Gomorrah Streetview

Merging locative media with civic media: opportunities and limitations of Streetview as a tool for monitoring and reporting environmental crimes

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August 2011

Interactive content inside. Best viewed on a browser:
http://tinktank.it/.../gomorrah-street-view/

«The territory no longer precedes the map, nor does it survive it.
It is nevertheless the map that precedes the territory—precession of simulacra—that engenders the territory»
(J. Baudrillard - Simulacra and Simulation, 1994)

Google Streetview is a popular Web-based tool that allows us to explore places through 360-degree street-level imagery. It can be used to visit locations around the globe [1], neighbourhoods, landmarks or even to observe candid everyday life situations. With Streetview, one can immerse themselves in globetrotting from the comfort of their chair. Thanks to the vast imagery and the intuitive interaction design, Streetview encourages users' explorations and can supplement or inspire several other practices, such as street ethnography [2] and historical research [3], participatory urbanism [4], photography and visual arts [5].
Streetview is also an effective tool for civic media. Citizens, activists and amateur journalists can use the toolkit and content to draw public attention on issues affecting a location or a geographic area, as well as to monitor and report conditions.

Having just returned from a short trip to Naples and its province, I have been interested in researching the reasons behind the degradation of the area due to the waste management crisis, and its social, political and public health consequences. Thus, I was directed to gather information on the Web to get a better sense of the situation. Projects like Terradeifuochi.it, LaboratorioCampano.org, and Munnezza.info [6] have dealt with the problematic issue of illegal waste disposal in the Campania region from different angles. In front of the public alarm about the issue and the limited knowledge about it, these services propose new and creative ways to convey environmental issues to the public using services like Google Maps and Streetview. They show the places in which illegal practices are concentrated and use the features to show the evidences and effects of illegal waste disposal practices.

By visiting the waste disposal hotspots via Google Maps, one can oversee the polluted sites and gather visual information about them. The use of Streetview provides us with an effective way to navigate through these dangers. Moving from the aerial view to street level, users are brought in close view of the streets and places affected by the phenomenon of illegal waste disposal. At this level they witness some of the most evident and hideous signs of illegal waste disposals: piles of waste, the remains of garbage fires, and the visible effects of pollution on the surrounding flora.
The area affected by this environmental emergency is also known as the «Land of Fires», an expression that calls to mind windy Patagonia pampas or volcanic regions in Iceland. Instead, the Land of Fires is a triangle-shaped area connecting the towns of Giugliano, Villaricca and Qualiano, spreading in the Naples and Caserta provinces in southern Italy. Here, hundreds of landfills, both legal and illegal, are concentrated in an area that used to be one of the most fertile in Europe [7]. Waste is everywhere. And when landfills and streets fill to capacity, the trash is set on fire releasing toxic smoke and other pollutants that contaminate the land and water basins. Thus, the Land of Fires is accurately named.

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1 World Heritage landmarks are available on Streetview: http://maps.google.com/help/maps/Streetview/gallery.html#world-landmarks . Also, first-class world museums are explorable: http://www.googleartproject.com/

2 Sociological Images: « Using Google Maps to Teach Urban Ethnography» - http://thesocietypages.org/socimages/2009/02/18/guest-post-using-google-maps-to-teach-urban-ethnography/

3 For the 150th anniversary of Italy's Unification, Google released «Le coordinate della nostra storia», a collection of Risorgimento historical places that can be visited through Streetview http://www.google.it/intl/it/landing/150anni/map.html

4 MIT Media Lab's Place Pulse aims at creating a Collaborative Image of the City - taking inspiration from Kevin Lynch's work: http://pulse.media.mit.edu

5 See «The Nine Eyes of Google Streetview» (Jon Rafman) and «A Series of Unfortunate Events» (Michael Wolf) in the next pages

6 Laboratorio Campano: http://www.laboratoriocampano.org - La Terra dei Fuochi http://www.laterradeifuochi.it/ - Munnezza.info: http://munnezza.info/

