

## **Social media analysis and crowd-sourcing for disaster management**

**Geneva, Switzerland  
3<sup>rd</sup> May, 2022**

**Jose Luis Fernandez-Marquez, PhD  
Senior Lecturer  
Citizen Cyberlab  
University of Geneva  
[Joseluis.Fernandez@unige.ch](mailto:Joseluis.Fernandez@unige.ch)**

[WWW.E2mC-PROJECT.EU](http://WWW.E2mC-PROJECT.EU)



*The E2mC project is co-funded by the European Commission /  
H2020 Programme Grant Agreement No.730082".*



Senior Lecturer at University of Geneva  
PhD, Collective AI.  
Head of the SDG Accelerator  
Joseluis.Fernandez@unige.ch

# About us



PhD candidate at the University of Geneva  
GIS analyst expert  
Amudha.RaviShankar@unige.ch



Anahi Sebastian Rico Chinchilla  
GIS specialist / Data Analyst  
World Health Organization



# citizen cyberlab

## Rethinking Public Participation

We initiate projects and organize events that encourage citizens and scientists to collaborate in new ways to solve big challenges.



**UNIVERSITÉ  
DE GENÈVE**



2005  
announcement of  
Pope Benedict XVI



2013 announcement of  
Pope Francis





# E2mC: Evolution of Emergency Copernicus services

ittipat pinrarod @ittipatNationTV Follow  
ชุมชน วัดเจดีย์ทอง อ.สามโคก เพชรบุรีน้ำท่วมมา4 เดือน ชาวบ้านบอกแม่ จะเดือดร้อน แต่ยังช่วยเหลือ ตัวเองได้ #Thaiflood #NationTV  
Translate Tweet

Koh Samui and Beyo @MandalaySamui MANDA Follow  
Laem Dim Market i to the heavy rain to #KohSamui #Thaila #WeatherNow

kaveri @ikaveri - 12 Dec 2016 Follow  
Winds @ 100 kmph lifting cars off the ground. Whoa!  
#cyclonevardah  
0:07 25.3K views  
11:16 PM - 2



Not secure witness-dev.geoservices.it/E2mC/#viewer/openlayers/57  
Lat: 42.62916 - Long: 13.2891  
postmedia  
Post Google Street View  
Posted on: Aug 24, 2016 10:35:47 AM  
100 m Scale: 1:454

The interface shows a map of a town with various streets labeled in Italian. To the right, there is a "Google Street View" window showing a street scene with people and damaged buildings.



# E2mC: Evolution of Emergency Copernicus services

*“Every year natural disasters kill around 90 thousands people and affect close to 160 million people worldwide”*

**Environmental health in emergencies.**

**WHO**



Haiti Earthquake, 2010



Hurricane Katrina, 2005



Chennai floods, 2015



# E2mC: Evolution of Emergency Copernicus services

*"The first 72 hours after a disaster are crucial; response must begin during that time to save lives" OCHA*

