NGI THINK NEXUS

Policy Brief 3

NGI technologies for Natural Hazard Prediction and Emergency Management: a fertile field for collaboration between EU and US in Science and Technology

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Think NEXUS, an EC-funded project, aims at reinforcing EU-US collaboration on NGI-related topics in three focus areas: Science and Technology, Innovation and Entrepreneurship and Policy. The aim is to boost strategic research, industrial partnerships and policy compliances in order to gain socio-economic benefits in both the EU and US regions.

In the framework of this project, we are regularly publishing several short articles aiming at comparing the US and the EU approaches in different topics of NGI. The present document is focusing on Artificial Intelligence.

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As stated by the United Nations Office for Disaster Risk Reduction (UNDRR), a disaster can be defined as "a serious disruption of the functioning of a community or society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope with using its own resources." In the last few decades, societies have become increasingly aware of the fact that disasters can be analysed as the result of long-term processes; whereby the risk is created years or decades before the disaster manifests itself[1].

There are indications that in recent years' disasters such as super typhoons, floods, droughts, wildfires, etc. have become common occurrences globally. In 2017 alone, 335 natural disasters affected over 95.6 million people, killing an additional 9,697 and costing a total of $335 billion[2]. More specific, in 2018 the United States experienced 14 disasters that cost the economy as much or more than $1 billion dollars each. But the total cost of these hurricanes, wildfires, floods and other disasters that struck the U.S. last year is about $91 billion, according to the U.S. National Oceanic and Atmospheric Administration, which tracks U.S. weather and climate events that have great economic and societal impacts[3].

In Europe only in 2018, The European Forest Fire Information System (EFFIS), reported that wildfires have heavily affected Sweden, UK, Ireland, Finland and Latvia; countries in which wildfires have not been a concern in past years. These effects can also reach long distances. In summer 2018, the normally clean air quality of Seattle WA in the U.S. became the worst in the world due to smoke from distant wildfires. Similarly, flooding has been occurring in places where it was not observed before such as regions around the Dead Sea in Jordan[4]. Further complicating response to these individual occurrences, cascading disasters like 2012's combined Tohoku earthquake, tsunami, and nuclear power plant meltdown have also become more common.

Disaster and crisis management have become more important than ever with both the public and private sectors pitching in solutions to stay ahead of the problem. To that end, social media (SM) analytics has become prominent in natural disaster management. In spite of a large variety

1 http://www.un-spider.org/risks-and-disasters
2 https://www.eu-startups.com/2019/10/10-european-startups-tackling-natural-disasters-and-other-emergencies/
3 https://www.cnbc.com/2019/07/10/billion-dollar-natural-disasters-rising-these-states-better-prepare.html
4 https://www.bbc.com/news/world-europe-48035682

of metadata fields in social media data, four dimensions (i.e. space, time, content and network) have been given particular attention for mining useful information to gain situational awareness and improve disaster response[5]. In recent years, there has been a spurt of interest and much research into the role of social media in disaster management. Rather than as a means of communicating hazard, risk, and disaster perceptions and warnings, SM-generated data like Facebook posts and Twitter feeds are sought to be analysed to arrive at the scale and spread analysis of disasters. This data is voluminous, different, and when used in new ways to monitor and manage a disaster, qualifies for the definition of Big Data and its five Vs (volume, velocity, variability, veracity, and variety).

The data shadows on the internet of Facebook likes, Flipkart orders, Google searches, Research Indexcitations, Tumblr pictures, You Tube videos—all add up to billions of bytes of information, most of which are geotagged, and which, if tweaked properly can bring up hidden, but critical geographical patterns of crowd responses. Big Data snared in the geoweb can be of critical importance in big disaster events, if its analysis is mellowed by domain experts[6].

Following the outcomes of the EU-US Climate Alliance forum that took place in Washington, DC on 8 November 2019[7], the European and the American Science and Technology community should collaborate towards exploiting the key NGI technologies, such as Big Data (analytics), AI, and 5G, for the benefit of the people from both regions, by providing a new arsenal of tools that matches the speed with which disasters occur and thus aids in very quick decision-making.

The rise of social media usage is now at its peak as they are used in all sectors right from individual citizens to non government organizations, private sectors, government stakeholders, and volunteering organizations for aiding in information communication or knowledge transfer during disaster situations. The power of SM has spanned new fields of research, which harness the power to arrive at instantaneous decisions which are needed in disaster situations.

5 Zheye Wang & Xinyue Ye (2018) Social media analytics for natural disaster management, International Journal of Geographical Information Science, 32:1, 49-72, DOI: 10.1080/13658816.2017.1367003

6 k joseph, Joice & Dev, Karunakaran & A.P., Pradeepkumar & Mohan, Mahesh. (2018). Big Data Analytics and Social Media in Disaster Management. 10.1016/B978-0-12-812056-9.00016-6.

7 https://eeas.europa.eu/delegations/united-states-america_en/70180/The%20EU%20Steps%20Up%20its%20Cooperation%20with%20the%20U.S.%20Climate%20Alliance

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