

Visualizing the law: Crisis mapping as an open tool for legal practice

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Abstract. Crisis mapping is a brand new field that has recently emerged as a set of online collaborative practices to source, process, and visualize information and data on events that derive from natural disasters (i.e. earthquakes, floods, tornados, or bushfires), crisis, and conflicts. Generally, the goal of crisis mapping is to provide aid organizations, NGOs, human rights activists, etc. with open, real time, geo-referenced, actionable data to organize a more efficient coordination and response. The mapping of the conflicts in Libya and Syria, to mention two relevant examples, has allowed volunteers and technical communities (VTCs) to document alleged human rights violations that can be the basis for legal prosecution of war criminals. Crowdsourced crisis mapping, therefore, opens a new era where global volunteer and technical communities may significantly contribute to transform international law by bringing into the picture a new humanitarianism based on practices, emerging norms, and both global and local capacities. This paper makes a case for including crisis mapping as part of the legal curriculum and providing lawyers with state-of-the art tools to expand their legal skills in a global community.

1. Introduction

Visualizing the law can hardly be considered a new trend in legal practice. Even if law is usually associated to written language – and to vast textual corpuses – images, maps, figures, and schemes have supported the works of legal scholars and practitioners for centuries. Bartolo da Sassoferrato (1313-1357), one of the most influential jurists in European legal history, illustrated his *Tractatus de fluminibus, seu tyberiadis* (1353) with a series of figures about hypothetical partitions of emerging alluvial islands in the Tiber River.

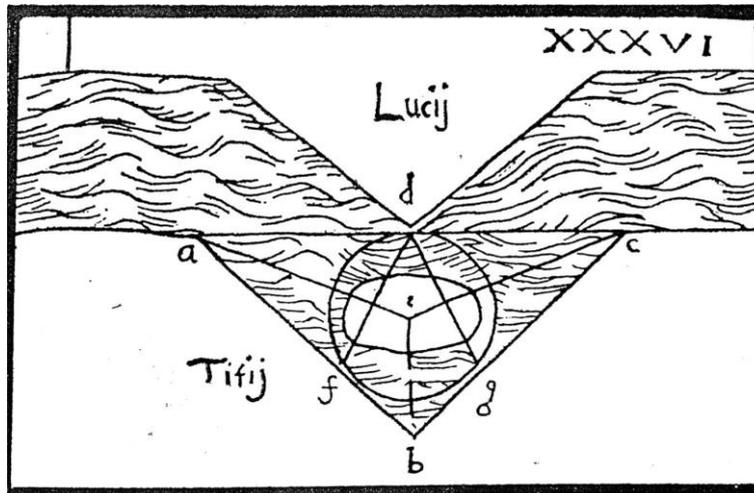


Fig. 1: Distribution of ownership of alluvial islands (Bartolo da Sassoferrato, 1353)

The goal of Bartolo when using Euclidean geometry to determinate ownership of new alluvial islands was two-fold: on the one hand, he aimed at resolving practical legal issues with appropriate – even if unusual for a jurist – mathematical tools; on the other, as a legal scholar, he wanted to contribute to the legal education curriculum with new methods to model legal issues (Frova 1999).

In Bartolo's time, maps were the rare, arcane products of skilled cartographers. At present, in contrast, maps are pervasive, user-friendly, and, since the advent of the Web 2.0 and its digital mapping platforms, largely interactive. While still aiming to represent a given geographical area, the new digital maps are also visual interfaces between datasets and users. Open data and crowdsourced information are only enhancing this functionality. In the legal domain, the growing availability of legal open data is fostering the use of geospatial technologies to make law and justice more accessible to citizens. However, these trends are hardly reflected on the curriculum of legal education institutions yet. In the sections that follow I will first review some recent examples of using maps to represent legal data. I will continue by exploring recent examples of the emerging domain of crisis mapping, and will conclude by making a case to include these trends in the legal curriculum in order to provide future practitioners with state-of-the-art skills for a global community.