7 Legambiente, rapporto Ecomafia 2010 (Edizioni Ambiente, 2010) http://www.edizioniambiente.it/eda/catalogo/libri/465/

Analysing the case of illegal waste disposal in Southern Italy through Google Streetview, this article questions whether this tool can constitute a form of «civic media», capable of effectively representing and raising public awareness on complex environmental problems. Using the Land of Fires as a case study, the article demonstrates that Streetview can help to illuminate these problems which are complex and difficult to perceive by non-experts. This is an important step in engaging citizens with these issues, whereby mapping becomes a form of collective monitoring of criminal actions in face of the apparent inaction of State apparatuses. Nevertheless, the article examines the constraints imposed by Streetview design. While it effectively «spatialise» the issue of illegal waste disposal, it represent such process as a static one, thus overlooking the rhythmic and cyclical character of the issue, something well shown by the outbreak of moments of emergency in waste disposal. This limit is to a great extent down to the technological capabilities offered by Google Maps and Streetview and the fact that they are updated only on a yearly basis. The impression the user gets, especially in the case of Streetview navigations, is the one of a frozen moment in time.

A guided tour

Video

[A Streetview. Land of Fires: Via Vianini]
Video available on Vimeo (with Streetview locations as captured in August 2011)

00:00 to 00:25

Drop the Pegman on the tour starting point. Find yourself in Via Starza, in the town of San Marcellino, province of Caserta. Move ahead on this countryside street. See on your right hand a furrowed landscape. On your left a large greenhouse. At the first intersection, turn left and follow Via Vianini.

00:26 to 01:25

Keep moving ahead. Notice a garbage pile in which domestic waste, tires and construction leftovers are mixed altogether. Move on, cross the first roundabout and enter the next segment of Via Vianini. The street sides are entirely covered by garbage. See the way limited to a single lane by piles of waste. Look around and observe the variety of waste: cumulations of dusts, tires, appliances, furniture, plastic. On top, clothes are strewn on the waste (clothes are commonly used as fire-ignitors). Black stains on the road surface indicate that fires occured in the recent weeks.

01:26 to 02:25

See a rickshaw followed by a luxury car. A few meters away, a third segment of Via Vianini surrounded by orchards. Here, large quantities of garbage were burned very recently, some piles are still smoking. Some of the trees in the orchards are partially burned. We can only assume dioxins as well as other pollutants released by the fires cover trees and vegetables in the nearby orchards.

The «Decisive Moment» arrested by Streetview

Figure: (1) «Behind the Gare St. Lazare», (2) «Hyères», (3) « Brussels». Henry Cartier-Bresson (1932)

Streetview vehicles capture the physical world through nine cameras while driving across the globe's endless network of streets [8]. The «nine eyes» of Streetview vehicles honestly record the world without any subjective interpretation or contextual inference. These eyes offer a un-aesthetic and automated [9] representation of physical places built upon sequences of spontaneous, indifferent photographies. The result is a world that looks truthful, transparent and unbiased, a Google-ised world.

In the visual arts field, Jon Rafman successfully leveraged this aspect with his project «The Nine Eyes of Google Streetview» [10] that portrays a number of «decisive moments» [11] of real life situations extracted from the geo-located imagery database. Similarly, German photographer and photojournalist Michael Wolf manipulated the same raw material capturing awkward everyday life moments from Streetview and gathering them in a collection named «A Series of Unfortunate Events» [12]. The project recently received a «Contemporary Issues» honourable mention at World Press Photo contest [13]. Indeed, an award that celebrates the photojournalism dignity of Streetview imagery.

The (Nine) Eyes of the Civic Journalist

According to Convergence Culture theorist Henry Jenkins, «civic media» describes any use of a medium that fosters civic engagement [8]. This includes tools and devices that not only support and sustain citizenship, but whose practice improve the sense of participation to a community. Jenkins points to contemporary forms of citizens journalism as one of the examples, along many others whose purpose is ostensibly to re-create a space of public engagement. Jenkins suggests that if locative media such as Streetview are civic media, it will not simply be down to their technological affordances but also crucially to the type of interaction they are designed to allow for, and the representations they convey. Building on this idea, we can understand the use made of geo-services like Google Streetview as a tool that supports citizens in political and social causes.

Consistent with Google's mission «to organise the world's information and make it universally accessible and useful»[9], Streetview maps the Land of Fires and makes its streets accessible to everybody through an intuitive interface. Citizens and activists can leverage on these street-level exploration tools to map and report environmental crimes: evidences on illegal waste disposal, garbage arsons and further environmental hazards. Streetview allows to perform an extensive set of investigative operations: click-and-go walking options, 360 degrees panoramic views, vertical panning and four different zoom levels [10]. Google Maps adds further twenty-one zoom levels and four imagery types.