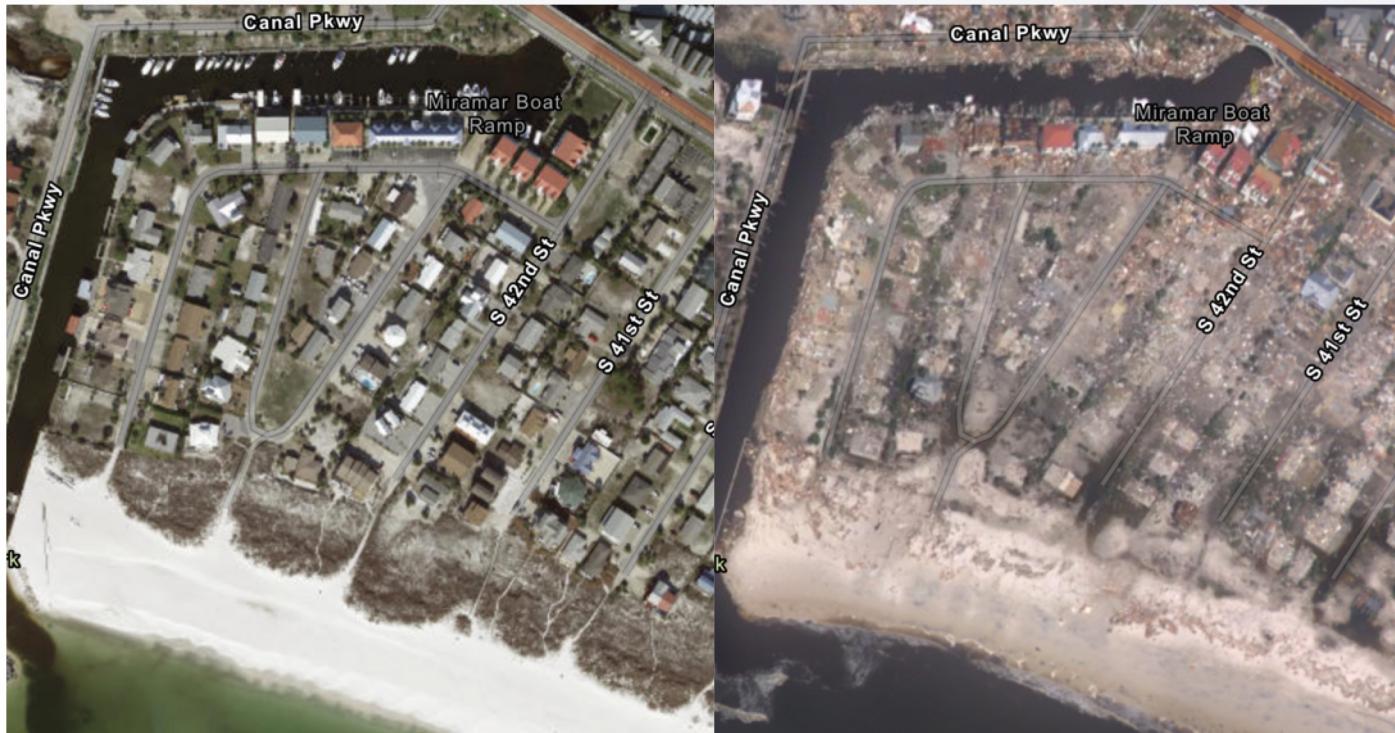
## Situational Awareness What is happening and where?



Hurricane Katrina – Satellite Imagine Corporation



# E2mC: Evolution of Emergency Copernicus services



Hurricane Michael – Mexico Beach ESRI



Mexico Beach, Florida, last year after Hurricane Michael made landfall. Douglas R. Clifford / Tampa Bay Times via AP



# E2mC: Evolution of Emergency Copernicus services

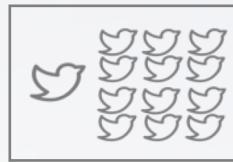
## Main Challenges

- Process of **large volume** of information
- Assessing the **relevance** of the content and the classification
- **Geolocation** of the content gathered from social media
- **Data quality** and reliability.
- **Timeliness**