2. Maps as Interfaces: Visualizing Legal Open Data

The adoption of open data principles is gaining momentum in the legal domain as part of a broader movement seeking greater transparency and accountability in government (Casanovas 2013, Casanovas 2012, Tiscornia and Fernandez-Barrera 2012). As governments, courts, and legal research institutions enable access and reuse of legal datasets under open licenses, new informational challenges arise: How can this information be appropriately linked to leverage interoperability and avoid data silos? How to make it digestible to users? The Linked Open Data (LOD) movement addresses the first question by working on standards, methods, and guidelines. The second question refers to usability issues challenging broader communities of data scientists, computer engineers, designers, journalists, artists, etc.

A number of initiatives and projects are currently focusing on visualization of open legal data using different tools. Two of them have been labeled as legal atlases. In the Netherlands, the Legal Atlas project uses Semantic Web technologies to merge geospatial data, textual data and controlled vocabularies in land use regulations (Hoekstra *et al.* 2010). The system can then answer users' questions such as: "What activity is allowed here?" (idem). The second Legal Atlas is a recent initiative by several partners at the University of Montana who are developing an online platform to map legislation, legal decisions, domain experts, and other sources of national, supranational, and international law in a number of legal areas (agriculture, energy, natural resources, land, industry, and mining).¹ The Legal Atlas is also the technology provider of Capture the Ocean, an upcoming project "to map the law of data" with "easy-to-understand visualizations and maps, helping people understand the issues, services, and rules that are shaping the world around them".²

¹ Available at: <http://legal-atlas.net/>.

² Available at: <http://www.capturetheocean.com/about>.



Fig. 2: Legal topics in the Legal Atlas mapping platform

At Stanford University, researchers from the Stanford Social Network Analysis and the Law Program (SNALP) are using a different approach to visualize legal cases on international arbitration. The method here consists of applying social network analysis to a knowledge base of cases from institutions such as the International Centre for Settlement of Investment Disputes, the Permanent Court of Arbitration, the UN administrative courts, and the World Trade Organization. The knowledge base contains up to 60,000 nodes and 80,000 relations. The project uses Gephi,³ an open-source platform to visualize networks, and GEXF⁴ (Graph Exchange XML Format) to describe complex networks structures, their associated data and the underlying dynamics.⁵

³ Available at: <http://gephi.org/>.

⁴ Available at: <http://gexf.net/format/>.

⁵ Enric Garcia Torrents (e-mail communication). See also Puig (forthcoming, 2014).

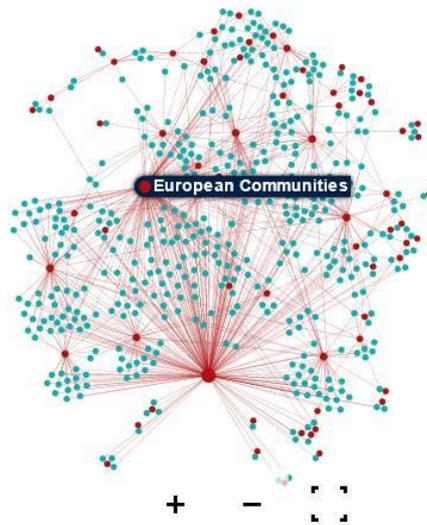


Fig. 3: Nodes and relations in WTO disputes and countries (SNALP 2013)

In Europe, researchers at the Institute of Law and Technology (IDT-UAB) working for the Menu for Justice Project⁶ (an EU project involving 51 partners from different European countries) mapped more than 550 legal education institutions in Europe using Crowdfmap, the web-based mapping platform developed by Ushahidi.⁷ The dataset contains geo-located basic information (description of the institution, programs, link to the official website, etc.). The data was supplied by the large network of researchers and academics linked to the project through a “limited crowdsourcing” approach. Rather than making an open call to the general public to submit information on European legal education programs, researchers tapped into the legal expertise of the academic network to provide concise, accurate, and updated information. This approach facilitated the quality checks on

⁶ See The Menu for Justice Project aims to provide guidelines on the potential contents of a homogeneous curriculum studiorum in judicial and legal studies, based on previous research from partners (e.g. Poblet and Casanovas 2005). Available at: <https://www.academic-projects.eu/menuforjustice/default.aspx>.

