of computer science. For companies, schools, and parents, the report demonstrates how media offers audiences a window into computer science as an activity or profession that may fail to attract a diverse group of participants.

One team working to create a more vibrant media environment is Google's CS in Media team. With the goal of inspiring a new, inclusive vision of computer science, Google's CS in Media team has served as a resource to the entertainment industry by advising content creators on computer science-related storylines across ten TV series and TV movies. One aim of the study was to assess the impact of the project. The

analysis found 5.9 percent of 1,039 characters depicted in the set of programs influenced by Google were engaged in computer science, compared with less than 1 percent of 883 characters in a matched sample of content. For this portion of the analysis, every episode of each series sampled was assessed. These results demonstrate how rarely computer science is shown on screen, and reinforce the importance of Google's ongoing efforts.

In addition, popular media content was analyzed to provide further context for Google's CS in Media team. Only 2.2 percent of a total of 2,138 characters used computer science across the top 20 movies of 2015, 20 TV series popular with 18-49 year olds from 2015-16, and 20 popular TV series among 2 to 12 year olds from the same time frame. Two episodes of each TV series were included in the analysis.

"Storytelling opens a window into professions or activities that might not otherwise capture our imaginations," said Professor Stacy L. Smith, director of the MDSC Initiative and the study's lead author. "Although technology powers much of our daily lives, we see few stories that reflect this in media. Given this, Google's work to highlight computer science in narratives is more important than ever, especially those showcasing women and individuals from underrepresented racial/ethnic groups."

One idea that guides Google's work is that audiences—especially girls and individuals from underrepresented groups—may be inspired to pursue computer science by seeing role models on screen. However, the report finds that even among the small sample size of characters using computer science, these individuals still tend to be white and male across all media studied. Nearly 25 percent, or 15, of the characters engaged in computer science in the Google-influenced series were female, while none of the characters using computer science in the matched sample of content were girls or women. Almost 41 percent, or 9, of leading or

series regular characters that engaged with computer science in the Google-influenced shows were female.

Comparing these findings to popular content revealed that females fare better as computer science users in TV shows popular among adults 18-49 than in top films, though once again there are few characters overall using computer science. Over one-third of characters using CS in prime-time series were female which is 8 girls/women total. This is compared to only 15 percent of characters engaged in computer science in popular movies, which represents just 3 females. Forty percent, or 8, of leading and/or series regular characters using computer science were girls and/or women.

"While a higher percentage of females overall used computer science in popular content," said Smith, "girls and women are still outnumbered as computer science users, even when the only limits to their participation are the imagination of content creators."

The authors also explored factors related to computer science stereotypes. Across the stories evaluated, characters using computer science tend to be dressed in "hacker-type" clothing, lack romantic or family relationships, and rarely mention how CS could be used to help others—exemplifying stereotypes about computer science users. One bright spot in the storytelling influenced by Google was that female characters using CS were more likely to be praised for their intelligence than their appearance. Despite this, the researchers concluded that portrayals of computer science still reflect a view of the field that is rooted in tired tropes.

"Media representations of computer science may be one way that viewers learn about the profession and develop an interest in what technology can do," Smith said. "When stereotypes permeate the environment, theory and research suggest that this may dampen

attraction to the field, especially for females. The very tool that might contribute to expanded diversity in the CS workforce may be working against it."

"Inclusive representation is critical in order to inspire students to pursue CS," said Daraiha Greene, Google CS in Media's Multicultural Strategy Lead. "Research and rigorous evaluation are imperative to the work that we do as we strive to change the narrative of computer science pertaining to underrepresented groups in mainstream media. We look forward to creating more favorable perceptions of CS across industries and demographics by transforming concepts, storylines, and characters in order to have a greater effect on the landscape of media content."

The report is the latest in a series of investigations published by the MDSC Initiative this year. It is the first study conducted by the MDSC Initiative in partnership with the Google CS in Media team to assess depictions of computer science in film and TV and to use theoretical and empirical evidence surrounding stereotypes of CS when evaluating these portrayals.

More information: Cracking the Code: The Prevalence and Nature of Computer Science Depictions in Media: assets.uscannenberg.org/docs/C … e_Summary_9-1-17.pdf

Provided by University of Southern California