Social media and Crowdsourcing platforms in emergency management and post-disaster recovery assessment

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Virtual Capacity Building Workshop on Regional Spatial Data Infrastructure (SDI) for Sustainable Development in ECO Countries
13 Sep - 15 Sep 2021
Islamabad-Pakistan
Virtual Capacity Building Workshop on Regional Spatial Data Infrastructure (SDI) for Sustainable Development in ECO Countries
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Background
Virtual Capacity Building Workshop on Regional Spatial Data Infrastructure (SDI) for Sustainable Development in ECO Countries

13 Sep - 15 Sep 2021
Islamabad-Pakistan

Background

earthquake or tsunami
Background

A preliminary estimate of damaged buildings and exposed population after the M5.4 #Zagrebearthquake (NW #Croatia) based on the #Sentinel1 GRD and #GHSL2015 data, processed with #EarthEngine

Thank you #Slovenia for your generous contribution. #StrongerTogether #ELUSolidarity #Solidarity

Slovenia MFA 🇸🇮 @SloveniaMFA

After a devastating earthquake hit #Zagreb, the football club, volunteers from #Zagreb, the football club, volunteered to evacuate newborn babies from a damaged hospital.

Then, they helped firefighters clear the streets.

#Zagrebearthquake
Background

Contreras, D. 2016. Fuzzy Boundaries Between Post-Disaster Phases: The Case of L’Aquila, Italy. International Journal of Disaster Risk Science, 7, 277-292. Fig. 2. Pag. 279

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13 Sep -15 Sep 2021
Islamabad-Pakistan
Background


**Virtual Capacity Building Workshop on Regional Spatial Data Infrastructure (SDI) for Sustainable Development in ECO Countries**

**13 Sep -15 Sep 2021**

Islamabad-Pakistan
Background

Text

1183 houses collapsed, 558 apartment blocks and 5497 houses were heavily damaged in the November 26 earthquake in Albania. Extremely strong shake with damage. Barn collapsed... extremely strong. We cannot get in touch with our brother Ramazan Bal, since the earthquake hit. If somebody sees him or has any information about him, please contact us. My aunt, Tevhide Akkus, is under the debris in 283/1 Emrah apartment, 1st floor, please help.
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Islamabad-Pakistan

Objectives

Emergency response

Earthquake reconnaissance

Preparedness

PDNA

Search and Rescue (SAR) training.
Source: IDIGER

Post-disaster recovery

Christchurch, New Zealand

L'Aquila, Italy, Photo: Dr Diana Contreras
1183 houses collapsed, 558 apartment blocks and 5497 houses were heavily damaged in the November 26 earthquake in Albania. Extrememly strong shake with damage. Barn collapsed…very strong 10 seconds…all was shaking strong. We cannot get in touch with our father Ramazan Bal, since the earthquake hit. If somebody sees him or has any information about him, please contact us. My aunt, Tevhide Akkus, is under the debris in 283/1 Emrah apartment, 1st floor, please help.
Zagreb earthquake 2020
Emergency response and early recovery

Virtual Capacity Building Workshop on Regional Spatial Data Infrastructure (SDI) for Sustainable Development in ECO Countries
13 Sep - 15 Sep 2021
Islamabad-Pakistan
Methodology (Data & Methods)
Methodology (Data & Methods)

Hashtags Identification
- #Croatia
- #croatia
- #croatiaearthquake
- #CroatiaEarthquake
- #CroatiaEarthquake
- #CroatiaFullofLife
- #CroatiaQuake
- #earthquakecroatia
- #earthquakeinzagreb
- #hrvatskapotres
- #LoveZagreb
- #potres
- #potreszaagreb
- #potresZg
- #PrayforZagreb
- #Zagreb
- #zagrebearthquake
- #zagrebpotres
- #ZagrebQuake
- #zagrebquake
- #ZagrebStrong
- #zagrebstaystrong