⁷ Available at: <https://legaeducationineurope.crowdfmap.com/>.

the data by the managing team (e.g. information gaps, relevance, consistency, etc.) that larger crowdsourced projects typically require. The resulting dataset can also be exported to other applications in different formats as a first step towards a comprehensive European open dataset of legal education institutions and programs.

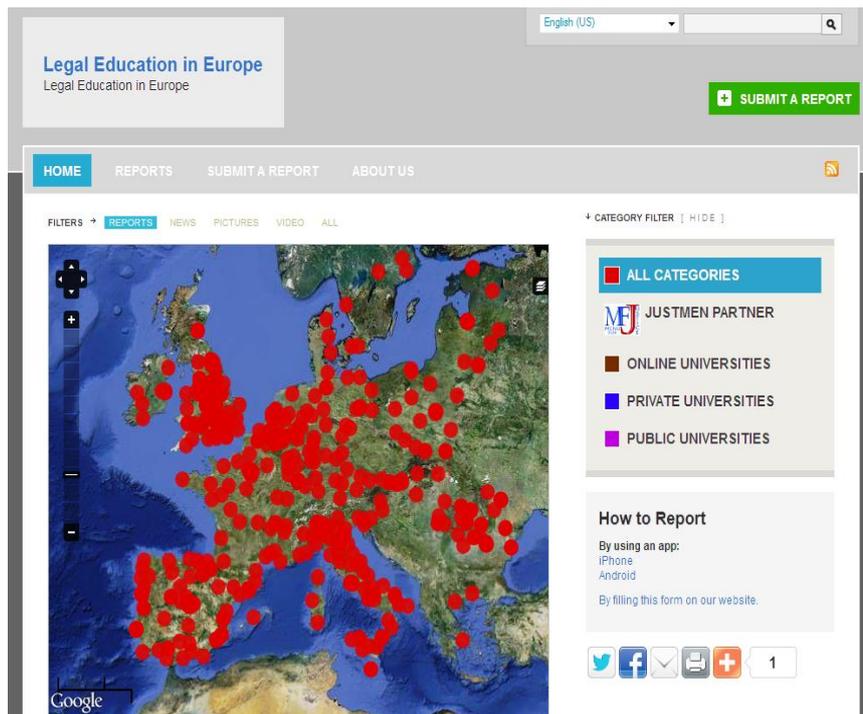


Fig. 4: Legal Education in Europe (Menu for Justice Project)

3. Crisis Mapping: A New Humanitarianism?

Crisis mapping is one of the emerging domains that best exemplifies how to leverage the tools and technologies of Web 2.0 and the explosion of user-generated content in humanitarian emergencies, crisis, and conflicts (Poblet and Casanovas, 2012). Crisis mapping can be broadly defined as a set of online collaborative practices to source, process, and visualize

information and data on events related to natural disasters (i.e. earthquakes, floods, tornados, or bushfires), crisis, and conflicts. The most visible outputs of crisis mapping practices are real-time digital maps that aggregate data using different categories to facilitate the visualization and analysis of events as they unfold.

Generally, crisis mapping activities aim at providing aid organizations, NGOs, and volunteer groups with real time, geo-referenced, and actionable data to organize a more efficient coordination and response in the aftermath of a disaster. Likewise, the mapping of conflicts may also enhance the capacities of human rights activists to aggregate information on alleged HR violations. While crowdsourced information does not constitute any legal evidence, it can trigger investigation of war criminals by international courts. In March 2011, Luis Moreno-Ocampo, first Prosecutor of the International Criminal Court (ICC) opened an investigation for alleged crimes against humanity by Libyan leader Muammar Gadhafi. The prosecutor emphasized in diverse forums the significant role of Facebook and other social networks in prompting a response in real time to allegations (Schubert 2001). With recent developments in international justice addressing crimes long past, the potential of these tools for advocacy and documentation of human rights abuses has become even more apparent. Crowdsourced crisis mapping practices are an expression of a shifting paradigm where global volunteer and technical communities may significantly contribute to transform international law by bringing into the picture a new humanitarianism based on practices, emerging norms, and both global and local capacities.

