

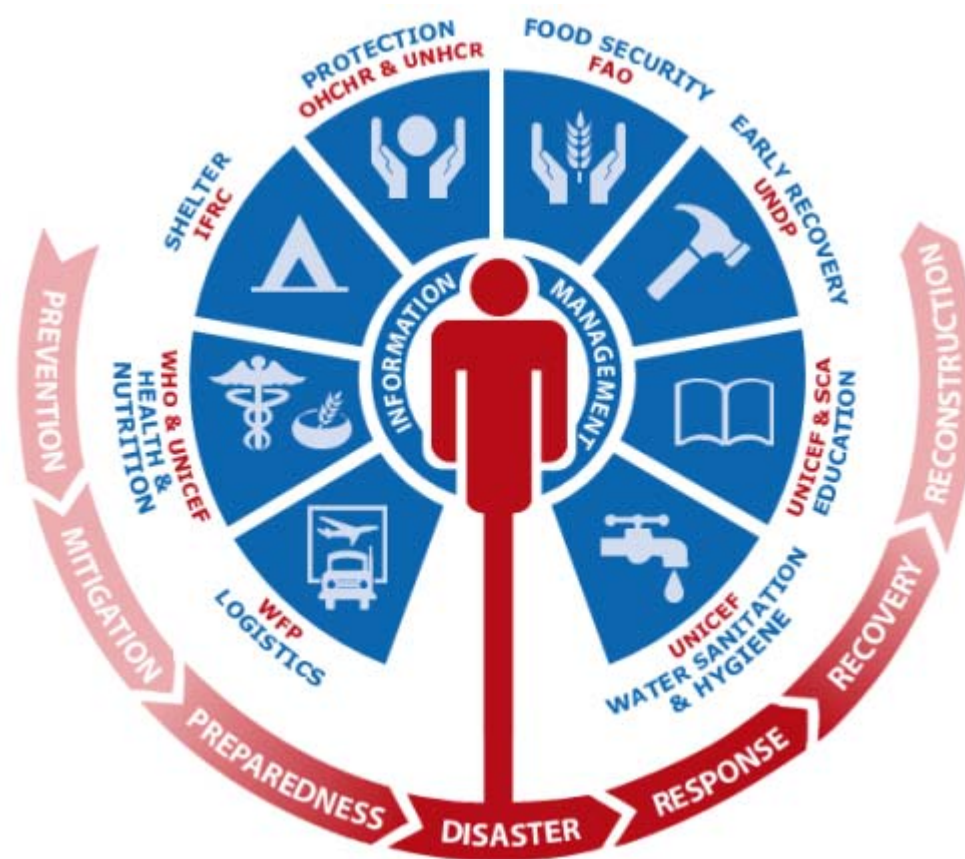
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This is How Social Media Can Inform UN Needs Assessments During Disasters

Posted on [February 24, 2015](#) | [2 Comments](#)

My [team at QCRI](#) just published their latest findings on our ongoing crisis computing and humanitarian technology research. They focused on [UN/OCHA](#), the international aid agency responsible for coordinating humanitarian efforts across the UN system. “When disasters occur, OCHA must quickly make decisions based on the most complete picture of the situation they can obtain,” but “given that complete knowledge of any disaster event is not possible, they gather information from myriad available sources, including social media.” QCRI’s latest research, which also drew on multiple interviews, shows how “state-of-the-art social media processing methods can be used to produce information in a format that takes into account what large international humanitarian organizations require to meet their constantly evolving needs.”



QCRI’s new study ([PDE](#)) focuses specifically on the relief efforts in response to Typhoon Yolanda (known locally as Haiyan). “When Typhoon Yolanda struck the Philippines, the combination of widespread network access, high Twitter use, and English proficiency led to many located in the Philippines to tweet about the typhoon in English. In addition, outsiders located elsewhere tweeted about the situation, leading to millions of English-language tweets that were broadcast about the typhoon and its aftermath.”