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8 Henry Jenkins - «What is Civic Media?» (2007) http://www.henryjenkins.org/2007/10/what_is_civic_media_1.html

9 Google's corporate mission: http://www.google.com/about/corporate/company/

10 Using Streetview: http://maps.google.com/help/maps/Streetview/learn/using-street-view.html

To illustrate through our case study the Streetview viability as a civic media tool, we initially center the Maps viewport on the Campania region. At macro zoom level, we can gather general features of the zone. By progressively zooming in, we can notice more evidences on environmental degradation: from landfills to storing sites. We focus in particular on the proximity of highway ramps, where dumping is more convenient. Then, we switch to Streetview to get closer to the subject and observe it from different angles and zoom levels. After we gather our evidences, we can share them either statically through snapshots or dynamically by pointing to a Web URL address. The first option results in a simple screen capture that doesn't introduce anymore information than traditional photo-reporting. At the contrary, through a Web URL address, we can replicate the original interactive and immersive experience for the audience. A Web URL address includes in fact the starting point coordinates, the map imagery typology, the orientation degree, the zoom level as well as other parameters.

To examine the Land of Fires, projects like Laboratorio Campano and La Terra dei Fuochi, combine Maps and Streetview to supplement texts, videos or pictures. Therefore, Streetview is used as a secondary tool and the core content is narrated on more traditional storytelling modalities. Conversely, the interactivity afforded by Streetview allows for more robust ways to spread information, extend the boundaries of content and provide the reader with spatial exploration experiences.

More on the Land of Fires

Please refer to the Appendix section **«Appendix - Smoke kills: the Land of Fires»**.

Investigating the Land of Fires with Streetview

Figure: Arsons in the area - Credits: LaTerraDeiFuochi.it

Using Google Streetview, I will guide you through the most graphic sites of the Land of Fires, pointing out patterns, crime contexts and practices related to the illegal waste disposal and fire-destruction in the area (as observed through the imagery available during August 2011). The case studies are organised according to recurrent location typologies, such as:

- Highway ramps
- Countryside spots
- Wastelands
- Water basins
- Farm fields

Sites map: all exploration sites are available at this address: http://goo.gl/Sjd8v

Site 1 - The region from above

- Typology: Highway ramps
- Location: SS162, 80014 Giugliano in Campania NA, Italy
- View: Aerial
- Coordinates: 40.933964,14.221901
- Link: http://goo.gl/mPNIX

Approaching the area from above, several arson smokes can be spotted starting from three-quarters of the maximum zoom level. The aerial view shows the Asse Mediano highway ramp in the town of Giugliano (Naples). We can spot piles of garbage in the bottom-right corner and, in particular, an arson in the crop surrounded by the ramps. In the waste disposal business, ramps are strategical points. Trucks drive there along highways with unknown loads. Once they arrive at a «safe» spot, trucks drivers pull over from the highway and dispose of their content in the proximity of the ramps.

Evidence 1: aerial view of arsons in Giugliano - Credits: Google Inc.

Site 2 - «Asse di Supporto» highway ramp

- Typology: Highway ramps
- Location: Autostrada del Sole - 80023 Caivano NA, Italy
- View: Street level
- Coordinates: 40.97345,14.326301
- Link: http://goo.gl/T48Uw

Evidence 2: asse di Supporto highway ramp - Credits: Google Inc.

Site 3 - «Asse Mediano» highway ramp

- Typology: Highway ramps
- Location: SP67 80021 Afragola NA, Italy
- View: Street level
- Coordinates: 40.939136,14.329632
- Link: http://goo.gl/csomX

Evidence 3: «Asse Mediano» highway ramp - Credits: Google Inc.

Site 4 - «Ponte Selex» bridge ramp

- Typology: Highway ramps
- Location: Via Circumvallazione Esterna di Napoli - 80019 Qualiano NA, Italy
- View: Street level
- Coordinates: 40.929382,14.122415
- Link: http://goo.gl/IhCJQ

Evidence 4: «Ponte Selex» bridge ramp - Credits: Google Inc.

Evidence 5: another view on «Ponte Selex» bridge ramp - Credits: Google Inc.

