

ISCN Global Mixer 46

Tectonic shift in urban disaster response

How GeoAI enables effective response
when disaster strikes cities

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fAIR/HOT

22 July 2026
11:00 a.m. CEST



Role of GeoAI in Damage Assessment for Disaster Response

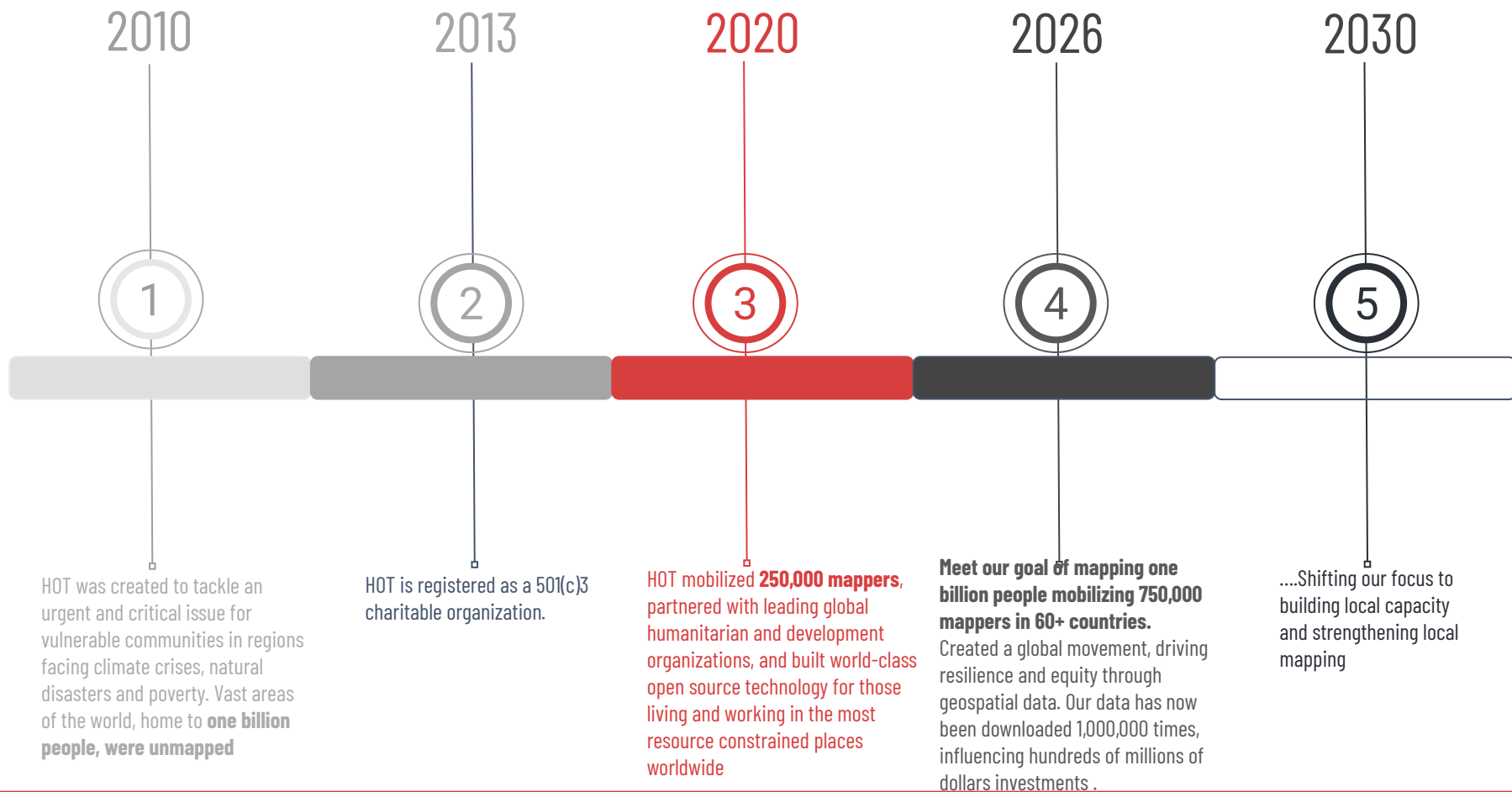


MapSwipe



Humanitarian
OpenStreetMap Team
(HOT) is an international
team dedicated to
humanitarian action
and **community**
development through
open mapping.