Hashtag Selection
- #Croatia
- #croatiaearthquake
- #CroatiaFullofLife
- #CroatiaQuake
- #earthquakecroatia
- #earthquakeinzagreb
- #hrvatskapotres
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- #potres
- #potreszaagreb
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- #Zagreb
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- #zagrebstaystrong

Data Collection
- Pictures
- Satellite images
- Newspaper articles
- Press releases
- Laws

Data processing
- Translation to English
- Eliminate Twitter handles, emoticons and hyperlinks

Twitter accounts
- @AndrejPlenkovic
- @MilanBandicGZ
- @ecapannelli
- @VladaRH
- @MORH_OSRH
- @wwwzagrebhr
- @Zg_Holding
- @RavnateljstvoCZ

Maps

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Methodology (Data & Methods)

Virtual Capacity Building Workshop on Regional Spatial Data Infrastructure (SDI) for Sustainable Development in ECO Countries

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Zagreb, the capital of Croatia, has seen a devastating earthquake for the first time after 140 years. Some parts of the city took on the scenery of World War II. Strangely enough, most Austro-Hungarian buildings are in good condition. Our wish is that nothing happens to In full quarantine due to COVID-19, a Magnitude 5.3 earthquake in Zagreb, Croatia, left severe material damage and several people injured, authorities reported. The earthquake occurred after 6 in the morning.

Pray for Croatia. Residents were asked to remain in their homes because of coronavirus—then an earthquake struck and they had evacuated... Now they are scared to be inside or out. Many churches have been destroyed. Croatia Earthquake.

Knitted heart on the crack of building damaged by earthquakes in Croatia

Damages location (Proxy indicator)
In the wake of the Zagreb earthquake, our thoughts are with the Croatian Meteorological and Hydrological Service. Their headquarters were damaged but thankfully the staff are all safe. National meteorological and hydrological services worldwide provide vital information for all and rise to the challenges they face.

Not only that you gave birth during COVID-19 but also earthquake happened and on top of it all it is winter time. Only love for all these brave women and Zagreb!

This morning, Croatia was hit with several earthquakes in the midst of the COVID-19 pandemic. We hope all of you are okay! Thankfully, our staff and their families are. Please stay safe everyone! Croatia Zagreb COVID-19

In full quarantine due to COVID-19, a Magnitude 5.3 earthquake in Zagreb, Croatia, left severe material damage and several people injured, authorities reported. The earthquake occurred after 6 in the morning. bravo

Zagreb, the capital of Croatia, has seen a devastating earthquake for the first time after 140 years. Some parts of the city took on the scenery of World War II. Strangely enough, most Austro-Hungarian buildings are in good condition. Our wish is that nothing happens to sister Bosnia and Herzegovina. Zagreb.

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Methodology (Data & Methods)

Twitter activity between the 20th March and 30th April 2020, related to the earthquake in Zagreb. Source: TweetBinder

59,246 tweets
19,840 original
39,406 retweets
Methodology (Data & Methods)

Intensity reports from LastQuake app users after the 22nd March 2020. Source: EMSC

Examples of pictures and comments done by LastQuake app users after the earthquake in Zagreb. Data Source: EMSC

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Methodology (Data & Methods)

Hashtags Identification

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- #potres
- #potreszagreb
- #potresZg
- #PrayforZagreb
- #quake
- #solidarnosthrvatskom
- #Tromemats
- #volinhrvatsku
- #Zagreb
- #ZagrebEarthquake
- #zagrebearthquake
- #zagrebpotres
- #zugrebpotres
- #ZagrebQuake
- #ZagrebStrong
- #zagrebstrong
- #zagrebstaystrong

Hashtag Selection

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- #zagrebearthquake
- #zagrebpotres
- #zugrebpotres
- #ZagrebQuake
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- #zagrebstaystrong

Data Collection

- 78,246 tweets
- 58,501 tweets
- 59,246 tweets
- 58,501 tweets
- 31,403 intensity reports
- 39,888 tweets
- 45 intensity reports

