Hungry for Data

Gary Singh

At an early age, Yun Wang became fascinated with the universal principles underlying most software and hardware systems. They were part of everyday life, yet still seemed mysterious and intriguing.

Equally so, she was always interested in food. As Wang learned how to cook, she enjoyed making food for others much more than tasting and eating the food herself. Anything strange or delicious in a restaurant inspired her to create her own version. She began to test different cuisines from around the world, often cooking challenging and complex dishes not usually found in family kitchens—crispy durian pastries, bubble milk tea, Thai soups like Tom Yum Goong and Szechuan style Dan dan noodles, not limiting herself to anything specific.

By the time she progressed through various computer science degrees, culminating in a Ph.D. at The Hong Kong University of Science and Technology in Clear Water Bay, she realized that cooking a meal in the kitchen, from preparation all the way through to the final product, required similar skills as that of a software engineer. One needed to secure all the ingredients beforehand, calculate the necessary amounts, and then prepare them in advance. During the cooking process, one could not just randomly throw materials together based on chance procedures. It took planning, focus, and multitasking so the food would not be overcooked or undercooked. Global and local variables often came into play.

"This is similar to project management in software engineering," says Wang, now a researcher at Microsoft Research Asia whose work appears in this issue's Visualization Viewpoints section. "You need to understand the dependencies between different functions very well, have an overall picture of the project in your mind, and manage your time and efforts wisely so that you can maximize your productivity."

DATA EDIBILIZATION

The cover image, as well as Figures 1–3, relate to Wang's research in "data edibilization," a new flavor of communication in which she and her team leveraged the sensations of taste to convey data stories. Initially, the idea emerged from Wang's experience with other researchers who used more traditional physicalizations. Being a natural foodie, she got to thinking.

"One day it occurred to me, 'Why can't we use food as a medium?'" she recalls. "Food can be more stimulating to human senses. It has color, taste, smell, and texture, and it can appear naturally in our daily life."

As a result, Wang and her team discovered that food resonated with people much more than

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Figure 1. STEM salad for data edibilization. (Used with permission.)

traditional methods of data visualization. Graphs and charts, by comparison, could not easily convey the additional sensory channels provided by food. She found an intangible richness in food's ability to show implicit information like taste, aroma, appearance, and even culture of origin. Just on one particular level, texture of food became yet another way to represent data, since users have distinct reactions to texture. And since food was something participants could take into their bodies, it felt much closer to them, as opposed to simply experiencing a data representation based on other senses, like sonification. Food also triggered emotional and intellectual responses from participants, plus behavioral and psychological effects.

"Humans consider food as a means of survival," Wang says. "Therefore, people are naturally attracted to food. Pleasant eating experiences further intensify the favor of food, especially when hunger strikes, which is a natural advantage for edibilization to attract people."

Food thus became a special medium Wang could repurpose from its normal use in everyday life. She could apply theoretical and practical experiences of making delicious food, yet redirect the experience to a data representation model.

The cover image demonstrates what Wang's data edibilization models often look like. Figure 1, for example, is from a user feedback study related to annual STEM degree earners and STEM job openings. To encode the data, Yang's team made a salad with ham and garden

Figure 2. Sweet dumplings used for data edibilization. (Used with permission.)

vegetables, subtly mapping the ingredients to the data. In the yet-to-be-blended salad inside the glass, the bread crumbs corresponded to available jobs, the ham represented associate degrees and certificates, the corn referred to bachelor's degrees, the diced tomatoes referred to master's degrees, and, at the top, the arugula denoted Ph.D. graduates. The quantity of each ingredient reflected the value of the data entry.

The results were intriguing. Several participants associated the bread crumbs with the term "breadwinner," so they correctly identified the crumbs as job openings. Others thought that since ham was the only meat involved, it must refer to associate degrees because those degrees are the basic substantive meat of all the other degrees and might thus yield greater strength across the majority of the population. On a humorous note, one participant even latched onto the bitterness of the arugula, concluding that this taste was accurate for Ph.D. graduates.

"When I shared this story during my presentation of our research of edibilization at CHI 2016 in San Jose, the audience suddenly got the meaning of using the arugula leaf to represent Ph.D. and burst into laughter," Wang says.

In other studies, Wang's team used dumplings as data edibilization (see Figures 2 and 3).

Figure 3. Sweet dumplings used for data edibilization. (Used with permission.)

The varying sweetness of the dumplings and the soup represented the students' performance during the past semester. After participating in the experiment, the students realized it was a way to show they have accepted, understood and digested their past achievements, turning them into nutrition for the future. This demonstrated the sociability factor of data edibilization. Figure 4 shows volunteers attending a data tasting workshop in which similar experiments were studied.

USER EMPOWERMENT

Currently, Wang is conducting even more research on data visualization for storytelling, and, in a broader sense, how she can empower people by helping them properly analyze complex data to convey their insights and knowledge. She is working on techniques that automatically generate infographics and visualizations, or systems that enable users to more creatively express the data. This includes designing visualization systems to help users interactively explore data and recommend insights automatically, through algorithms.

"I think my curiosity in making food is similar to my interests in computer science and software engineering," Wang says. "I am interested in understanding and building things from nothing."

Figure 4. Volunteers attending a data testing workshop. (Used with permission.)

Gary Singh lives and writes in San Jose, California. Contact him at http://www.garysingh.info/.