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Extreme weather, digital media, and big data: following communication trails to investigate urban communities resilience

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Nowadays when extreme weather affects a urban area, huge amounts of digital data are spontaneously produced by the local community on the Internet. These “digital trails” can provide an insight on the interactions existing between climate related risks and the social perception of these risks. This research aims at testing how unstructured Big Data exploration techniques can be employed to monitor these interactions and assess their impact on a city resilience. More specifically, advanced text mining and network representation are used in this work to investigate digital communication patterns in terms of communication frequency, the audience size, as well as the quality of communications, i.e. if disseminated information is understood and accepted.

Four corpora of Web communications data related to urban flood events were extracted: press news covering the June 2016 Seine River flood; press news covering the October 2015 Alpes-Maritimes flood; tweets on the Seine River flood; 2003-2017 Public Authorities documents on climate related risk management strategies in Paris Region. The analysis of the corpora involved an iteration between manual and automated extraction of hundreds of key-terms, network representations based on key-terms co-occurrences, automated cluster visualisation based on adjacency matrix. Visual observation of the network coupled to quantitative analysis of its nodes and edges allowed to obtain an in-depth understanding of the most prominent topics and actors, as well as of the connections and clusters that characterise each corpus.

Through a comparison of the four corpora, it was possible to observe how these patterns change in the context of two different weather extreme events, in a short term perspective (in the journalistic and the social media spheres) and in a long term perspective (in the policy making sphere).
These analysis illustrate that digital research can bring out the most debated issues in a community, identify the stakeholders that have the capacity to influence the public opinion and the community attitudes towards an issue, policy, project or action. If the analysis is repeated at different time scales and in many locations, it is possible to examine how social construction of reality evolves over time and in various urban contexts. This approach allows to make the link between a short term assessment that focuses on crisis information management and a long term assessment that apprehends the slow evolution of collective memory and representation of climate related threats.

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