While crisis mapping is often equated to a geographic information system (GIS) for its use of maps to aggregate, manage, and visualize data, it actually includes a broader set of tasks enabling the monitoring and geolocation of events and the filtering, categorization and analysis of information. In addition, many crisis mapping initiatives rely on crowdsourcing as a method of distributing tasks. The term crowdsourcing was coined in 2006 by Jeff Howe to describe the outsourcing of a set of tasks to a generally large group of people who respond to an open call (Howe 2006). The various versions of Wikipedia constitute a paradigmatic example of crowdsourcing on the web. Although crowdsourcing as a principle or method existed before the advent of the Internet and the subsequent emergence of Web 2.0 technologies, there is no doubt that they have been a spur to the crowdsourcing phenomenon.

Most frequently, crisis mapping initiatives may apply crowdsourced methods in two different senses: (i) the sources of information and data being collected and mapped are multiple (social media, mainstream media, updates from international organizations, etc.); (ii) the tasks of collecting, processing, mapping and analyzing these data are crowdsourced to groups of volunteers and technical communities who are organized in loose global networks and are able to quickly swarm around these tasks.⁸ Likewise, crowdsourcing may also have different scopes: in some cases, crisis mappers may retrieve information from an unlimited number of social media sources (e.g. by monitoring Twitter hashtags). In some others, there is a “bounded network of trusted local media organizations who gather real-time, first-hand information from affected populations to create a two-way communication flow with emergency response organizations”, a strategy that “contributes to reinforce community participation and community resilience.” (Ayala Iacucci, 2012).⁹ While unlimited crowdsourcing offers a greater potential in terms of granularity of information, it also raises major issues.



Fig. 5: Example of crowdsourced information on urgent needs after an emergency

⁸ Well-known examples of VTCs are international networks such as GIS Corps, Humanitarian Open Street Map, Humanity Road, or the Standby Task Force. Recently, the Digital Humanitarian Network has been set to coordinate the tasks of some of these groups.

⁹ A recent example of this approach in the Central African Republic map can be found at <http://www.cartehumanitaire-rca.org/>. See also the LRA Crisis Tracker Initiative by Invisible Children, <http://www.lracrisistracker.com/>.

Firstly, there is a need to establish standardized mechanisms to verify the information collected, aggregated and published on the map: is it possible to verify all the information retrieved from social networks? How can different levels of reliability be set? How should we seek to verify the information on each level? In short, how can we distinguish truth from rumor, propaganda or disinformation? Although it is true that the groups and organizations dedicated to crisis mapping are considering to draft common standards, verifying information has to date been done *ad hoc* in each initiative, with different protocols in each case, and subject to debate and discussion in forums and conferences.

The second aspect to bear in mind is the quality of the information processed. A number of issues arise here: (i) how can the level of noise or redundancy be minimized? (ii) How can relevant information for the recipients or final users of a map be filtered out from the multiple information flows? Even if Semantic Web technologies are currently being tested and some software tools already facilitate that filtering –e.g. Geofeedia¹⁰ or Swiftriver¹¹– human intelligence and manual monitoring of sources are essential in identifying the most relevant contents.

Finally, the ethical, privacy, and security issues involved in crisis mapping practices are paramount. In natural disasters as in crises caused by violence or armed conflict, the principle of doing no harm should prevail and the necessary security and privacy measures should be adopted. Even if crowdsourced information is publicly available, the fact of locating and disclosing it in the context of a crisis can severely compromise the safety of the people who originally published it in social networks. What responsibilities the crisis mapping community would bear if as a result of its practice individuals or communities were harmed? This and other similar questions are being addressed in the ongoing discussion on the legal and ethical issues of using crowdsourced information in humanitarian interventions, protracted crisis, and complex emergencies. To address such challenges, different strategies have been adopted so far: some initiatives have opted to anonymize the data and protect their maps with user logins and passwords; in some cases, two maps have been produced, the second, public version of the map showing only limited information (this was the case with the Libya Crisis Map reviewed below). In extreme cases in which

¹⁰ Available at: <http://geofeedia.com/>.

