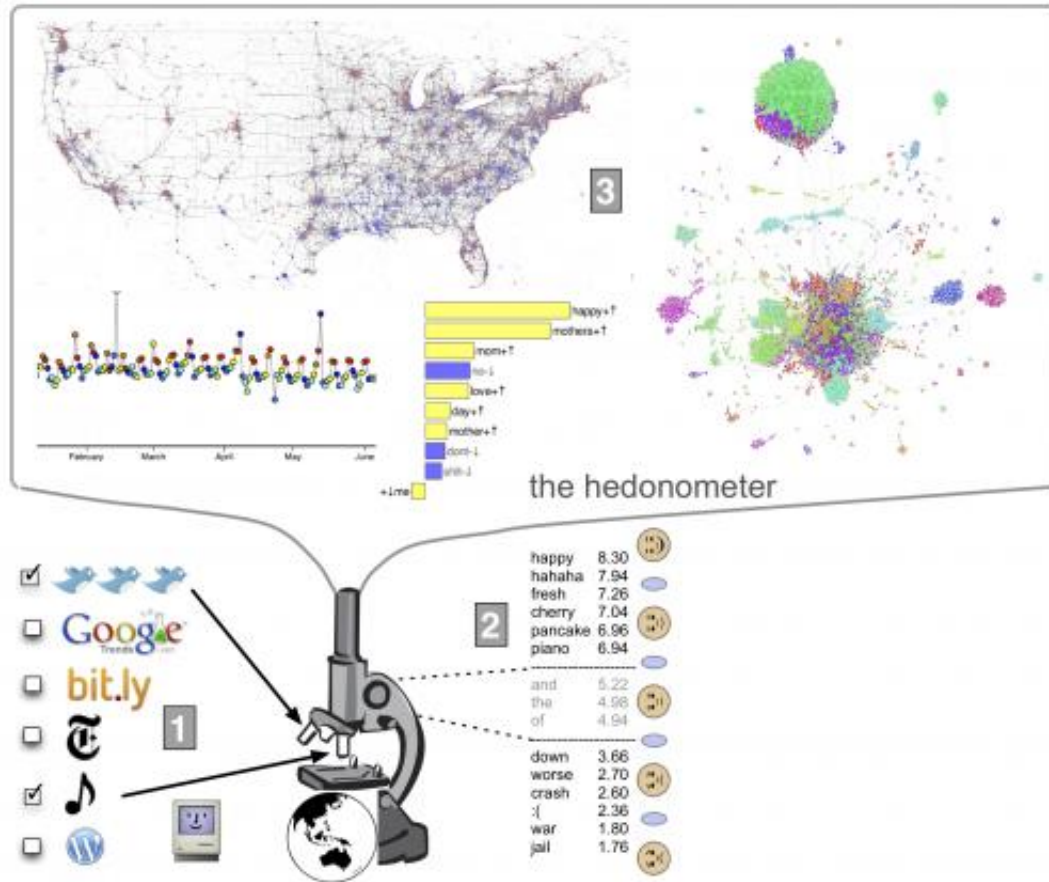# Happiness: There's an app for that

April 30 2013

the hedonometer

The day of the Boston Marathon was the saddest day in nearly 5 years of observations by a team of scientists from the University of Vermont and The MITRE Corporation. Their on-line "hedonometer"—an online sensing device—shows a drop in global happiness associated with the bombings at the race. For the first time, results from the hedonometer are being made available to the public for free at a new website. The technique is a bit like a global microscope that draws in millions of words in English from around the world—using Twitter and, soon, sources like CNN transcripts, Google Trends data, New York Times stories and others—and that lets the scientists, and now

Pick up your smartphone. How are financial markets faring? Check Dow Jones or the S&P 500. Average temperature in the United State last July 4th? Steer your iPad over to the National Weather Service. OK, so how unhappy was the world after the Boston Marathon bombings on Monday, April 15?

Wait a minute. You can't measure global happiness, can you? Yep, now there's a website for that: http://www.hedonometer.org.

A team of scientists from the University of Vermont and The MITRE Corporation have been gaining international attention over the last few years for the creation of what they're calling a hedonometer. It's a happiness sensor.

Now findings from this research are updated every 24 hours (soon to be every hour, and, eventually, every minute)—and are available to the public for free.

The day of the Boston Marathon was the saddest day measured by the scientists in nearly 5 years of observations.

The new website will go public on Tuesday, April 30, at 12:00pm.

On its front page, a wavering graph rises and falls like a ticker at the New York Stock Exchange. Except, instead of averaging the value of thousands of companies, the hedonometer compiles and averages the emotional state of tens of millions of people.

"What it's doing right now is measuring Twitter, checking the happiness of tweets in English," says Chris Danforth, a UVM mathematician who co-led the creation of the site with fellow mathematician Peter Dodds.

But soon the hedonometer will be drawing in other data streams, like Google Trends, the New York Times, blogs, CNN transcripts, and text captured by the link-shortening service Bitly. And it will be data-mining in twelve languages.

Hedonometer.org is based on the research of Dodds and Danforth and their team in the Computational Story Lab at the University of Vermont's Complex Systems Center, and the technology of Brian Tivnan, Matt McMahon and their team from MITRE, a not-for-profit organization that operates federal research and development centers and has expertise in big data analytics.

In February, the research team made headlines with the hedonometer. Studying geo-tagged tweets from cell phones, they reported on the happiest and saddest cities in America: Napa, CA, at the top and Beaumont, TX, at the bottom. In future versions of the new website, the researchers plan to make this kind of geographically linked data available, allowing as-it-happens observation of how a happiness signal varies, say, between Seattle and San Diego.

