



SHARE AND MOVE TO FACE NASTY BUGS

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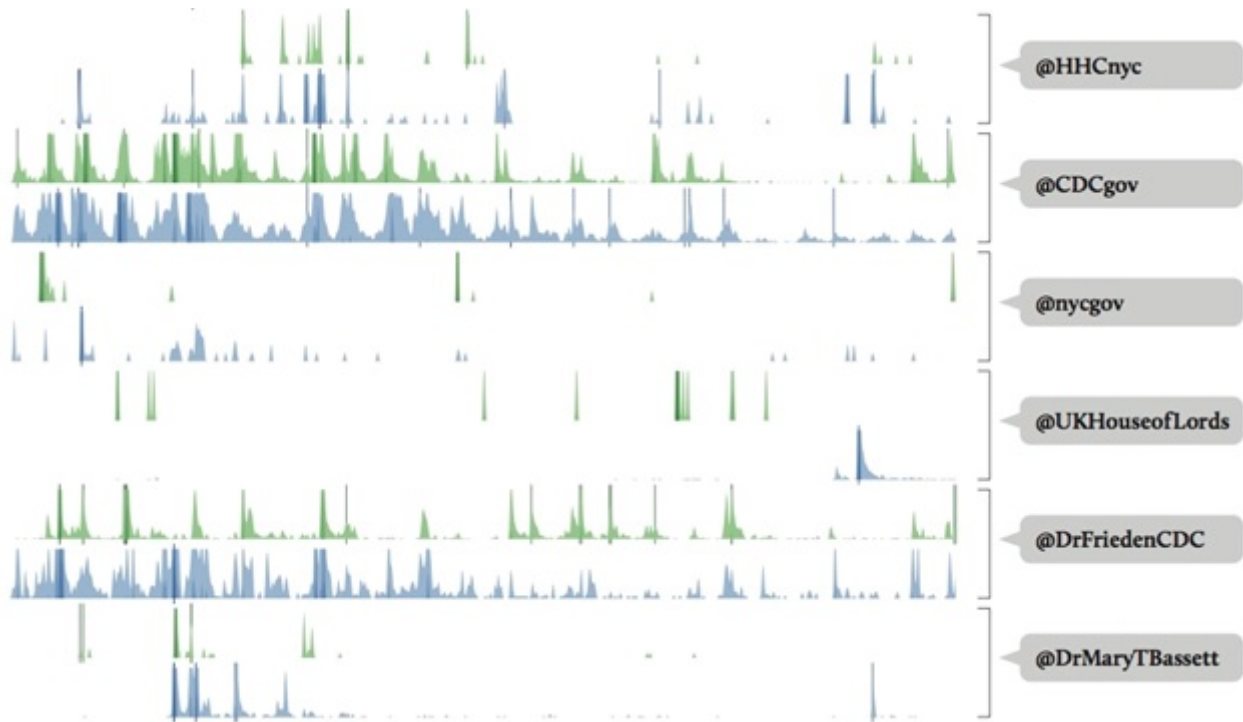
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Monitoring health on a large scale through Big Data or using social networks to modify behaviour and risk factors are two relevant examples of how cutting edge technology may provide new and powerful tools against infectious diseases.