When disasters like Yolanda occur, the UN uses the Multi Cluster/Sector Initial Rapid Assessment ([MIRA](#)) survey to assess the needs of affected populations. “The first step in the MIRA process is to produce a ‘Situation Analysis’ report,” which is produced within the first 48 hours of a disaster. Since the Situation Analysis needs to be carried out very quickly, “OCHA is open to using new sources—including social media communications—to augment the information that they and partner organizations so desperately need in the first days of the immediate post-impact period. As these organizations work to assess needs and distribute aid, social media data can potentially provide evidence in greater numbers than what individuals and small teams are able to collect on their own.”

My QCRI colleagues therefore analyzed the 2 million+ Yolanda-related tweets published between November 7-13, 2013 to assess whether any of these could have augmented OCHA’s situational awareness at the time. (OCHA interviewees stated that this “six-day period would be of most interest to them”). QCRI subsequently divided the tweets into two periods:

Period	Start (GMT)	End (GMT)	# of Tweets
First	Nov. 7, 2013 19:28	Nov. 10, 2013 20:30	1,173,850
Second	Nov. 10, 2013 20:31	Nov. 13, 2013 12:00	1,128,719
Total			2,302,569

Next, colleagues geo-located the tweets by administrative region and compared the frequency of tweets in each region with the number of people who were later found to have been affected in the respective region. The result of this analysis is displayed below (click to enlarge).

Region designation and name	OCHA Information		Number of Tweets	
	Affected people	Affected houses	By geolocation	By keywords

I Ilocos Region	-	-	228	189
II Cagayan Valley	-	-	344	1,905
III Central Luzon	-	-	705	575
IV-A CALABARZON	27,076	840	2,034	2,524
IV-B MIMAROPA	425,903	33,499	150	1,339
V Bicol Region	695,526	12,129	1,372	1,214
VI Western Visayas	2,694,031	476,844	14,110	6,329
VII Central Visayas	5,180,982	101,789	19,075	7,938
VIII Eastern Visayas	4,156,612	504,526	1,110	19,224
IX Zamboanga Peninsula	-	-	25	165
X Northern Mindanao	19,592	20	381	2,174
XI Davao Region	5,175	40	847	1,217
XII SOCCSKSARGEN	-	-	74	39
XIII Caraga	45,063	549	198	660
ARMM Autonomous Region in Muslim Mindanao	-	-	175	442
CAR Cordillera Administrative Region	-	-	353	1,428
NCR National Capital Region	-	-	2,211	15,909

While the “activity on Twitter was in general more significant in regions heavily affected by the typhoon, the correlation is not perfect.” This should not come as a surprise. This analysis is nevertheless a “worthwhile exercise, as it can prove useful in some circumstances.” In addition, knowing exactly what kinds of biases exist on Twitter, and which are “likely to continue is critical for OCHA to take into account as they work to incorporate social media data into future response efforts.”

QCRI researchers also analyzed the 2 million+ tweets to determine which contained useful information. An informative tweet is defined as containing “information that helps you understand the situation.” They found that 42%-48% of the 2 million tweets fit this category, which is particularly high. Next, they classified those one million informative tweets using the Humanitarian Cluster System. The Up/Down arrows below indicate a 50%+ increase/decrease of tweets in that category during period 2.