Data processing

Translation to English
Eliminate Twitter handles, emoticons and hyperlinks

SA

Positive
Neutral
Negative

Keywords extraction

CSEM

EMSC

Wordclouds

Topic

Classification

Building damage
Geotechnical effects
Injuries-casualties
Emergency response
Solidarity messages
Preparedness
Seismic Information
Intensity
Early recovery

Data extraction

.xls., .jpg, .pdf,.doc
## Preliminary results

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<thead>
<tr>
<th>Word</th>
<th>Count</th>
<th>Similarity</th>
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<tr>
<td>full pandemic</td>
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</table>

Keywords extraction using word clouds
## Preliminary results

### Polarity classification

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<th>Polarity</th>
<th>Twitter &amp; Instagram</th>
<th>LastQuake app</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
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<td>Negative</td>
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<td>33</td>
<td>2044</td>
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<td>Positive</td>
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<td><strong>Total</strong></td>
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</table>

![Polarity classification chart](image)

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Preliminary results

Building usability in the Lower Town: green-usable; yellow temporarily unusable and red-unusable (GIS BUD 2020).


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Preliminary results

Topic classification

<table>
<thead>
<tr>
<th>Topics</th>
<th>Twitter &amp; Instagram</th>
<th>LastQuake app</th>
<th>Total</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Seismic information</td>
<td>3450</td>
<td>0</td>
<td>3450</td>
<td>48</td>
</tr>
<tr>
<td>Building damage</td>
<td>1726</td>
<td>25</td>
<td>1751</td>
<td>24</td>
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<td>Emergency response</td>
<td>940</td>
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<td>Solidarity messages</td>
<td>706</td>
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<td>Intensity</td>
<td>12</td>
<td>30</td>
<td>42</td>
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</table>
Preliminary results


Page 15, Figure 12
## Preliminary results

### Topic classification

<table>
<thead>
<tr>
<th>Topics</th>
<th>Twitter &amp; Instagram</th>
<th>LastQuake app</th>
<th>Total</th>
<th>Percentage</th>
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<tr>
<td>Seismic information</td>
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<tr>
<td>Intensity</td>
<td>12</td>
<td>30</td>
<td>42</td>
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</table>

![Pie chart showing distribution of topics]
## Emergency response assessment

<table>
<thead>
<tr>
<th>Polarity</th>
<th>Twitter &amp; Instagram</th>
<th>LastQuake app</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
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<td>54%</td>
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<tr>
<td>Positive</td>
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<td>34%</td>
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<tr>
<td>Neutral</td>
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<tr>
<td>Total</td>
<td>940</td>
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Preliminary results
Preliminary results

DATASET


**DOI:** https://doi.org/10.25405/data.ncl.14687163.v1 .v1
Methodology (Data & Methods)

Aegean earthquake 2020
Emergency response and early recovery

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Methodology (Data & Methods)

LastQuake app – EMSC
3,028 Users reports
2,546 Users reports
2,518 Users reports

2,371 app – 123 mobile phone - 24 Desktop
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Methodology (Data & Methods)

<table>
<thead>
<tr>
<th>Languages</th>
<th>Number</th>
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<tbody>
<tr>
<td>Turkish</td>
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<tr>
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<td>1%</td>
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<tr>
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<td>Latvian</td>
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<td>Polish</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

LastQuake users reports location. Data source: EMSC
Methodology (Data & Methods)

Georeferenced Pictures with comments taken by LastQuake app users. Data source: EMSC

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Methodology (Data & Methods)

Modified Mercalli (MM) Intensity Scale

- 10 Extreme: 1
- 9 Violent: 4
- 8 Severe: 12
- 7 Very strong: 36
- 6 Strong: 116
- 5 Moderate: 188
- 4 Light: 417
- 3 Weak: 981
- 2 Weak: 618
- 1 Not felt: 146

Map showing seismic activity intensity.
Methodology (Data & Methods)

1. Data collection
2. Data storage
3. Data extraction
4. Data process
5. Data analysis
   - Supervised classification
     - Sentiment Analysis (SA)
       - Positive - Negative - Neutral
6. Database
7. SA map
8. Topic map

Components of EMSC's multichannel rapid information system. Source: Bossu et al. (2020). Figure 3. Pag. 35

IZMİR flagged, we felt it violent. There is a destroyed building.

