

Tweet bursts: quantifying mass excitement in social media

High excitement, short messages: MIT researchers unveil relationship between the length of online posts and mass excitement during collective social events

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For immediate release

A team of MIT researchers has conducted a statistical analysis of millions of public online messages, revealing statistical laws behind collective excitement during special events, such as major golf tournaments, presidential elections or large snow storms. Studying various online media - from Twitter to Facebook and popular forums - the researchers were able to uncover the impact of events on people's excitement as quantified through the length and rate of their online reactions. Results are published this week in the scientific journal PLOS ONE.

"High excitement, short messages: posts become shorter and more frequent during the climax of an event" - says professor Carlo Ratti, head of MIT's Senseable City Lab, where the study was carried out. "This follows a logarithmic relationship, as in many other laws of psychophysics that describe human phenomena - from hearing to visual perception."

"With the widespread use of digital communication media it has become possible to study massive data streams of user-created content in which individuals express their sentiments, often towards a specific topic" - added Michael Szell and Sebastian Grauwin, lead authors of the article. The analysis led to two key findings. First, that the length of sentences follows a very well defined lognormal distribution - a notion that had previously been posited within the field of stylometry (the study of linguistic style) and observed in telephone calls. Second, and most importantly, when the rate of messages per hour increases, the lognormal contracts.

The researchers discovered that the latter effect can be observed in the behavior of most regular users, but is amplified by the engagement of additional user demographics who only post during phases of high collective activity. Furthermore, the same phenomenon spans a variety of media including Twitter, Facebook, or online forums. The team linked this process to principles of psychophysics, revealing a phenomenological relationship between the exposure to online stimuli and emotional response. Future work could also elucidate how excitement might correlate to more impulsive, less rational responses - for example, during financial 'bubbles'.

Beyond its intended scope, the study may also offer insights into how to improve online media such as Twitter, and enrich their user experience. "Message length limitations, such as Twitter's 140 character upper bound, result in a clear cut-off of the lognormal distribution" - adds Sebastian Grauwin. "This restriction means that a substantial fraction of users are forced to truncate their messages, causing possible dissatisfaction." As such, this analysis may inform the design and functionality of micro-blogging and messaging services in the future.

The research was carried out at the MIT Senseable City Lab, in collaboration with Ericsson's "Signature of Humanity" initiative. Additional partners were the Rhone Alpes Institute of Complex Systems and the Computer Science Laboratory at Ecole Normale Supérieure in Lyon, France.

Link to webpage: <http://senseable.mit.edu/tweetbursts/>

Link to article: <http://dx.plos.org/10.1371/journal.pone.0089052>

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