¹¹ Available at: <http://ushahidi.com/products/swiftriver-platform>.

security standards cannot be guaranteed (for example, when the disclosure of the location of incidents of violence may result in further attacks on the population), the appropriateness of a mapping project may be called into question.

4. The Libya Crisis Map: A Case in Point

On 28 February 2011 (two days after UN Resolution 1970 on the Libya crisis was adopted)¹², Brendan McDonald, the head of UN OCHA's Information Services Section (ISS) and Chair of the Inter-Agency Standing Committee's (IASC) Information Management Task Force, contacted the leads of several VTCs including Crisis Commons, the SBTF and the Humanitarian OpenStreetMap (HOT). McDonald invited these and other parties to join a conference call which led to the formal activation of the SBTF by OCHA's Information Services Section (ISS). SBTF's representative Patrick Meier committed the Task Force to a one-week activation after which the situation was to be evaluated.¹³ After the conference call, Meier sent an email to the SBTF team leaders and coordinators asking for specific teams to be activated. Within 4 hours, the initial version of the crisis map was set up (SBTF, 2011).

The purpose of the activation was to improve UN OCHA's situational awareness of the emerging humanitarian crisis situation in Libya after the rise of protests and consequent violent crackdown by the Libya security forces. Based on the information coming from inside the country, a severe humanitarian crisis was expected and the security situation in Libya limited the ability to monitor events directly in the field. In addition, UNOCHA had not been based in Libya for many years and therefore did not have any Information Management Officers (IMOs) in-country. Furthermore, there were virtually no independent media groups with journalists on the ground in Libya during the onset of the conflict. (SBTF, 2011).

¹² S.C.Res.1970, U.N.Doc.S/RES/1970 (Feb. 26, 2011).

¹³ The engagement of the SBTF was repeatedly extended until it was finally handed over to OCHA on March 28th. After that date, a smaller group of SBTF and UN volunteers kept working with OCHA staff until the final closing of the deployment on June 1, 2011. In all, 250 individuals participated in deployment (SBTF, 2011).

SBTF online volunteers from all over the globe and time zones were organized in different teams and started working in shifts. The Media Monitoring Team parsed information from media sources and submitted reports to the Ushahidi mapping platform, tagging them with predefined categories—from a set of 62—according to the type of event being reported (migration/shelter, health, logistics, food security, etc.).

The screenshot shows the 'Submit a New Report' interface on the Libya Crisis Map website. The page has a dark header with the title 'Libya Crisis Map' and the subtitle 'Social Media Mapping for Common Operational Datasets'. The OCHA logo is in the top right. A navigation menu includes 'HOME', 'BIG MAP', 'REPORTS', 'SUBMIT A REPORT', 'GET ALERTS', 'CONTACT US', and 'DOWNLOAD REPORTS'. The main form area is titled 'Submit a New Report' and contains several sections:

- Report Title**: A text input field.
- Description**: A larger text area for details.
- Date & Time**: Set to 'Today at 2:05 pm' with a 'Modify Date' link.
- Categories**: A grid of checkboxes for various event types such as 'Armed Confrontations', 'Mass Displacements', 'Attacks on Civilians', 'Internal Sources', 'Population', 'Needs', 'Attacks on Illicit Targets', 'Explosive Remnants of War', and 'Response'.
- Demographics**: Input fields for 'Deaths', 'Injured', 'Displaced', and 'Women'.
- Location**: A map of Libya with a red pin. Below the map is a search box for 'City, State and/or Country' and a 'Refine Location Name' field with an example: 'Corner of City Blaine, 2nd Street & 4th Avenue, Johannesburg'.
- Links**: Input fields for 'News Source Link(s)' and 'Audio/Video Link(s)'.
- Upload Photos**: A 'Browse...' button.
- Submit**: A prominent green button at the bottom.