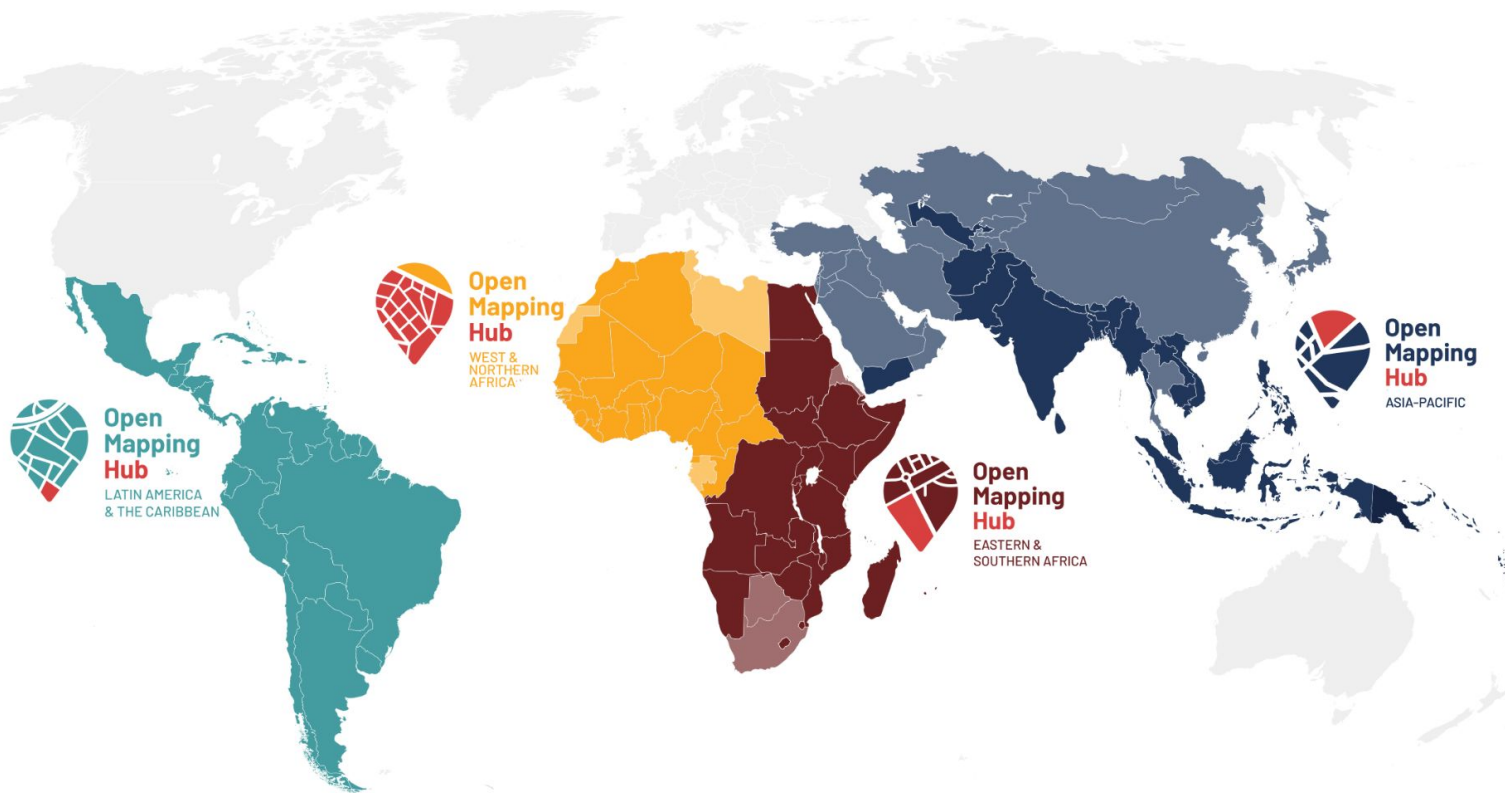




HOT is working to strengthen open data in 4 priority regions



Humanitarian
OpenStreetMap
Team



Key Outcomes



Humanitarian
OpenStreetMap
Team

35,000

People
trained

760,000

Community
mappers

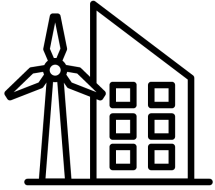
174 Million

Buildings
mapped
(6.3% of all
buildings in the
world)

1,000,000+
downloads of
HOT's data

Mapped an area
home to
1.02 Billion
people

Open geospatial data used to support the following impact areas



Climate Resilience & Sustainability

Developing strategies to mitigate potential climate impacts, enhance community preparedness, and ensure that communities grow in environmentally sustainable ways.