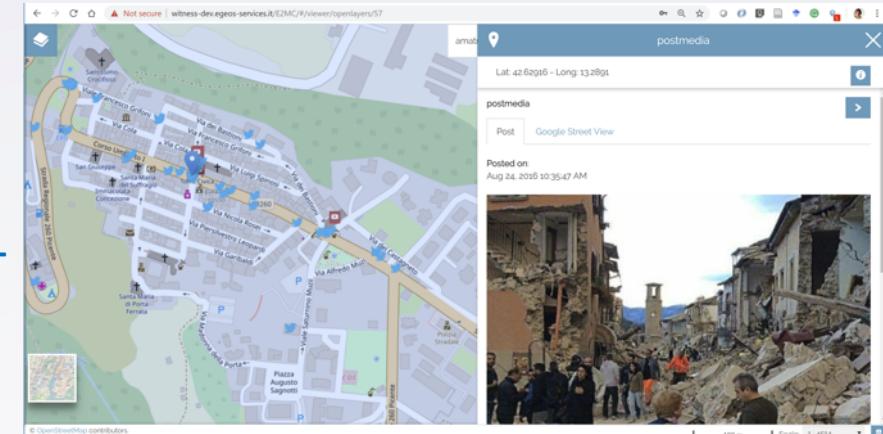


# E2mC: Evolution of Emergency Copernicus services

## Social Media



## Witness Component



## Relevance

## Geolocation

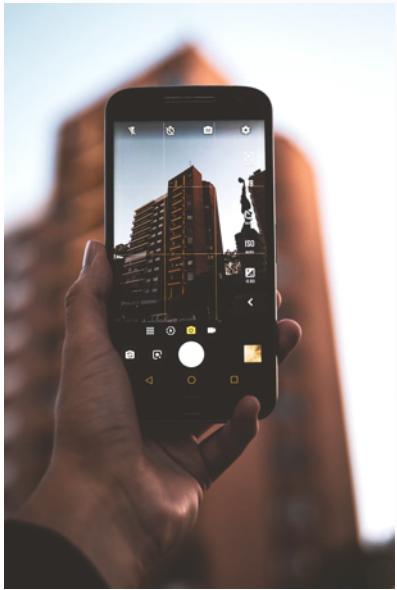


<https://www.youtube.com/watch?v=3MNFoXZLWJw&t=28s>



# E2mC: Gathering Data

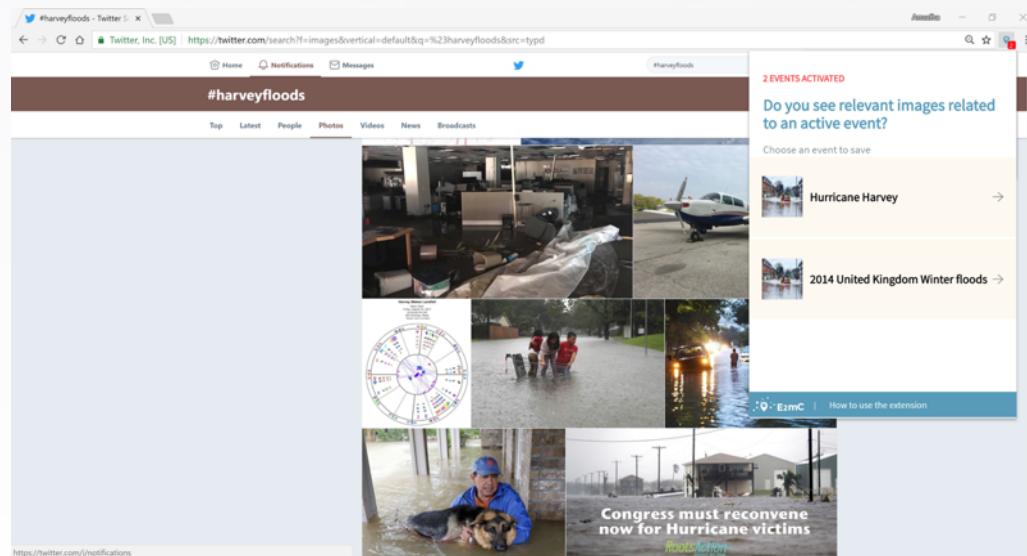
Crowdsourcing data collection



E2mC | [www.e2mc-project.eu](http://www.e2mc-project.eu)



CROWD4EMS Chrome Extension



E2mC | [www.e2mc-project.eu](http://www.e2mc-project.eu)

Social Media Data

Social Media



Data Mining + Crowd sourcing!





# E2mC: Data Relevance and Classification

Is this image providing useful information about the Earthquake, Central Italy?



1 post contains this

#Amatrice distrutta da #terremoto <https://t.co/npBv6gB4MK>

Luisa Loffredo More info  
tweet / 157 d

skip X NOT relevant ✓ Relevant



# E2mC: Data Geocalization

☰ ⓘ

#Amatrice distrutta da #terremoto <https://t.co/npBv6gB4MK>

Luisa Loffredo @statuses -@ Jul 5

[See original post](#)

[Search Google for image](#)

[Translate on Google](#)

[Show comments](#)

Locate the exact position of the damage on the map.  
Use the search box or drag the flag to point the location. [? Tips](#)

Enter a location

SR260  
Amatrice, Lazio  
View on Google Maps

Google

© 2018 Google | Terms of Use | Report a problem

Colli

SR260

SR577

Cemetery Cimitero Amatrice

Ristorante La Campagnola - Albergo...

Map data ©2018 Google | Terms of Use

Skip

2 of 4



# E2mC: Data Geocalization

☰



#Amatrice distrutta da #terremoto <https://t.co/npBv6gB4MK>

Luisa Loffredo @statuses -@ Jul 5

[See original post](#)

[Search Google for image](#)

[Translate on Google](#)

[Show comments](#)

**3 - Great! Please, measure the precision of the location you've just saved**

**A High precision**

You found the exact location, meaning you locate a very accurate point on the map: building, street number, coordinates of a road or similar precision.

**B Medium precision**

You know the image was taken close to your geolocation. It may be an street, road, path or similar.

**C Low precision**

Meaning that the precision you have provided it's in a level of a city, town, district, region, neighbour and so on.



