Math model predicts growth, death of membership-based websites

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facebook.com

% Internet's daily active users — 45% 34% 23% 11% 0

data

model fit

predictions

Past   Future

1 yr   2 yr   3 yr   4 yr   5 yr   6 yr

time (years) since 2007
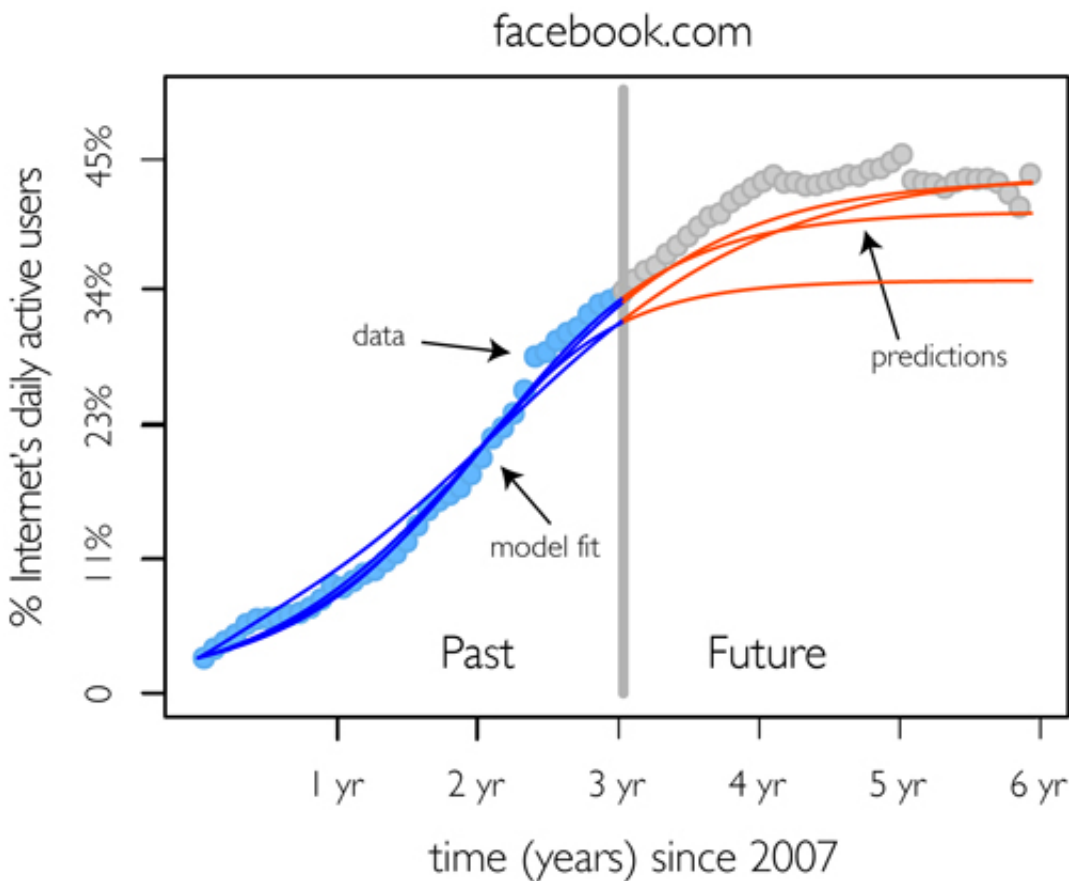
(Phys.org) —Facebook, now celebrating its 10th anniversary, is a proven success in what the late Nobel laureate Herbert Simon called "the marketplace of attention." A new model devised at Carnegie Mellon

University assesses the viability of websites and social networks in this new attention economy to predict which sites are sustainable and which are not.

The model, developed by Bruno Ribeiro, a post-doctoral researcher in Carnegie Mellon's Computer Science Department, attempts to replicate the dynamics of membership sites such as Facebook, LinkedIn and TeaPartyNation, including the role of active users as catalysts of website activity, turning dormant website members into active users and keeping them active.

In applying the model to six years of user statistics for 22 membership-based websites, Ribeiro found that it was able to reliably predict which sites will be sustainable for the foreseeable future—including the Huffington Post news site, Ashley Madison dating site and The Blaze commentary site—and which sites could not be sustained, such as Flixster.com, OccupyWallSt.org and TeaPartyPatriots.org.

Unlike a recent, widely publicized academic study that predicted an [80 percent drop in Facebook membership](#) from 2015 to 2017, Ribeiro's model shows Facebook to be sustainable for the foreseeable future. As with all of these predictions, however, Ribeiro points out that even sustainable sites are vulnerable to upstarts that steal the attention of their members, as Facebook famously did to MySpace.

Ribeiro said his model could help investors understand which sites are self-sustaining and which are likely to fail, as well as help website managers identify and correct problems in the dynamics of attention to their sites.

It's not enough to look at the total membership or the growth of membership of a site to understand which sites will be successful, Ribeiro said. His model accounts for the tendency of active members to

become inactive, the influence that active members can have in encouraging friends to join or become active members, and the role of marketing and media campaigns in convincing people to join.

Ribeiro said he was inspired to take this approach by the writings of Simon, a Carnegie Mellon professor who won the 1978 Nobel Prize in economics. Simon had observed that many information systems were designed as if information was scarce, when the problem was just the opposite. "A wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it," he said.

Ribeiro tested the model by evaluating both successful and unsuccessful sites. "If you don't look at the negative examples, you never understand what makes for success," he explained. Six years of daily number of active users (DAU) data, beginning in 2007, were obtained for 22 sites from Alexa, a Web analytics company. "This study couldn't have been done even two years ago," he added, "because data of this quality and breadth simply didn't exist."

In addition to separating the self-sustaining from the unsustainable sites, the model was able to discern which sites grew primarily from word of mouth, such as Facebook, Meetup.com and LinkedIn, and those powered by media and marketing, such as The Blaze, Bandstack and OccupyWallSt.

Unfortunately, the model also suggests that in the quest for attention, many sites are likely to increase annoying behaviors, such as sending emails about what friends on the site are doing.

"If this model is correct, social network sites will try to make your friends' lives seem more interesting and your feedback on their posts more urgent," Ribeiro said. Many teens, for instance, seem glued to their

smartphones for fear of missing something that might get posted on a social [site](#) by or about a friend. "From the [model](#)'s perspective it is beneficial for companies to be encouraging this type of behavior," he added.

Ribeiro will present this research at the World Wide Web [Conference](#), April 7-11, in Seoul, Korea.

  More information: arxiv.org/abs/1307.1354

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