Disaster Response

The rising impact and scale of humanitarian emergencies on vulnerable populations make the demand for data-driven disaster response even more pressing. Open geospatial data provides government agencies and first responders with critical information to take more informed and locally appropriate action when a disaster or humanitarian crisis hits.



Created by Creative Mania
from Noun Project

Urban Development

Urban resilience, access to basic services, waste mgmt, transport, etc.

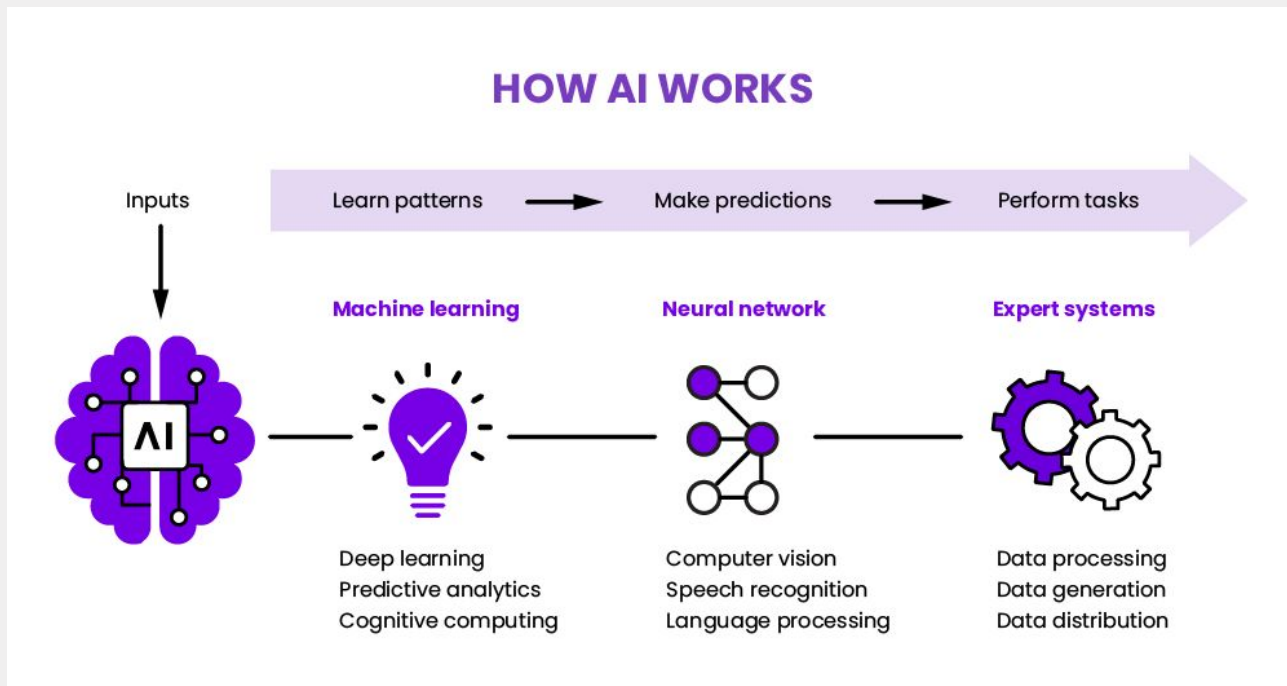


Created by John Kook
from Noun Project

Displacement & Safe Migration

Supporting those forced from home including IDPs, refugees, and asylum seekers

What is AI ? How it works ?



The problem

Globally, there are approximately 300 to 450 major natural disasters reported every year. During 2025 these events affected 115,45* million people affected (annually)* .

LACK OF DATA

Organizations and communities responding to climate-related disasters frequently lack accurate and timely map data relating to damaged infrastructure.