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### Methodology (Data & Methods)

#### Rules

<table>
<thead>
<tr>
<th>Polarity</th>
<th>Rules</th>
</tr>
</thead>
</table>
| Positive | - Reports of light intensity  
- Reports of short seismic movements  
- Reports of slight shakes  
- Supporting and solidarity messages  
- Emergency response messages  
- Preparedness measures |
| Negative | - Reports of long seismic movements  
- Reports of strong shakes  
- Reports of strong intensity  
- Reports of aftershocks  
- Report of damages in buildings and/or lifelines  
- Reports of injuries and/or casualties  
- Reports of fear and anxiety |
| Neutral  | - Seismic information |

Rule-set for polarity classification of text data produced by LastQuake app users.

---

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Positive
- ‘Low damage’
- ‘We felt it, but it was short’
- ‘Everybody should respect and act according to scientific rules and regulations. Otherwise, everybody will lose’

Negative
- ‘Everything rattled for a few seconds. The cracks in our walls are getting bigger’
- ‘Chios, Vrontados. Very strong shake, ground floor, cracks in walls objects fell.’
- ‘I felt that earthquake when I was in school in Athens. The floor was moving and the walls too. It was very scary because it happened so suddenly!’

Neutral
- ‘The epicentre is in Samos, Greece, not in Western Turkey’.
- ‘Moment intensity VI’
- ‘It is not Dodecanese islands. It is North Aegean Samos island’
Final results

Location of LastQuake app users comments polarity. Data source: LastQuake app

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Final results

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>2283</td>
<td>90.67</td>
</tr>
<tr>
<td>Seismic information</td>
<td>87</td>
<td>3.46</td>
</tr>
<tr>
<td>Solidarity messages</td>
<td>39</td>
<td>1.55</td>
</tr>
<tr>
<td>Emergency response</td>
<td>39</td>
<td>1.55</td>
</tr>
<tr>
<td>Unrelated</td>
<td>27</td>
<td>1.07</td>
</tr>
<tr>
<td>Building damage</td>
<td>24</td>
<td>0.95</td>
</tr>
<tr>
<td>Tsunami effects</td>
<td>9</td>
<td>0.36</td>
</tr>
<tr>
<td>Preparedness</td>
<td>5</td>
<td>0.20</td>
</tr>
<tr>
<td>Lifelines affected</td>
<td>3</td>
<td>0.12</td>
</tr>
<tr>
<td>Geotechnical effects</td>
<td>2</td>
<td>0.08</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2518</td>
<td>100</td>
</tr>
</tbody>
</table>

Location of LastQuake app users comments polarity. Data source: LastQuake app
Final results

Buildings damaged
- ‘There are buildings destroyed in different districts of Izmir. We shook so violently. The items in the house were overturned. Earthquakes still continue. May God help us. Get past us all’
- We were caught in Atasehir in my 12-floor house. I said everything is over. We waited for the building to come out. All flats in the building have cracks and collapse in the plaster’

Lifelines affected
- ‘It was the first time I saw the .300-ton transformers shaking like a cradle, which was shifted in Aliagada. God bless us all’.
- ‘Very powerful and long lasting. All neighbours are on the street. No visible damage although telephone poles sway and a line broke. Many smaller quakes within the last 45 minutes or so’.

Tsunami
- ‘The sea rises here and falls again so you can say it rises if I can estimate that by 50 cm and 2 minutes later it goes down again’
- ‘I was in the tsunami, 1 meter the sea could go to the stairs of the bank. Car with water but started, got the hell out of there...pfff’
Final results

Emergency response assessment

<table>
<thead>
<tr>
<th>Polarity</th>
<th>LastQuake app Comments Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>28</td>
<td>72</td>
</tr>
<tr>
<td>Positive</td>
<td>11</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>100</td>
</tr>
</tbody>
</table>

![Pie chart showing the distribution of comments with 72% positive, 28% negative, and 3% unclear.](chart.png)
Final results

Negative

- ‘A boom like someone dropped something upstairs. My husband asked what was that and I said ’maybe an earthquake?’ and then suddenly there was obvious shaking with rumbling sound that lasted 5 to 10 seconds. It was enough to make us head for the front door. It stopped so we did not open the door. I still fell ’shaken up’ over it’.

