A Virtual Opinion

The idea of crowdsourcing medical diagnosis is crazy, isn’t it? I mean, how could anyone consider putting something as important as their health in the hands of strangers with unknown credentials? Yet, as patients are increasingly becoming the keepers of their own personal electronic medical records, which includes all kinds of multimedia data, radiological images, doctor’s notes, and test results, they have the ability to do just that. Beyond the assortment of family doctors, general practitioners, and specialists and sequences of first-, second-, and higher-order opinions, the crowd too can have a role.

Since being first coined in 2006, crowdsourcing has taken off as a form of participatory online work production. Sites such as Amazon Mechanical Turk have created an Internet marketplace with hundreds of thousands of human intelligence tasks (HITs) that range from audio transcription to language translation to photo tagging. Numerous image classification and retrieval evaluations and datasets have used Mechanical Turk for annotating ground truth. ImageNet used Mechanical Turk to annotate tens of millions of images across tens of thousands of WordNet synsets, and ImageCLEF used it to annotate concepts, sentiments, and categories for tens of thousands of photos. Mechanical Turk “automates” these kinds of simple tasks, which in the case of multimedia and computer vision research are required to be performed by people.

Crowdsourcing also has the potential to tap into a wide base of expertise online. Medical diagnosis is something that certainly benefits from appropriate expertise. However, relevant knowledge and experience can be valuable, wherever it resides. Social networking health sites such as PatientsLikeMe let people actively share and learn from each other’s medical information including histories of conditions, symptoms, side effects, and more (see www.patientslikeme.com). This gives people in similar situations a better understanding of possible treatments and outcomes. Other sites like Google Flu Trends (www.google.org/flutrends) more passively crowdsource health-related data by using Google search terms from around the world to predict flu activity. The idea is that when people are feeling ill they search online about medication or symptoms, thus enabling effective early disease detection and monitoring.

Other various forums present medical situations complete with symptoms, test results, and images. The New England Journal of Medicine (NEJM, www.nejm.org/image-challenge) hosts a regular “image challenge,” which presents a patient image that might be an x-ray, magnetic resonance imaging (MRI) scan, computed tomography (CT) scan, photomicrograph, or ordinary photograph of a condition. The NEJM then asks the crowd for a diagnosis and, in some cases, a treatment. The mysterious nature of many of the NEJM image challenge questions can stump even experts. But everyone is free to try, and every week tens of thousands of people do, typically converging on something that looks like a correct answer.

The New York Times similarly hosts a monthly Diagnosis column that outlines a complete patient situation, which can include a sequence of tests and images. The column then asks readers to answer questions or make a diagnosis. (See http://topics.nytimes.com/topics/news/health/columns/diagnosis/index.html for a list of past articles.)

Crowdsourcing medical diagnoses can introduce its share of risks. A patient’s own research from information gleaned online, if not well founded or from credible sources, can add noise and possibly complicate care. In fields such as radiology, specialists often disagree on diagnoses for the same image. Adding a
bunch of novice opinions to the mix does not necessarily help. However, doctors are increasingly making use of social media sites like Facebook and Twitter and can potentially provide their expertise online.8

Unanswered questions remain regarding what constitutes good standards of care and whether doctors should give out diagnoses or prescribe treatments online. Nevertheless, people are using social media platforms to seek and share medical information. For example, we can find hundreds of new Tweets everyday on allergies, headaches, insomnia, sprained ankles, tendonitis, sinusitis, and more. There is not yet a wealth of tweeted medical images, but a quick search of TwitPic produces a smattering of x-ray and ultrasound images.

Advances in medical-related devices and portable apps will help produce more personal health data. We are witnessing an explosion of health-related apps that use mobile phones to capture, track, and post personal health information, including heart rate, sleep patterns, moods, meals, and exercise levels and history. Additional specialized sensors are being developed for various mobile phones that read blood glucose level, blood oxygen level, body temperature, and so on, which will further accelerate the ability to monitor health and share the acquired information online.

Although MRI equipment is not routinely connected to social media sites today, if these information sharing trends persist and patients continue to seek answers online, we might reach the point where it will become easier for everyone if they were. The resulting explosion of multimedia health data would certainly keep us researchers busy for a long time. The hope is that we will all be better off for it.

References

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