# Scientists text-mining social media for data on food-related topics

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Data analytics of users' posts on social media platforms and other digital media are being used by researchers to study a variety of food- and health-related issues and to collect consumer feedback on restaurants, food products and delivery services, University of Illinois food science graduate student Dandan Tao found in a study. Credit: Pengkun Yang

From tweeting photos of delicious meals to reviewing restaurants, social media give foodies numerous opportunities to indulge their passion for edibles. But these media and other digital communications—including recipe websites and food-delivery apps—also generate a rich trove of text data for food scientists and food industry researchers to study what people eat, how nutrition affects health and many other food-related topics.

Food scientists Dandan Tao and Hao Feng of the University of Illinois at Urbana-Champaign and Pengkun Yang of Princeton University examined the use of text mining—defined broadly as the retrieval and analysis of text data—in food science and nutrition research, which they said is a young but growing field, nourished by advances in big-data analytics.

Researchers have used social media to investigate foodborne illness outbreaks, and they have analyzed the digital records of British consumers' grocery purchases to monitor obesity rates and obesity-related diseases in London. They also mine the text of other digital media such as search queries and recipe websites to explore dietary patterns and the growing popularity of plant-based diets.

Public health experts use text mining on Twitter, Instagram and Yelp! to identify unreported foodborne illness outbreaks, with users' posts helping them develop a clearer picture of the number of people experiencing symptoms, said Tao, a graduate student in food science at the U. of I. and the first author of the study.

"Only a small portion of the people who get sick after eating potentially contaminated food go to the hospital, and public health experts' estimates of the number of people affected by a foodborne illness are based on those who seek treatment," Tao said. "Scientists think that text mining social media discussions and contacting other potential sufferers gives a much stronger signal of the extent of an outbreak than just the number of patients treated."

Text mining of online scientific databases and abstracts of studies helps scientists better understand the relationships among diet, genes and disease.

Past studies of dietary patterns, obesity and related chronic illnesses relied on limited data gathered from participants who completed food diaries or surveys. But with millions of internet users going online daily to swap information about their eating habits and health conditions, digital media enable scientists to easily obtain data from broader populations for studies on food consumption and health outcomes.

Twitter and Instagram posts and Google search

histories have been used to investigate nutritional patterns and health behaviors, Tao and her co-authors found.

In one study, scientists found correlations between tweets on obesity and the prevalence of obesity in U.S. adults. In another project, researchers found associations between the Twitter hashtags people used and the quality of their diets.

Instagram users' posts have provided data for studies of alcohol consumption patterns and the impact of food deserts on neighborhoods' eating habits, according to the study.

In addition to whetting the appetites of amateur chefs, recipe websites and search queries for recipes have fueled research on dietary trends such as veganism, and associations between dietary patterns and disease.

The recipes that users post online also provide clues on cultural differences, Tao said.

"One group did a study that compared Western cuisines with Asian cuisines and identified ingredient pairings in these recipes," Tao said. "They found that Western cuisines tended to use ingredients that shared flavor components, while Eastern cuisines—especially Indian dishes—try to avoid using ingredients that share flavor components."

Online media are powerful sources of business intelligence, too, Tao said.

"Digital text analytics are cost-effective methods for the food industry to gain quality improvement ideas from the public and make informed business decisions," she said.

Restaurants and manufacturers harvest [text](#) data from [social media](#) platforms to analyze consumer feedback on their own and their competitors' products and services, such as which fast-food chains diners prefer.

And restaurants and [food](#) delivery services use data from their online ordering apps to optimize their delivery routes and reduce customers' wait time for their meals, according to the researchers.

Provided by University of Illinois at Urbana-Champaign

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