Site 5 - Abandoned farmhouses

- Typology: Countryside
- Location: Autostrada del Sole - 80023 Caivano NA, Italy
- View: Street level
- Coordinates: 40.975173,14.328362
- Link: http://goo.gl/CJF9s

Abandoned farmhouses are often used to hide bins containing toxic liquids and other hazardous waste. In this view, we observe a dismissed farmhouse that is few hundreds of meters away from a highway ramp.

Evidence 6: Abandoned farmhouse next to the «Asse Mediano» highway ramp - Credits: Google Inc.

Site 6 - Via Vianini

- Typology: Countryside
- Location: Via San Marcellino-Casapesenna - 81030 San Marcellino CE, Italy
- View: Street level
- Coordinates: 40.9854,14.157362
- Link: http://goo.gl/Ew0Qy

Via Vianini is probably the most emblematic spot in the Land of Fires of those I explored through Streetview. The imagery shows a sequence of garbage piles that almost cover the entire width of the street, surrounded by crops, orchards and greenhouses.

Evidence 7: entering Via Vianini - Credits: Google Inc.

Evidence 8: a rickshaw crossing Via Vianini - Credits: Google Inc.

Evidence 9: a pile of waste still smoking after an arson - Credits: Google Inc.

Evidence 10: what remains from a garbage arson - Credits: Google Inc.

Evidence 11: Construction waste likely exposing asbestos fibers - Credits: Google Inc.

Site 7 - «Taverna del Re» waste-derived combustible (Ecobails) storing site

- Typology: Wastelands
- Location: SP131 - 81039 Villa Literno CE, Italy
- View: Street level
- Coordinates: 40.959711,14.077864
- Link: http://goo.gl/zaowj

Another interesting location to visit through Streetview is the «Taverna del Re» storing site, at the border between the provinces of Naples and Caserta. «Taverna del Re» is the largest of 18 similar sites in Campania region. It has the extension of around 185 football pitches measured altogether. The site stores over 7 millions of the so-called eco-bails (each weights up to 1 ton) that wait since 10 years to be burned in one of the area incinerators. An eventual fire in this site would have disastrous consequences on the entire area and population.

Evidence 12: one of the entrances to «Taverna del Re» - Credits: Google Inc.

Site 8 - Sant'Anastasia illegal landfill

- Typology: Wastelands
- Location: SS162dir - 80048 Sant'Anastasia NA, Italy
- View: Street level
- Coordinates: 40.888617,14.381683
- Link: http://goo.gl/Nsl9E

In the town of Sant'Anastasia, we can find an improvised landfill within the protected land of the Vesuvius National Park.

Evidence 13: illegal landfill containing toxic waste in Sant'Anastasia - View from the highway - Credits: Google Inc.

Site 9 - Resit landfill

- Typology: Wastelands
- Location: SP141 - 80014 Giugliano in Campania NA, Italy
- View: Street level
- Coordinates: 40.947135, 14.106746
- Link: http://goo.gl/ZkZrz

In 2007, Resit landfill was set on fire destroying 700.000 tons of toxic waste after insider information on a imminent Police investigation leaked to the local Camorra clans.

Evidence 14: Resit Landfill - Ex-cave in Località Scafarea, Giugliano - Credits: Google Inc.

Site 10 - Ponte Riccio landfill

- Typology: Wastelands
- Location: Viale Ferrovia dello Stato, 22 - 80014 Giugliano in Campania NA, Italy
- View: Aerial
- Coordinates: 40.942143,14.105802
- Link: http://goo.gl/TVshU

Evidence 15: Ponte Riccio Landfill - Water accumulations on the plastic insulations, Giugliano - Credits: Google Inc.

Site 11 - Lakes in Castel Volturno

- Typology: Water basins
- Location: Prima Traversa Via dei Diavoli - 81030 Castel Volturno CE, Italy
- View: Street level
- Coordinates: 41.013503,13.96719
- Link: http://goo.gl/0el10

In the town of Castel Volturno, we can found about 30 lakes whose origin exemplifies the ways eco-mafia clans exploit the local areas. First a cave is used to extract sand for constructions. Once the cave is out of mineral resources, it gets filled with waste. After that, bulldozers intentionally break up the water table underneath, provoking the flooding of the cave. The springing flow covers all evidences with water [11].

Evidence 16: One of the 30 lakes in the area of Castel Volturno - Credits: Google Inc.