AI PREDICTIONS

Using AI to generate disaster damage assessments offers speed but raises some challenges with **accuracy**, **reliability** and **context** due to algorithmic **bias**, lack of contextual understanding, and **data quality** (false positives and negatives).



The Solution : fAlr

The screenshot shows the fAlr website. The navigation bar at the top includes the fAlr logo, links for 'EXPLORE MODELS', 'LEARN', 'ABOUT', and 'RESOURCES', and a user profile for 'OmranNAJJAR'. The main hero section features the text 'YOUR AI MAPPING PARTNER' and a description of the AI-powered assistant. Two buttons, 'CREATE MODEL' and 'START MAPPING', are prominently displayed. The background of the hero section is a dark image of a laptop displaying the fAlr interface. A sidebar on the right contains four statistics: 136 Published AI Models, 258 Total Registered Users, 2,898 Human Feedbacks, and 16 Accepted Prediction.

fAlr

EXPLORE MODELS LEARN ABOUT RESOURCES

OmranNAJJAR

YOUR AI MAPPING PARTNER

AI-powered assistant that amplify your mapping efforts intelligently and quickly, helping you map smarter and faster.

CREATE MODEL **START MAPPING**

Tasking Manager

Search features

EXPLORE PROJECTS MY CONTRIBUTIONS LEARN ABOUT SUPPORT US

CHINHOYI URBAN RENEWAL, ZIMBABWE - #200

COMPLETION INSTRUCTIONS HISTORY

136 Published AI Models

258 Total Registered Users

2,898 Human Feedbacks

16 Accepted Prediction

Use of GeoAI in disaster

Problem :

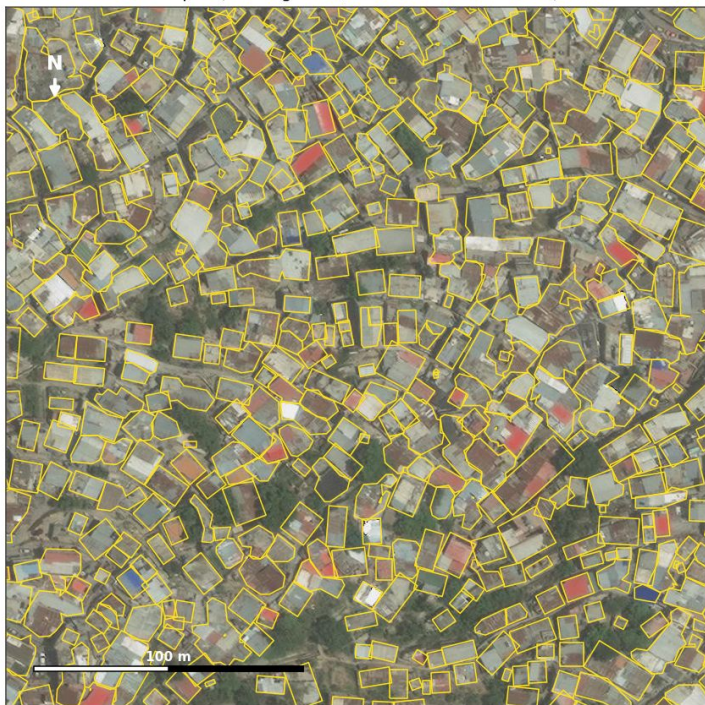
- **Lot of different AI** sources out there
- Rapid data generation but How can we increase the **trust** ?
- **Human in the loop** is important in disaster
- Estimation might help , there are different stages in disaster and based on when we respond the product differs ! How can we insure how it can be used responsibly ?

How AI Helped ?