Fig. 6: Submitting a report to the Libya Crisis Map

The Geolocation Team provided geographic coordinates to incoming reports, and helped to locate hospitals, refugee camps, attacked zones, etc. The Report and Verification Teams applied quality checks by assessing the accuracy of categories and verifying reports to the extent possible. The Analysis Team produced daily situation reports and cross-referenced data with other databases. In addition, on March 4th the Task Team began to create the 3Ws database (Who, What, Where) to assist OCHA in collecting

and visualizing data about the humanitarian response operations of various agencies and organizations. At that moment, besides OCHA, up to eight humanitarian agencies and NGOs requested access to the password protected version of the Libya Crisis Map: UNHCR, WFP, Save the Children, IOM, IRC, SAARA, ICRC, and the American Red Cross. The image below shows the front end crisis map as visualized by its users:

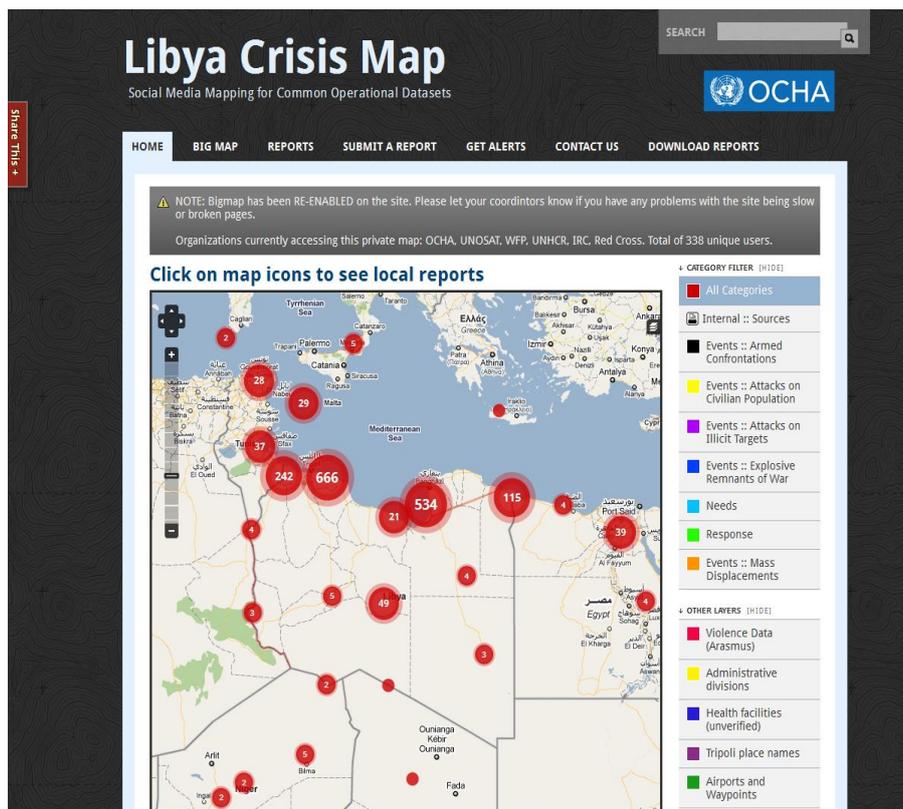


Fig. 7: Front end of the Libya Crisis Map

Despite that a number of mainstream media were reporting from the ground at the onset of the crisis, there was a growing amount of information being shared from within Libya via social media outlets including Twitter, Facebook, Flickr and YouTube. Over time, while data from mainstream media decreased as journalists were sent to cover other crisis, data coming