"Reporters, policymakers, academics—anyone—can come to the site," says Danforth, "and see population-level responses to major events."

Like the Boston Marathon bombings.

On Monday, April 15, reporters and TV crews from all over the world flocked to Boston to report on what they thought would be stories of athletic triumph. Instead, as the world now knows, two crude bombs near the finish line were detonated, killing three and injuring more than 260.

Reporters turned to telling this new, tragic story. Many went out and started interviewing people. The stories were compelling; many people they spoke to around Boston seemed scared, angry, and sad.

But suppose reporters wanted to find out how the bombings were affecting the mood of the world—in real-time. Was this horror registering in the global psyche, and how deeply?

"Many of the articles written in response to the bombing have quoted individual tweets reflecting qualitative micro-stories," says Danforth. But capturing a few online comments or reactions on video does not necessarily reflect the overall mood of the English-speaking world anymore than talking to ten people in the park equals the US Census.

What if a reporter had also turned to the hedonometer? First, she'd have seen a dramatic downward spike in happiness for that day. Clearly, the Boston Marathon bombings were registering around the world. "Our instrument reflects a kind of quantitative macro-story," Danforth says, "one that journalists can use to bring big data into an article attempting to characterize the public response to the incident."

Then—in the same way that a stockbroker might drill down into a market average to get a sense of which companies are moving the markets the most—a reporter could dig deeper into the hedonometer's data. There, she could see that "explosion," "victims," and "kill" are at the top of a list of trending words pushing the hedonometer down to its lowest ever point on April 15.

"They rise to the top because they are words that are negative," Danforth says, "but primarily because they appear so much more than they usually do in the background in the ambient chatter of English."

The hedonometer draws on what scientists call the "psychological

valence" of about 10,000 words. Paid volunteers, using Amazon's Mechanical Turk service, rated these words for their "emotional temperature," says Dodds, director of UVM's Complex Systems Center.

The volunteers ranked words they perceived as the happiest near the top of a 1-9 scale; sad words near the bottom. Averaging the volunteers' responses, each word received a score: "happy" itself ranked 8.30, "hahaha" 7.94, "cherry" 7.04, and the more-neutral "pancake" 6.96. Truly neutral words, "and" and "the" scored 5.22 and 4.98. At the bottom, "crash" 2.60, the emoticon ":(" 2.36, "war" 1.80, and "jail" 1.76.

Using these scores, the team collects some fifty million tweets from around the world each day—"then we basically toss all the words into a huge bucket," says Dodds—and calculate the bucket's average happiness score. As the site develops, the scientists anticipate that it will be gathering billions of words and sentences daily.

"Our method is only reasonable for large-scale texts, like what's available on the Web," Dodds says. "Any word or expression can be used in different ways. There's too much variability in individual expression," to use this approach to understand small groups or small samples. For example, "sick" may mean something radically different to a 14-year-old skateboarder than it does to his pediatrician.

But that's the beauty of big data. Each word is like an atom in the air when you're trying to figure out the temperature. It's the aggregate effect that registers, and no individual tweet or word makes much difference. In the Boston Marathon bombings example, positively scored words like "prayers" and "families" also spiked, but, obviously, not for positive reasons.

"If we remove 'prayers,' 'love,' and 'families,'" says Chris Danforth, "it's not going to change the day's overall deviation from the background,

because of all the other words."

Changing which words are used to assess the overall emotional picture, "is like changing the filter on a lens you're using," explains Peter Dodds. "You can take out all the color, or you can turn up the contrast, but you can still see the picture."

In 1881, a little-known book, Mathematical Psychics, published by Francis Edgeworth, asked the reader to "imagine an ideally perfect instrument, a psychophysical machine, continually registering the height of pleasure experienced by an individual, exactly according to the verdict of consciousness."

In other words, a hedonometer. While Edgeworth's was a thought experiment, Dodds and Danforth's hedonometer is a real device. Of course, it doesn't directly measure "the height of pleasure." While the team is opening conversations with experts in brain scanning about how fMRI images might corroborate their remote-sensing approach, "we can't—and really don't want to—look inside people's heads," says Dodds.

Nor is their hedonometer "ideally perfect." They're working now to expand beyond the "atoms" of single words to explore the "molecules" of two-word expressions. But the hedonometer does work.

"The key piece is not whether we're correctly measuring atoms and molecules," says Brian Tivnan, a researcher from MITRE. "It's the relative context that is so important: which is why the sudden drop from the Boston Marathon bombings jumps out at you. The hedonometer shows the pulse of a society."

Of course, happiness isn't simple. Plato, Buddha, Freud and Tina Turner all pondered its meaning. Many Americans rank happiness as what they want most in life, but what is it, really?

"We're not trying to tell you that contentment is better than happiness—we're not trying to define the word," says Danforth. The Nasdaq Index doesn't capture the whole stock market. Gross Domestic Product doesn't define the meaning of the economy. An EKG doesn't tell a doctor everything about your heart. But all these aggregate measures, of something remote, are widely studied. The hedonometer may prove to be the same.

"We're just saying we're measuring something important and interesting," says Chris Danforth. "And, now, sharing it with the world."

Provided by University of Vermont

Citation: Happiness: There's an app for that (2013, April 30) retrieved 3 July 2024 from https://phys.org/news/2013-04-happiness-app.html