Cluster	Human Labeled Automatically Labeled		
	(period 1)	(period 1)	(period 2)
Food and nutrition	54	4,712	39,448 ↑
Camp and shelter	41	1,870	8,470 ↑
Education and child welfare	50	18,076	22,198 ↓
Telecommunication	90	8,002	5,899 ↓
Health	57	1,008	2,487
Logistics and transportation	51	2,290	3,259
Water, sanitation, and hygiene	31	1,210	82,568 ↑
Safety and security	87	7,884	4,970 ↓
Early recovery	216	14,602	46,388
None of the above	1,323	382,906	451,122 ↓
Total	2,000	442,560	666,809

“In the first time period (roughly the first 48 hours), we observe concerns focused on early recovery and education and child welfare. In the second time period, these concerns extend to topics related to shelter, food, nutrition, and water, sanitation and hygiene (WASH). At the same time, there are proportionally fewer tweets regarding telecommunications, and safety and security issues.” The table above shows a “significant increase of useful messages for many clusters between period 1 and period 2. It is also clear that the number of potentially useful tweets in each cluster is likely on the order of a few thousand, which are swimming in the midst of millions of tweets. This point is illustrated by the majority of tweets falling into the ‘None of the above’ category, which is expected and has been shown in previous research.”

My colleagues also examined how “information relevant to each cluster can be further categorized into useful themes.” They used topic modeling to “quickly group thousands of tweets [and] understand the information they contain. In the future, this method can help OCHA staff gain a high-level picture of what type of information to expect from Twitter, and to decide which clusters or topics merit further examination and/or inclusion in the Situation Analysis.” The results of this topic modeling is displayed in the table below (click to enlarge).

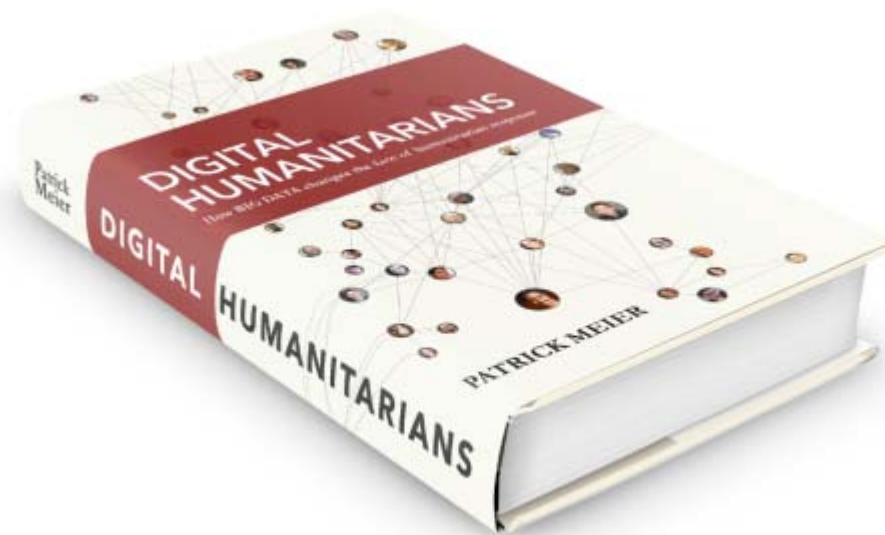
Cluster	Number of Tweets		Topic Words	Example Tweet
	(period 1)	(period 2)		
Food and nutrition	2,340	17,559	food, need, please, goods, relief, help, volunteer	<i>Multi-climate ration packs or healthy army food. Folks need practical food specially the kids @sarah-meier @USArmy #yolandaPH #urgentneed</i>
	2,372	21,889	donate, food, wfp, families, water	<i>RT @radikalchick: Red Cross asks for help from police / military. their trucks w/ food and water for 25000 families are stopped in Tanauan</i>
Camp and shelter	846	3,447	homes, destroyed, areas, relief, moving, many	<i>Roxas says many homes in Leyte's coastal areas destroyed: They're like matchsticks that were flung inland & talagang sira</i>
	1,024	5,023	shelter, seek, millions, apart, super, rise, super	<i>Super typhoon Haiyan slams central Philippines millions seek shelter Read more: http://...</i>
Education and child welfare	14,153	12,275	suspended, today, classes, work	<i>RT @AdamsonUni: Classes and work at all levels are suspended today Nov 8 in anticipation of Typhoon Yolanda. Stay safe Adamsonians. #wala</i>
	3,923	9,923	relief, kids, help, support, emergency	<i>Support UNICEF emergency relief efforts for kids in the Philippines. How to help:http://.../ #Haiyan http://...</i>
Telecommunications	8,002	5,899	satellite, call, image, mtsat, officials, countries	<i>MTSAT enhanced-IR satellite image of #YolandaPH as of 2:30 am 09 November 2013: http://.../ via @dost_pagasa RT @gosph</i>
Health	547	1,030	medical, doctors, help	<i>MSE emergency & medical teams continue to check on...</i>