from social media sources inside the country increased. In the final month of the site's deployment, social media made up more than 70% of the new content being added (OCHA, 2011). At that time, a small network of trusted sources could be built to keep the information flow coming in. But in sensitive environments such as the Libya Crisis Map or, more recently, the Syria Tracker,¹⁴ building a set of trusted information sources may involve major security issues, for it can seriously compromise the safety of the people who originally published information on social media. The security of data on the Libya Crisis Map proved to be a very serious concern to the SBTF and UN volunteers. The Libya Crisis Map was initially private and password protected for security reasons. On March 4th, OCHA requested that a public site be launched, mirroring the information from the official site but set on a 24-hour time delay with all reports limited to titles only. While this strategy was intended to minimize security risks, one of the major lessons learned from this deployment is that "in conflict settings, it would be best to simply not solicit or store any information which could be personally compromising" (OCHA, 2011).

5. Crisis Mapping as Part of the Legal Curriculum

The case of the Libya Crisis Map and the role of social media as a primary source of information also offer important lessons for legal practice. Crowdsourced information from social media will most likely be increasingly relevant to the investigation and prosecution of alleged human rights violations around the world. In addition to the Prosecutor of the ICC, two UN-affiliated bodies—the Panel of Experts on Sri Lanka and the Special Rapporteur on extra-judicial, summary, or arbitrary executions—have assessed the role of citizens' footage in investigations of alleged violations of human rights law committed by the Sri Lankan government and the LTTE (Liberation Tigers of Tamil Eelam):

The POE considered allegations credible if they were based on trustworthy primary sources and corroborated by other direct and indirect sources. They report that citizen-submitted video and photographic footage "could not be individually verified by the Panel"

¹⁴ Available at: <http://syriatracker.crowdmap.com/>

and was therefore not used as a primary source, but did help “to corroborate other sources of information. (Gruszko, 2011).

Likewise, the Special Rapporteur’s Report on the same events in Sri Lanka considers a video that has been authenticated by experts “as *prima facie* evidence of crimes, even if no other corroborating evidence is immediately available” (Gruszko, 2011). Precisely, experts will have a crucial role in assessing that multimedia contents have not been altered or manipulated and can therefore be considered as authentic. The use of proprietary platforms such as Facebook or YouTube to post contents and document human rights abuses has recently raised some concern, since

[T]heir technology is designed primarily to host and expose content, rather than serve as a permanent container for media. The rate of disappearance, for instance, of Iranian protest or Arab Spring videos is alarming. (...). And, where such preservation is happening, institutions are often left with grabbing the derivative files, rather than the original source content. YouTube “normalizes” video formats to accommodate its technology, and embedded metadata about the producers and circumstances of production are usually stripped out.¹⁵

Crisis mapping initiatives in conflict zones cannot ignore these crucial issues either, especially when the main sources of information are user-generated contents. Understandably enough, legal experts in the area of International Humanitarian Law (IHL) have warned about the limits of using such information as a valuable source of legal evidence:

The issue also arises as to whether the complexity, nuance, and context of IHL can be conveyed adequately through social media technology. Crisis maps, for instance, may help identify an area of armed conflict or the outcome of an event (e.g. two people killed), but it offers only limited utility in determining whether IHL violations have taken place. Similarly, satellite imagery or other data gathered may not show the context of a particular battle, how particular objects were destroyed, who destroyed the objects, whether they were military objectives, whether combatants were present at the time of the fighting, and other critical components necessary for making a determination as to whether an IHL

¹⁵ James Simon, posted in “What is Human Rights Archiving and Why is it Important?”, online discussion thread at New Tactics in Human Rights, 19 May 2012, <http://www.newtactics.org/en/thread/what-human-rights-archiving-and-why-it-important>

violation had, in fact, occurred. The sheer volume of social media information is another factor that limits the ability to communicate context and complexity relating to armed conflicts and IHL. How can so much information be tracked? What should be tracked? How do you choose the best sources? (Herzberg 2012).