- ‘We felt the earthquake in Izmir excessively, we are in the skyscraper, the highest floors are very afraid call for help’.

Positive

- ‘I was in bed with a mob in my hand and a shaking device, I shivered and quickly got out of the house’.
- ‘Independent mine workers are trying to reach people who are under the rubble’.
Final results

DATASET


DOI: https://doi.org/10.25405/data.ncl.14604354.v3
Conclusions

- The users of social media and crowdsourcing platforms have different profiles.

- **Twitter and Instagram** users share data from **seismic information, building damage, emergency response, solidarity, injuries-casualties, lifelines and intensity**

- **LastQuake app** users focus their comments on **intensity and seismic information**

- Comments with negative polarity include more data that the comments in other polarities

- The **spatial distribution of negative polarity** is a proxy indicator of the **location of damages**

- **Citizens** as sensors should be **trained to provide** more useful **data**
Methodology (Data & Methods)

L’Aquila earthquake 2009 – 2019
Post-disaster recovery
10th anniversary
Methodology (Data & Methods)

L’Aquila location: (a, b) location of the case study area: L’Aquila, Italy and (c) restricted zone in L’Aquila after the earthquake on 6 April 2009.


Church Santa Maria del Sufragio.
Photo: Prof. David Alexander
Methodology (Data & Methods)

Twitter activity from the 4th to 10th April 2019.
Methodology (Data & Methods)

Methodology
Final results


Polarity of the tweets with the hashtag: #L’Aquila.
**Final results**

**Negative**
‘Another interesting and very **painful** report on nine. ”L'Aquila - 10 years later. I would recommend to many politicians to look at it..and to be **ashamed** to think of the **poor** people who still live among the **rubble**. The **Red zone**’.

**Neutral**
‘L'Aquila earthquake the comparison between 2009 and 2019’.

**Positive**
‘I saw on TV .. the **rebirth** of L'Aquila, of what in 10 years has been **restored** and the great **commitment** of all those **beautiful** people to rebuild (bricklayers/engineers/carpenters/restorers/architects/carpenters, etc.). I am touched’

**Not related**
‘L'Aquila, weekend in the sun and scattered rains’.
Final results

Keywords extracted from tweets with negative polarity using word clouds. Source: Contreras et al (2021). Assessing post-disaster recovery using sentiment analysis: The case of L’Aquila, Italy. Earthquake Spectra, 0(0), 87552930211036486. doi:10.1177/87552930211036486. Figure 10a. Page 18.
Keywords extracted from tweets with neutral polarity using word clouds. Source: Contreras et al. (2021). Assessing post-disaster recovery using sentiment analysis: The case of L’Aquila, Italy. Earthquake Spectra, 0(0), 87552930211036486. doi:10.1177/87552930211036486. Figure 10b. Page 18.
Final results

Keywords extracted from tweets with positive polarity using word clouds. Source: Contreras et al (2021). Assessing post-disaster recovery using sentiment analysis: The case of L’Aquila, Italy. Earthquake Spectra, 0(0), 87552930211036486. doi:10.1177/87552930211036486. Figure 10c. Page 18.
Feature extraction based on relevance using word clouds.

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Final results

DATASET


**DOI:** https://doi.org/10.25405/data.ncl.14579196.v1
Maule earthquake 2010 – 2020

Post-disaster recovery
10th anniversary
Methodology (Data & Methods)

CASE STUDY AREA

AFECTED AREA: EARTHQUAKE 27 FEBRUARY 2010

CHILE

Zone of catastrophes in Chile after the earthquake on the 27 February 2010.