# E2mC: Witness Component (step 4)

The screenshot displays the E2mC platform's witness component. On the left is a map of Amatrice, Italy, showing streets like Corso Umberto I, Via Cola di RIENZO, and Piazza Orsini. Numerous blue Twitter bird icons are scattered across the map, indicating the locations of tweets. On the right, a detailed view of a postmedia entry for a tweet from 'postmedia' is shown. The tweet was posted on Aug 24, 2016, at 3:29:01 PM. The text of the tweet is partially visible as 'Il prima, e il dopo. #Amatrice #Terremoto https://t.co/WRnt4kc680'. Below the tweet are two side-by-side Google Street View images showing the same street scene before and after the earthquake. A table below the map lists several tweets with their geolocation, publication date, and text. The table includes columns for geolocation\_rank, publication\_date, image\_recognition, crowd\_assessment, crowdtags, text, and media.

geolocation_rank	publication_date	image_recognition	crowd_assessment	crowdtags	text	media
53.33333333333336	2016-08-25T17:18:25Z	NO	True		Terremoto en Italia: hasta 70 https://t.co/WRnt4kc680	
53.33333333333336	2016-08-26T18:31:52Z	NO	True		Firemen Continue Working c https://t.co/WRnt4kc680	
53.33333333333336	2016-08-25T16:59:59Z	YES	True		El terremoto del centro de It https://t.co/WRnt4kc680	



# E2mC: Witness Component (step 4)

The screenshot displays the E2mC Witness Component interface. At the top left is a map of the United States with numerous blue dots representing event locations. A modal window titled "Sync map with filter" provides instructions to synchronize the map with selected filters. Below the map is a search result for a post from "postmedia". The search results table shows 5106 items with columns for geolocation\_rank, publication\_date, image\_recognition, crowd\_assessment, time\_stamp, and text. One specific post is highlighted, showing details such as the location (Lat: 29.77235 - Long: -84.83333), date (Oct 10, 2018 9:00:20 PM), and a thumbnail image of a house being hit by strong winds.

geolocation_rank	publication_date	image_recognition	crowd_assessment	time_stamp	text
40	2018-10-10T12:36:09Z	NO	Not Evaluated	20181010193609	Damage caused by #Hurricane
40	2018-10-10T21:07:03Z	NO	Not Evaluated	20181010230703	BEST NEW RISING I
40	2018-10-10T16:57:53Z	NO	False	20181010185753	A Tornado Watch has been i
40	2018-10-10T17:20:51Z	NO	False	20181010192051	RIDING OUT THE STORM   P

5106 Items

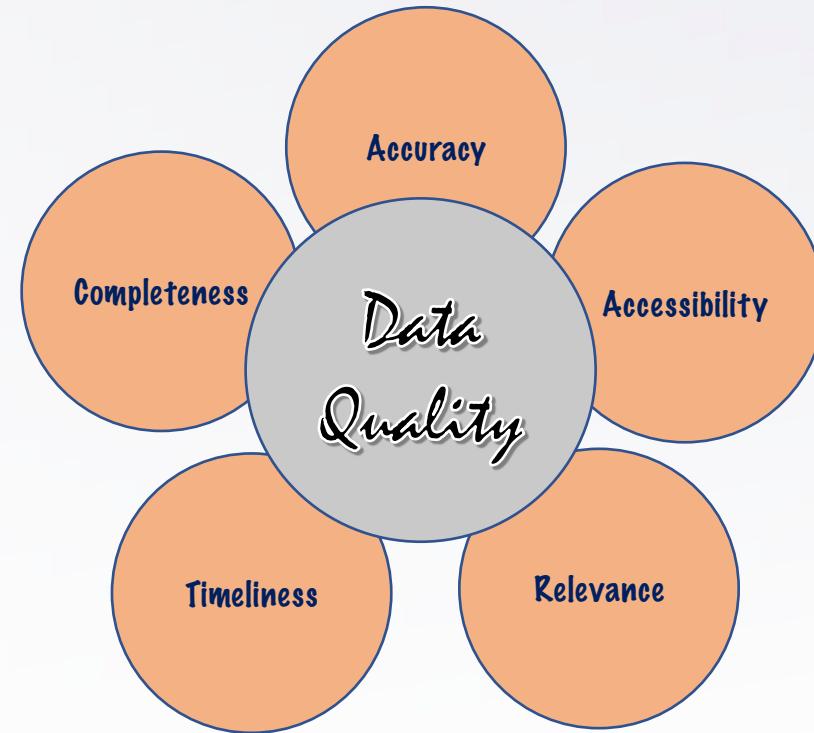
VIDEO | From Franklin County, Florida, captured by Lanark Fire Department. <https://t.co/3B6hwokmIJ> . <https://t.co/QGGUodOdde>

Geolocation type: CIME geocoding  
Crowd validation: True

Deep learning tags:



# Data Quality





## Current research

- AI enhanced tools
  - Filtering from social media
  - Aggregating volunteers answers
  - Geolocation of social media
- Paid vs non-paid volunteers
- Integration into Copernicus EMS



# Thank you

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