The crisis mappers' community is currently addressing these pressing issues, which demand a multi-layered strategy.¹⁶ From the technology standpoint, Semantic Web technologies are coming to the rescue by developing software tools and applications that are able to filter and geolocate the relevant information, separating relevant signals from noise.¹⁷ Technology solutions are equally available when it comes to analyze and authenticate multimedia contents (images, audio and video files, etc).

As regards quality and verification of data—a far more uncharted terrain—crisis mappers need to take stock of the experience accumulated by its humanitarian partners (Searle and Wynn-Pope, 2011). Current discussions on possible solutions include end-user scoring systems, modular quality controls and validation protocols adjusted to each crisis, weighting systems adjusted by positional accuracy or other *ad hoc* parameters, etc.¹⁸ Similarly, the Crisis Mappers network has set two different subgroups on data protection and security. Current work includes the development of appropriate guidelines, protocols, standards, and codes of conduct in order to ensure that crowdsourced data can be effectively used to pinpoint potential violations of human rights and IHL and, eventually, “play a key role in judicial enforcement of IHL”.¹⁹

Nevertheless, it is important to keep in mind that crisis mapping practices are only one of the available strategies to harness the potential of social media for IHL, but they can't replace the expert assessment on site. In any case, though, the contribution of legal experts to the current debate on how

¹⁶ Data filtering, verification, and data protection were the object of dedicated sessions at the 3rd International Conference of Crisis Mappers (ICCM 2012) held in Geneva (Switzerland), in November 16-17th, 2011.

¹⁷ Geofeedia and Swiftriver being the most recent examples, see notes 4 and 5 above.

¹⁸ These were some of the alternatives discussed at the session on “Mainstreaming quality standards in crowd sourced and volunteered (geo) information” at the 3rd International Conference of Crisis Mappers (ICCM 2012), see note 9 above.

¹⁹ Id.

to develop adequate protocols, standards, and codes of conduct for crisis mapping is most required for this emerging domain to achieve its full potential.

6. Crisis Mapping as an Open Tool for the Global Community

To Marlies Glasius, editor of the Global Civil Society Yearbook, the “global civil society”—first defined in the 2001 Yearbook as “the sphere of ideas, values, institutions, organizations, networks, and individuals located between the family, the state, and the market and operating beyond the confines of national societies, polities, and economies”—is like an elephant that “lives deep in the jungle of social reality, covers large distances, and tends to defy systematic observation” (Glasius, 2010). According to her, one of the reasons why people tend to disagree on how the elephant looks like is that “the term ‘civil society’ comes with a number of quite different and sometimes contradictory normative connotations.”²⁰ Even if the “global community” could be equally depicted as an even rarer and intriguing beast, it shares with the notion of “global civil society” the normative connotations listed by Glasius:

- A cosmopolitan view: being part of a global imagined community, a sense of connection and solidarity.
- A normative belief in human rights and/or global social justice rather than just civil rights and fair distribution for citizens of one’s own state.
- A belief in global and shared responsibility for the earth. Environmentalists in particular, however locally active, have early on tended to stress the necessarily transnational and even global nature of their cause, and the necessity for ‘global solutions’.
- Global resistance against hegemony: challenging the winners, championing the losers, of globalization.²¹

²⁰ Ibid.

²¹ Ibid.

Crisis mapping as a tool for this global community clearly highlights some of these normative connotations. Notably, the cosmopolitan one: traditionally, in any given emergency the first responders are those on the ground in the neighborhood, but now crisis mapping makes it possible that a second type of neighbor, a digital neighbor, comes to the scene to help out. In this sense, crisis mapping volunteers have repeatedly stated that their work makes them feel part of the global community (Starbird, 2011; Starbird and Palen, 2011; Hichens, 2012). Similar feelings are usually shared in sensitive deployments, where human rights are at stake. Most likely, one of the reasons why crisis mapping and its use of Web 2.0 technologies has attracted so much interest in the last few years²² is that it not only contributes to make the beast more visible, but empowers it with a powerful tool to voice its presence.

Acknowledgments

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²² Ushahidi, the most popular open sourced crisis mapping platform, has registered 20,000 deployments across 132 countries so far.

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