Methodology (Data & Methods)

The 27th de February 2010 to 2020

Twitter activity from 15th December 2019 to 18th April 2020. Source: TweetBinder

44,189 tweets
7,361 originals
36,828 retweets

#27F
#PorUnaLeyDeCostasEnChile
#Maule

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Preliminary results

#27F
- The Dominican Republic independence
- The ‘Caracazo’
- Birth of José Vasconcelos, Mexican educator and philosopher (1882); José Antonio Meade Kuribreña (1969), Mexican politician and economist; and Elizabeth Taylor (1932)
- Mauricio Garcés, Mexican actor died (1989)
- 2 years and 10 months of the dead of Eyker Rojas Gil (27/04/2017)
- 2 years and seven months of the dead of Leonardo González el 27/07/2017
- International polar bear day

Sentiment Analysis (SA) result

<table>
<thead>
<tr>
<th>Topic</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Not related</th>
</tr>
</thead>
<tbody>
<tr>
<td>#27F</td>
<td>39%</td>
<td>29%</td>
<td>13%</td>
<td>1108</td>
</tr>
<tr>
<td>8,837 tweets</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Polarity

Positive
‘After 27F the State took measures to improve the ability to react to the earthquakes. One of them was the alliance between the National Office of Emergency of the Interior Ministry (ONEMI) Chile and the National Seismological Centre of the University of Chile. We believe that collaborative alliances foster local development through appropriate and decentralized solutions’.

Negative
‘10 years ago Michelle Bachelet and Carmen Fernández, former director of the National Office of Emergency (ONEMI), they told Chile that there was no tsunami, an announcement that cost 156 Chileans their lives, 82 men and 74 women + 25 missing ...Do not forget 27F earthquake’.

Neutral
‘Seismic Ephemeris a day like today on February 27, 2010 the earthquake of the Maule occurred. At 03:34 am local time, a magnitude 8.8 (Mw) earthquake shook the south-central area of Chile, affecting about 80% of the population and producing a very destructive tsunami’.

Not related
‘27th to 31 years of the caracazo popular rebellion against the economic package imposed by the neoliberal system that the government of Carlos Andrés Pérez tried to impose. Trump the threat is you’.
Preliminary results

Topic analysis: Recovery

**Negative**
‘Only in the Biobio Region 29 public schools continue in cargo containers. 27F 10 years after the earthquake and tsunami we are still waiting for reconstruction and justice’.

**Positive**
‘The 27F affected more than 230 communes in seven regions of the country. In four years we reconstructed Chile and today more than 224,000 families have a definitive housing solution. Together with the Minister Cristián Monckeberg and undersecretary Guillermo Rolando. We are better able to face catastrophe. Strength.’

**Positive**
‘This afternoon we shared valuable experiences: we learned the stories of improvement of the young people of Talcahuano, Dichato and Concepción 10 years after the 27F and the tremendous work in the House of Culture of Hualpén where classes of Mapuche weaving are taught. Ministry of Social Development and Family (MDSF) Biobío’.
DATASET


DOI: https://doi.org/10.25405/data.ncl.15081795.v1
Methodology (Data & Methods)

Haiti earthquake 2010 – 2020

Post-disaster recovery

10th anniversary
Methodology (Data & Methods)

Cathedral of Port-au-Prince destroyed after the earthquake.
Source: https://twitter.com/AC360/status/121688960720478209/photo/1
Methodology (Data & Methods)

The 12th de January 2010 to 2020

47,200 tweets
8,157 originals
39,043 retweets

#Haiti
#Haiti10
#HaitiEarthquake
#Haiti10YearsOn
#10AnsAprès
#12Janvier2010

Twitter activity from 6th January 2020 to 15th January 2020. Source: TweetBinder
Preliminary results

TRAINING

TAG
(positive, neutral, negative, not related)

1% sample
(406)
tweets
tweets
tweets
tweets
tweets

feature extractor

Machine Learning Algorithm

MonkeyLearn

PREDICTION

TAG
(positive, neutral, negative, not related)

Classifier Model

Positive
Negative
Neutral
Not related
Positive
Neutral
Negative
Not related

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'Haiti earthquake is trending because 10 years ago yesterday was the earthquake that lasted 30 seconds, but a decade later they have still not recovered and rebuilt. It is incredibly sad that this could be Puerto Rico if they face more natural disasters without help to build.'
Conclusion

- The tweets regarding the memorial of disasters are not necessarily trending topics like the tweets related to the disaster itself.