Site 12 - Agribio at Discarica Difrabi Pianura

- Typology: Farm fields
- Location: Via Cofanara, 96 - 80078 Pozzuoli NA, Italy
- View: Street level
- Coordinates: 40.850307,14.136392
- Link: http://goo.gl/W4yfw

«Food is not growing on the supermarket shelves» [12]. Extended areas in Campania region are used for agriculture and sheep-farming. Local rural companies produce vegetables, meat, livestock and dairy products. We can also found «Bio» farms that operate meters away from polluted spots. Here, a biologic farm has his main entrance in front of Difrabi landfill in the town of Pianura / Pozzuoli. Difrabi is a wasteland that has been exploited for more than 40 years. As environmental organisation dossiers report, Difrabi was took over by Camorra clans that are using it for hazardous waste disposal (painting mud, asbestos, acrylic glue, cosmetics leftovers, aluminium dust, contaminated land).

11 Alessandro Iacuelli: «Le vie infinite dei rifiuti. Il sistema campano» (Rinascita edizioni, 2008) - http://rifiuti.alessandroiacuelli.net/

12 Guido Viale - Economist and Writer (http://guidoviale.blogspot.com/)

Evidence 17: Agribio biological agriculture farm at meters of distance from the Discarica Difrabi Pianura landfill - Credits: Google Inc.

Site 13 - Greenhouses

- Typology: Farm fields
- Location: Via Vicinale Trenga, 19 - 80014 Giugliano in Campania NA, Italy
- View: Street level
- Coordinates: 40.940738,14.079918
- Link: http://goo.gl/yKJ0N

Evidence 18: Extended greenhouses surface in the area of Giugliano - Credits: Google Inc.

The third eye of Google Streetview

Google Streetview is an effective tool for explorations of critical issues. In our journey through the Land of Fires, Streetview includes different sightseeing spots to observe areas with critical pollution conditions. Because of its features, this Web service is valuable because of several aspects:

1. **Immersive**
   Through its street-level perspective, Streetview enables immersive experiences.

2. **Accessible**
   Streetview is accessible to everyone having Internet connection and a browser. Its interface is intuitive and easy for users with different skill levels.

3. **Neutral**
   Streetview reports the real world in a neutral fashion, as it is (besides the images blurred for privacy matters and the locations excluded for security reasons).

4. **Experiential**
   Streetview enables several point-of-view actions while visiting a location: walk, jump, zoom, rotate.

5. **Spreadable**
   Every Streetview URL address contains a sequence of machine-readable information that allow to «set the stage» for users to re-experience a place exploration [13]. Such experiences can be either replicated via URL address spread through email, Twitter and other social networks, or via embedded HTML code.

6. **Expanding**
   Mapped locations are constantly expanding. Streetview vehicles are crossing simultaneously new

13 A Streetview URL defines the starting geographic location, the rotation and tilt angle, the zoom level, the pitch as well as the surrounding panorama objects

spots worldwide [14] and the overall imagery set keeps expanding.

The myopia of Google Streetview

While Streetview offers tremendous value for storytelling, I recognise four limitations that reduce the potential of Streetview to engage the users in civic journalism activities. Mapping coverage partiality, lack of chronology as well as property and access limitations, make Streetview an ideal tool to supplement content, and not to build new forms of civic media narration, such as the illegal waste disposal in Campania region.

- **Leopard's spots: mapping coverage limits.**
  Currently, Streetview imagery covers vast portions of the most connected and richest countries in the world, or at least those where political systems and national privacy regulations allow for it [15] [16]. However, the imagery necessarily doesn't cover all sensible areas, despite user-generated Panoramio images that compensate for Streetview sources that are missing. Furthermore, only streets that are accessible to cars or trikes are actually mapped. This excludes streets with car traffic bans or whose width doesn't allow Streetview vehicles to drive through.

- **A-chronology: a space with no time.**
  Streetview portrays a space where time is static and landscape evolution does not occur. Thus, a space with no time implies that relevant issues cannot be monitored along mid or long periods nor timely covered as significant events unfold. Furthermore, lack of time flow implies that no comparisons nor chronologically browsing of imagery content is possible. The project HistoryPin [17] is an interesting attempt to bypass the missing time flow perception of Streetview. It superimposes archive photographies to Google's imagery portraying the same spot as it looked in the past. Hence, HistoryPin enables a diachronic comparison of a location. Similarly, BBC has used Streetview imagery to show London locations before and after the riots of August 2011 [18].