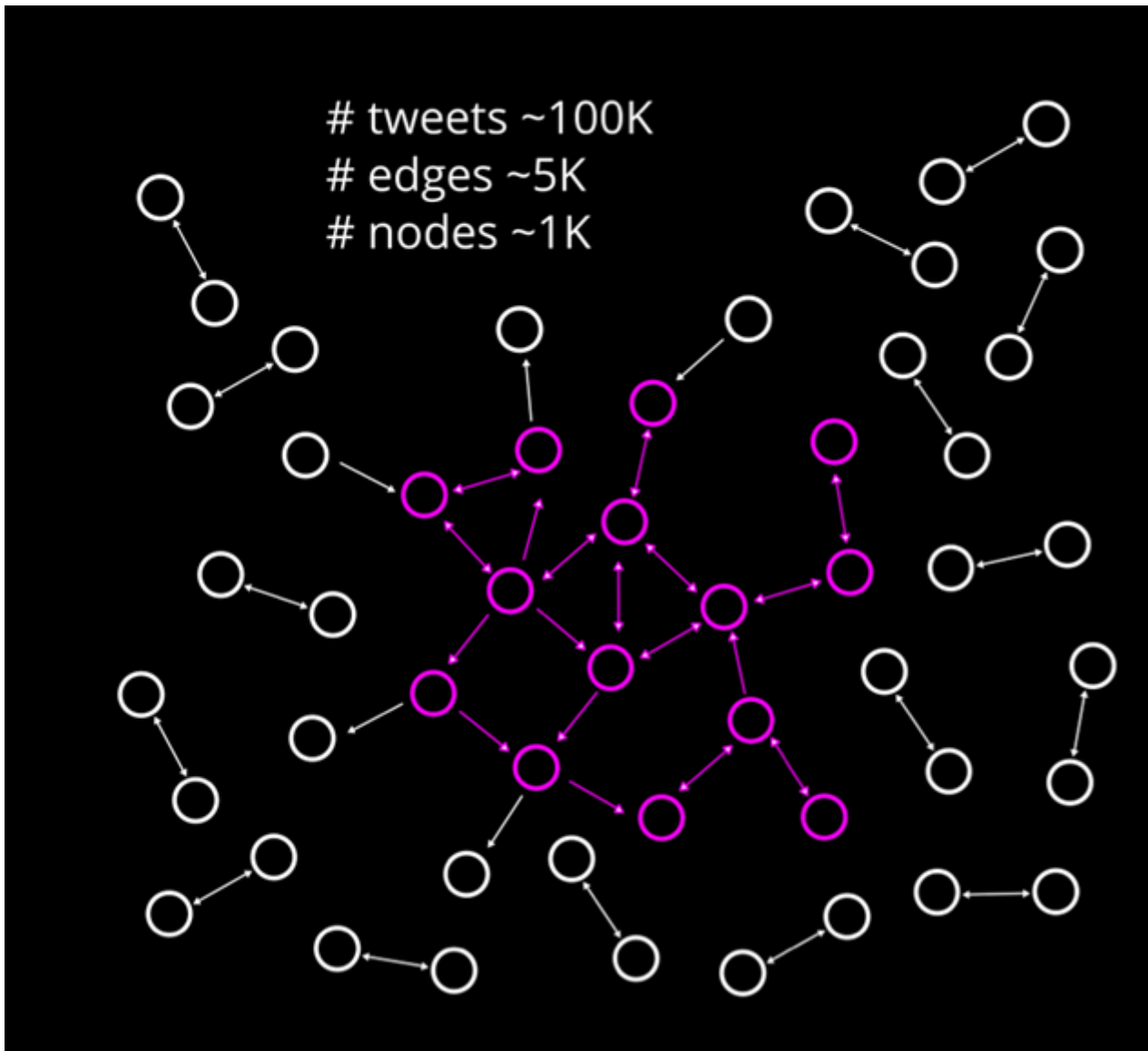
Many public and private agencies and bodies gather data from social networks and search engines to try and identify health emergencies and solve the problem: the most common approach is to analyze the search strings used by Google and the texts of blogs, forums and other pages on the Net.

In 2009, the Google Flu Trends ^[8] team managed to forecast the seasonal flu peak better than the public agency, but subsequently made major mistakes, especially in 2013. This led many laboratories to develop more sophisticated algorithms to perform more accurate forecasts, based on what people searched for on line. Once again, it is important to have accurate predictions and surveys to avoid false alarms and disregard existing emergencies. Geolocalization of the social network posts in discussion groups are precious for private and public institutions. Through them, each user becomes a potential source of useful data. Data that can be used to forecast and monitor ongoing epidemics, health emergencies following natural events, social trends ? such as anti-vaccination campaigns ? or animal testing.

The EU research project TELLME ^[9], which came to an end in 2014, developed a new model to identify influencers and new strategies within the context of the Ebola crisis in West Africa, by monitoring Twitter conversations and trends on this topic. This model led to new procedures to gather information using the tone and subjects being discussed, such as fear, plot, drug.



Markov chains were used as they allow to identify micro-communities that appear to play a key role in conveying information in the course of emergencies.



The main actors of these micro-communities may not be the most renown and consolidated influencers but they still can become important nodes of discussion if continuously monitored and stimulated, as they can help spread messages throughout the community. ASSET project will carry on working on this model, thus taking the TELLME's legacy. Automating procedures will be developed to monitor the debate on certain subjects, in order to identify the most authoritative participants, process information through text analysis and intervene in the debate.

The use of social networks and how they may directly impact on the health of individuals is another relevant area. Two cases are exemplar: a project from the European Medicine Agency (EMA) ^[10], currently underway, and Foodborne, from the Chicago Department of Public Health

[11], which is already active.

Thanks to European funding, Alessandro Spina, EMA legal adviser and data protection officer, explained how the agency and its partners are fine-tuning a project that uses social sectors to monitor undesirable drug side effects. Currently, the information is gathered through a network of centres that collect data from physicians, hospitals and citizens. However, there can be a time gap between the information going through the official channels and the first reactions. Social networks can shorten this lag by enabling the agency to act more promptly. The project is now dealing with privacy matters and result validation processes.

Foodborne [12], the Chicago experiment, is smaller and based on automatic monitoring of food conservation. When the algorithm identifies references to possible food intoxications, it automatically sends a message to the author of the post from the Twitter account of the project asking for further details. If the answer is positive, then the hospital staff are alerted to initiate further investigations and actions.

We are starting to see the first effective simulations able to define and standardize procedures that can be applied to a range of information sources, thus improving the response to health emergencies. Devices and increasing availability of public data are opening new opportunities. The use of social networks and Big Data looks promising, although currently there are only two sources that offer interesting information: Twitter and the Google search engine, as it is more difficult to interface and analyse the data from other media such as Wikipedia, Facebook, Instagram, LinkedIn, forums and online communities. The development of Application programming interface [13] tools (API) will yield further results.

However, all these opportunities should not eclipse other issues related to this data. Despite several declaration of intents, current development priorities are focused on

gathering and using this huge amount of information, more than on caring about privacy concerns.

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