- There are more related tweets in the days before the anniversary of the earthquake than after, with the critical day to collect most of the data being on the day of the anniversary.

- Tweets from the citizen and news agencies are more reliable to assess post-disaster recovery. Official sources are more likely to focus on positive achievements.

- Sentiment analysis is a suitable method for post-disaster recovery assessment.

- The pre-defined model of SA had an ACC of 53%, but the customised model 63%
Recommendations

When an Earthquake or Tsunami strike....

Earthquake
https://www.guemil.info/2020/48_earthquake_v15/

Tsunami
https://www.guemil.info/2020/47_tsunami_v15/
Recommendations

Keep you safe !!!

Protection
https://www.guemil.info/2020/10_drop_cover_hold_v15/

Horizontal evacuation
https://www.guemil.info/2020/11_evacuate_vertical_v15/

Vertical evacuation - Tsunami
https://www.guemil.info/2020/11_evacuate_vertical_v15/
Recommendations

Report that you are safe !!! and…

A screenshot of Facebook's Safety Check feature.
Recommendations

Take pictures !!!

Faculty of social and political sciences – Tadulako University (Indonesia)
The 17th November 2018
Recommendations

Take pictures !!! and
Recommendations

Upload pictures to:

Components of EMSC's multichannel rapid information system.
Source: Bossu et al. (2020). Figure 3. Pag. 35
My aunt, Tevhide Akkus, is under the debris in 283/1 Emrah apartment, 1st floor, please help #earthquake #izmirearthquake

Mansuroğlu mahallesi 283/13 Sok Rza Bey apt No 2 kat 4 Daire 16 Bayrakli izmir enkaz altinda 3 kişi var 1 anne 2 küçük çocuk Emine Yücel Toklu adı rt lelyn lütfen #Deprem #depremizmir #Tsunami https://t.co/cMM2eZ4Ws
Recommendations

Download...


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Noise floor of the phones. Noise floors of the smartphones color coded by the phone release date (also shown in the legend as MM/YY). Dashed black lines are typical ground motion amplitudes of earthquakes 10 km from the epicenter for various magnitudes. Noise floor for high-quality MEMS sensor (HP MEMS, blue) and a typical force-balance accelerometer from a regional network (BKS in northern California, purple) are also shown. Source: Kong, Q. K., Martin-Short, R., & Allen, R. M. (2020). Toward Global Earthquake Early Warning with the MyShake Smartphone Seismic Network, Part 2: Understanding MyShake Performance around the World. Seismological Research Letters, 91(4), 2218-2233. doi:10.1785/0201901778 Page 2. Figure 1.
Project: Learning from Earthquakes

https://research.ncl.ac.uk/learningfromearthquakes/
@LEarthquakes
https://www.instagram.com/learning_from_earthquakes_uk/
https://www.youtube.com/channel/UCQf-I8BG9fWqNHWimrcXE1w?view_as=subscriber
https://www.facebook.com/Learning-from-Earthquakes-110392457215986

Dr Diana Contreras

https://www.cardiff.ac.uk/people/view/2534179-Contreras-Mojica-Diana
https://www.ncl.ac.uk/engineering/staff/profile/dianacontreras-mojica.html
@DianaContrerasM
https://www.instagram.com/diana_contreras_mojica/
https://www.facebook.com/diana.m.mojica.50/

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- Roldós, I., Best Word Visualization Tools to Create Your Own Word Cloud, in MonkeyLearn Blog, MonkeyLearn, Editor. 2020, MonkeyLearn.
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Thank You

Questions?