- **Representation monopoly: a Google-ised world.**
  All Maps and Streetview images belong to Google and all decisions are opaque to its users. Therefore, the world representation from above and at street level is Google's representation of it, with all its implications in terms of visual aesthetics, copyrights, usage rights and even politics [19]. All initiatives based on Google's services can be discontinued at any time without previous alerts nor motivations from the company (say for marketing strategies or pressures from governments and organisations: in October 2010, Google ceased Streetview operations in Australia, in April 2011 in Germany and in June 2011 in India [20]). Users cannot re-negotiate company's decisions which are indisputable.

- **Proprietary information: what is Google's is Google's - what is yours is not yours.**
  All itineraries and locations that I describe in this article are those available during August 2011. Meanwhile, all imagery might get updated and some of the mapped locations discontinued for several reasons. As to the intellectual property on user-generated content, all material that is

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14 Currently, Google is mapping Amazon River and surrounding villages with its own trike. Source GoogleBlog: «Streetview goes to Amazon» (Aug 17, 2011) http://googleblog.blogspot.com/2011/08/street-view-goes-to-amazon.html

15 Current Streetview coverage: http://maps.google.com/help/maps/Streetview/learn/where-is-street-view.html

16 «We then think about which places we should start photographing, and since Streetview will be useful for the greatest number of people in large metro areas, we start driving there» - http://maps.google.com/help/maps/Streetview/technology/photos-into-street-view.html

17 History Pin: http://www.historypin.com/photos/

18 BBC.co.uk: «London riots: Before-and-after images» - http://www.bbc.co.uk/news/uk-14446548

19 Maddowblog: «The Politics of Cartography». Google updates Tripoli's Green Square in Martyrs' Square after Gaddafi's opponents uprising http://maddowblog.msnbc.msn.com/_news/2011/08/22/7440696-the-politics-of-cartography

20 Streetview discontinued regions http://en.wikipedia.org/wiki/Google_Street_View#Discontinued_regions

uploaded on Google's servers turns into Google's availability. The necessity of an independent mapping source is further justified by the recent concerns on users' data intercepted over Wi-Fi by Streetview vehicles.

Many eyes, many Streetviews

Despite Google's vast content and functional tools, grassroots' initiatives to be really effective have to be independent from Google's marketing, strategic and political decisions. Considering Streetview design elements previously described, I propose ten design requirements that can guide the development of a comprehensive civic media toolkit for citizens involved in environment monitoring.

1. **DIY:** mapping imagery is collected through DIY tools that are relatively cheap and affordable.
2. **Hyper-local:** the map exceeds the territory. the imagery is location-specific and pervasive on the entire area of interest (e.g. a highway ramp, a landfill or other illegal waste disposal spot).
3. **Multi-angle:** imagery isn't only street-centric such as in Streetview. It is built on several Points-of-View that exceed the limitations of road vehicles. Additionally, imagery includes different angles on a certain spot. For instance, it shows a location from above and from different street-level perspectives.
4. **Synchronic:** complex and evolving phenomena such as the waste disposal in Campania region clashes against the static representation of Streetview. Locations that require constant monitoring should be mapped at regular intervals.
5. **Diachronic:** imagery is stored according to its date and time stamp and it is chronologically accessible / navigable to monitor a location status over time, and compare different periods.
6. **Participatory:** the imagery is generated, analysed and organised with the contribution of everyone taking part to the initiative.
7. **Extendable:** new sets of imagery can be created through specific lenses or visualisations. Infrared cameras, augmented reality and emerging computational photography practices can enable interesting developments in this sector.
8. **Aggregative:** maps should aggregate and visualise geo-referenced content that is extracted from sources such as Twitter, RSS and news-feeds.
9. **Narrative:** tools that enable innovative storytelling modalities that leverage on the latest Web technologies, interaction design as well as merging mapping imagery with aggregated data.
10. **Open**: the imagery is freely available under licenses that enable content circulation and collaboration such as Creative Commons' Attribution-ShareAlike [21].