	466	1,457	volunteer, charities, team supplies, red cross, hospital, medical, send	<p>more emergency or immediate needs concerns as closely monitor the #Typhoon #Haiyan situation and are ready to respond to needs</p> <p>@KarloPuerto: Davao City 911 sends rescue and medical equipment and personnel to Tacloban City #YolandaPH</p>
Logistics and transport	1,138	1,649	goods, help, repack	<p>RT @DepEd.PH: DSWD needs volunteers to help repack relief goods. Call DSWD-NROC at 851-2681 to schedule your shift. #YolandaPH http://...</p>
	1,153	1,609	roads, river, affected, debris	<p>Debris on roads in Tacloban is blocking delivery of aid from airport to victims of Typhoon #Haiyan in #Philippines http://...</p>
Water, sanitation, and hygiene	613	34,825	water, clean, need, food, supply	<p>Heard from @ExtremeStorms who is still in Tacloban. Desperate need for drinking water. Need for military ship & supplies #haiyan #yolanda</p>
	596	47,743	donate, clean, water, millions, appeal	<p>No potable water supply power outage & impassable roads in Leyte. Immediate needs r clean water food & shelter-staff in OrmocMai #haiyan</p>
Safety and security	7,884	4,970	safe, dead, killed, ridiculous	<p>7000 kid's parents have been killed by the storm in the Philippines and #StayStrongJustin is trending... Ridiculous http://...</p>
Early recovery	14,602	46,338	donate, relief, efforts, support, donations, goods	<p>Doing relief efforts now for #YolandaPH. Need free shipping line info. @indayvarona @juanxi @kwittiegirl</p>

When UN/OCHA interviewees were presented with these results, their “feedback was positive and favorable.” One OCHA interviewee noted that this information “could potentially give us an indicator as to what people are talking most about— and, by proxy, apply that to the most urgent needs.” Another interviewee stated that “There are two places in the early hours that I would want this: 1) To add to our internal “one-pager” that will be released in 24-36 hours of an emergency, and 2) the Situation Analysis: [it] would be used as a proxy for need.” Another UN staffer remarked that “Generally yes this [information] is very useful, particularly for building situational awareness in the first 48 hours.” While some of the analysis may at times be too general, an OCHA interviewee “went on to say the table [above] gives a general picture of severity, which is an advantage during those first hours of response.”

As my QCRI team rightly notes, “This validation from UN staff supports our continued work on collecting, labeling, organizing, and presenting Twitter data to aid humanitarian agencies with a focus on their specific needs as they perform quick response procedures.” We are thus on the right track with both our [AIDR](#) and [MicroMappers](#) platforms. Our task moving forward is to use these platforms to produce the analysis discussed above, and to do so in near real-time. We also need to (radically) diversify our data sources and thus include information from text messages (SMS), mainstream media, Facebook, satellite imagery and aerial imagery ([as noted here](#)).

But as [I've noted before](#), we also need *enlightened policy making* to make the most of these next generation humanitarian technologies. [This OCHA proposal](#) on establishing specific social media standards for disaster response, and the [official social media strategy](#) implemented by the government of the Philippines during disasters serve as excellent examples in this respect.



Lots more on humanitarian technology, innovation, computing as well as policy making [in my new book](#) *Digital Humanitarians: How Big Data is Changing the Face of Humanitarian Action*.

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