

Mathematical model predicts success of movies at the box office

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A group of Japanese scientists have surprised themselves by being able to predict the success or failure of blockbuster movies at the box office using a set of mathematical models.

The researchers, publishing their study today, 15 June, in the [New Journal of Physics](#), used the effects of advertising and word-of-mouth communication to create a model that turned out to be successful in predicting how each movie fared once it hit the silver screen.

The only data the researchers needed to put into the model were the daily advertisement costs of 25 movies that appeared in Japanese cinemas.

Their model was originally designed to predict how word-of-mouth communication spread over social networks, applying it to conversations about movies in particular, which was a success; however, they also found that when they overlapped their predictions with the actual revenue of the films, they were very similar.

They now intend to apply their model to other commercial markets, such as online music, food snacks, noodle cups, soft drinks and local events.

The researchers, from Tottori University, used their model to calculate the [likelihood](#) of an individual going to watch a movie in a Japanese cinema over a period ranging from 60 days prior to the movie's opening date to 100 days after it had opened.

Recognising that word-of-mouth communication, as well as advertising, has a profound effect on whether a person goes to see a movie or not, whether this is talking about it to friends (direct communication) or overhearing a [conversation](#) about it in a café (indirect communication), the researchers accounted for this in their calculations.

The daily number of blog postings for each of the 25 films was also collected from the internet as a means of comparison for the researchers' calculations.

Lead author of the study, Professor Akira Ishii, said: "If a person is reading and commenting on a friend's blog, we consider this as direct communication. If a person happens to come across a blog through a series of web pages and links, we consider this indirect [communication](#)."

The result was a set of graphs outlining a person's intent on watching movies such as The Da Vinci Code, Pirates of the Caribbean: At World's End, Spider-Man 3, Transformers and Avatar, based on the daily amount of money spent on advertising the film and word-of-mouth.

When overlaid on the actual revenue from these [movies](#) whilst screened in the cinema, they appeared to match very well, meaning the calculations could provide a fairly good prediction of how successful a movie could be even before it is released.

More information: "The 'hit' phenomenon: a mathematical model of human dynamics interactions as a stochastic process" Ishii A et al 2012 *New J. Phys.* 14 063018, iopscience.iop.org/1367-2630/14/6/063018/article

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