Wrapping-up

In «Gomorrah Streetview» article, I illustrated the opportunities and limitations of Google Streetview as an instrument for monitoring and reporting environmental issues. In particular, I leveraged the Land of Fires case study to highlight the street-photography aesthetics of Streetview through striking imagery and explain how we can turn it into an investigative tool in contexts with long-lasting and complex issues. The article guides the reader through thirteen sites and shows evidences and patterns of waste disposal in the Campania region. By focusing on such examples, the article stresses the design elements that make Streetview an effective instrument to supplement grassroots' initiatives.

At the same time, the article discusses the downside of Streetview to solidly underpin civic media initiatives. The limited mapping coverage in local areas, the lack of temporal evolution, and the copyright as well as the intellectual ownership of Google Inc. urge us to define a set of design directions for a comprehensive toolkit to be used by citizens involved in environmental monitoring and reporting.

Imagine the practical, social and political implications of do-it-yourself and independent tools that allow users to create, with limited investment, extensive mapping imagery through weather balloons, cheap drones and mobile devices. And, perhaps sensors that gather precious information on

21 Creative Commons License: Attribution-ShareAlike http://creativecommons.org/licenses/by-sa/3.0/us/

environmental conditions and pollution sources and platforms to publish and manage information collected by participants and streamed by real-time artefacts. Or ones that aggregate multiple sources to combine site-specific datasets and create deeper meaning. Interfaces that allow us to browse the information according to chronology and location for effective comparison and analysis. Shared spaces where to spark the discussions among local communities and leverage personal communication and storytelling to bring attention to local issues by the larger public and institutions.

Ubiquitous Computing can positively support initiatives with an environmental spirit. On the other hand, locative media has not yet been extensively employed for these purposes and the development of tools is still in its infancy. Streetview is a remarkable inspiration and raises our consciousness on the relevance of mapping systems as instruments that can have political, social and environment impact. The potential of neo-geography tools lies in the opportunity to transfer to people the production and maintenance of mapping systems. Given this, in the future we should harvest, combine and refine existing neo-geography and civic media tools to support initiatives focusing on environment monitoring and reporting, such as I only could begin to do with the Streetview case study for the Land of Fires. In a following article, I propose to probe deeper into the application of an enhanced toolkit based on these considerations.

Appendix - Smoke kills: the Land of Fires

The waste management in Campania - the region of Naples - has been under the control of an emergency commission since 1994. Despite the efforts of public authorities and the substantial investments to solve the crisis, the situation is now worse than in the past. Using a strong metaphor, writer and journalist Roberto Saviano in his best seller Gomorrah [22] coined the term «Land of Fires» to indicate a large area in Campania region wherein deliberate fires are ignited to burn the waste, predominantly hazardous, by eco-mafias. Eco-mafias are accomplished by Camorra clans, the local criminal organisations, that yearly accumulate € 20.5 billions on environmental crimes (more than the income of Italian enterprises such as car-manufacturer FIAT) [23].

Figure: The affected area mapped by LaTerraDeiFuochi.it - Credits: Google Inc. and LaTerraDeiFuochi.it

According to a survey of environmental monitoring agency ARPA [24], there are approximately 5200 critical sites in Campania. They are legal or illegal landfills, countryside lands, abandoned farms, parking lots and regular streets. In such sites millions of tons of waste are disposed, spilled, buried, poured, dumped and then burned, with deadly effects on the local population, environment and business. The dramatic situation in this area of Campania has serious consequences on locals that suffer from illnesses caused by dioxins, percolate and other highly toxic substances present in the land, air and water. In a 2004 article, Lancet Oncology called this area the «Triangle of Death» and exposed shocking statistics demonstrating that the death rate for liver cancer is close to 34.5% for males and to 20.8% for females, whereas the national average is 14%. Furthermore, the severe pollution is affecting the food chain as well, because residents consume food coming from the local land [25].

22 Roberto Saviano: «Gomorrah» (2006). Book review on the New York Times: http://www.nytimes.com/2007/11/25/books/review/Donadio-t.html

23 «Legambiente, rapporto Ecomafia 2010» (Edizioni Ambiente, 2010) http://www.edizioniambiente.it/eda/catalogo/libri/465/

24 ARPA: Agenzia Regionale per la Protezione Ambientale (Regional Agency for Environment Protection): http://www.arpacampania.it/

25 Lancet Oncology: «Italian Triangle of death» (The Lancet Oncology, Volume 5, Issue 12, Page 710, December 2004): http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(04)01645-6/fulltext

Here the waste has different origins and sources. Apart from the «domestic» waste, we can find tires, furniture, appliances, street-cleaning dusts, industrial process leftovers and construction materials. The waste is normally set on fire during night hours, when darkness obscures the black smoke and protects arsonists' identity. Responsible for the fires are often «roma» minors or other immigrants that get minimal incomes by operating for eco-mafia clans. In the «Biùtiful Cauntri» [26], the garbage is nothing but the central element of a complex system that involves organised crime, business, health and the environment.

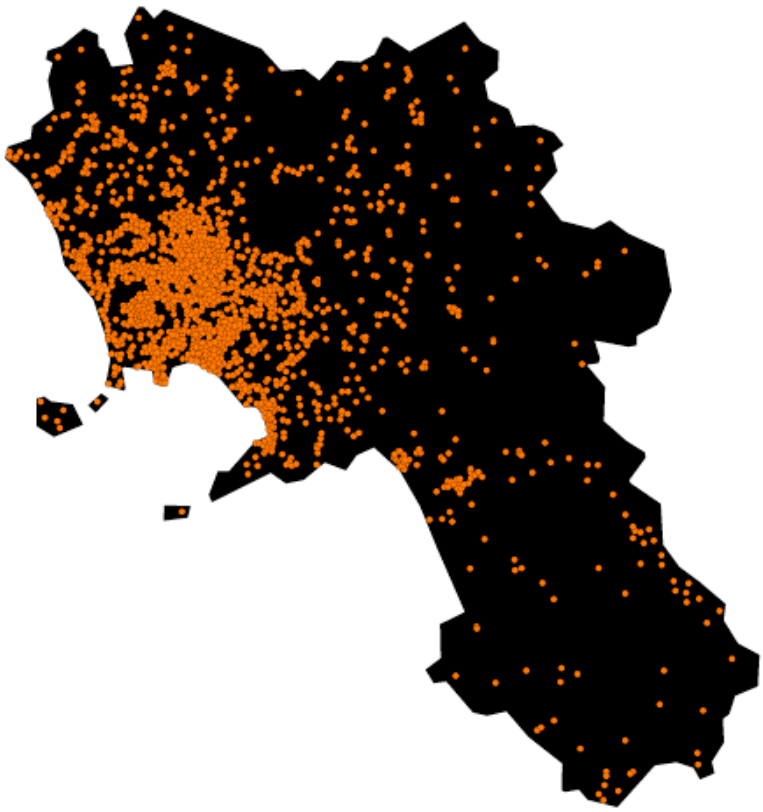

Figure: Map of the over 5,200 potentially polluted sites in Campania according to ARPA Campania

More info on the Land of Fires

- More pictures by La Terra dei Fuochi (gallery on Facebook group): https://www.facebook.com/media/albums/?id=203880605181
- Videos by La Terra dei Fuochi: http://www.youtube.com/user/VideoReport24h#p/u
- Laboratorio Campano: http://www.laboratoriocampano.org/
- La Terra dei Fuochi: http://www.laterradeifuochi.it/
- Munnezza.info: http://munnezza.info/

26 The documentary «Biùtiful cauntri» on IMDB: http://www.imdb.it/title/tt1313097/. «Biùtiful cauntri» is the Italian pronunciation of Beautiful country.

A step further

Do you have further sites and evidences to suggest on the Land of Fires?
You can share your findings and extend the sites mapping of this article. Feel free to contact me.

Do you have other Streetview experiences to suggest?
It would be interesting to add further examples of Streetview-based civic journalism or urban ethnographies. If you are interested in extending the research, please contact me.

Are you interested to know another story on the toxic waste disposal?
In 2009, I have been working on a data-journalism project that maps the scandal of illegal toxic waste disposal in the Mediterranean sea: in fondo al mar (Italian: Under The Sea).
More info: http://infondoalmar.info/

Author's bio

David Boardman (IT) is a designer and media artist. His projects have been recognised by well-know organisations including Ars Electronica, MIT Humanities + Digital Conference, Pervasive Computing Conference, Digital Heretics at International Journalism Festival, Milan Fuorisalone, IEEE, and Picnic Conference. He has been Research Scholar at MIT Design Laboratory. After that, he joined frog - a global innovation firm. More at: http://www.tinktank.it

Thanks to

Emily Kokernak, Paolo Gerbaudo and Diego Mometti for the support and article editing.