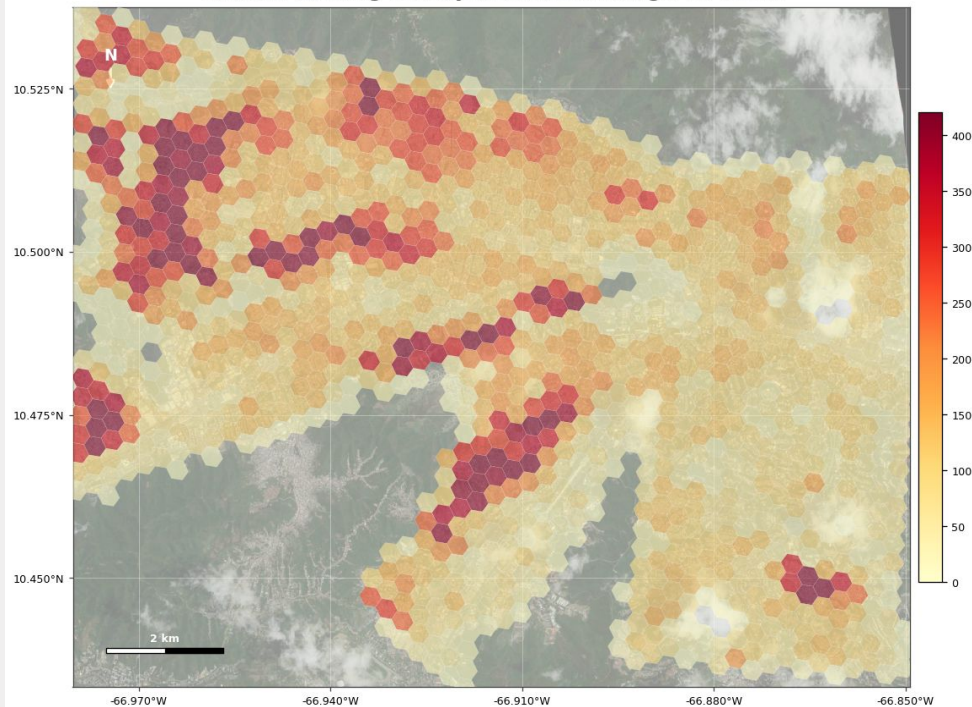
Estimating Density

During rapid disaster estimation of where people might be in the effected area is crucial

Crop 1 (buildings: 456, native 0.0024° ~ 260 m)



Caracas: building density (158,271 buildings, H3 res-9)



Damage Predictions

After which using Pre and Post Imagery , AI predicted the damaged Area



AI Sources Fusion

After which we quickly fused multiple sources to assess where all of the sources align to find out the areas where all different AI align !



Is it enough ?

Problem : How can we validate that ? In doing so how can we do it in scale ?

The solution: MapSwipe Powering Humanitarian Response

[MapSwipe](#) is a tool which enables harnessing the collective strength of volunteers to contribute to geospatial data.

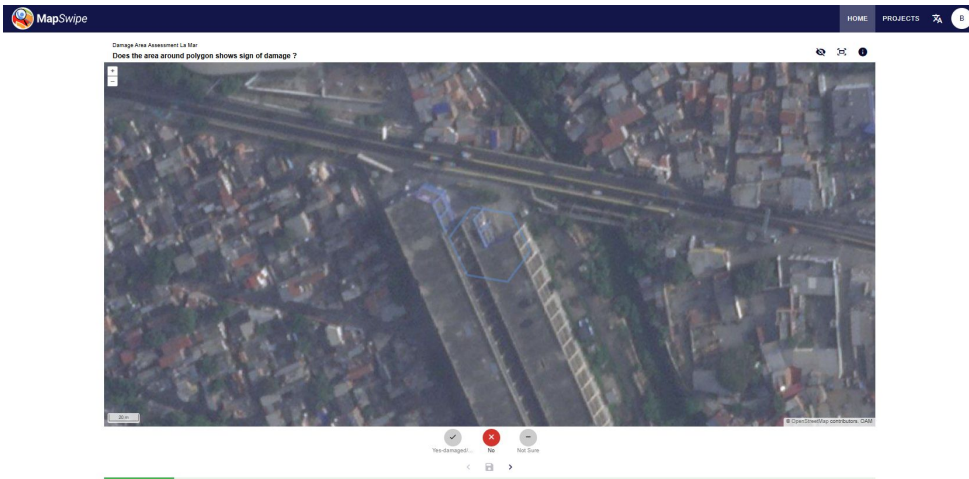
Integrating **Human-in-the-Loop (HITL)** validation is a strategy to mitigate AI failures in post-disaster response and to improve AI model predictions.



HOT has used MapSwipe to verify damage assessments made by geoAI models in response to the **Venezuela Earthquake**.

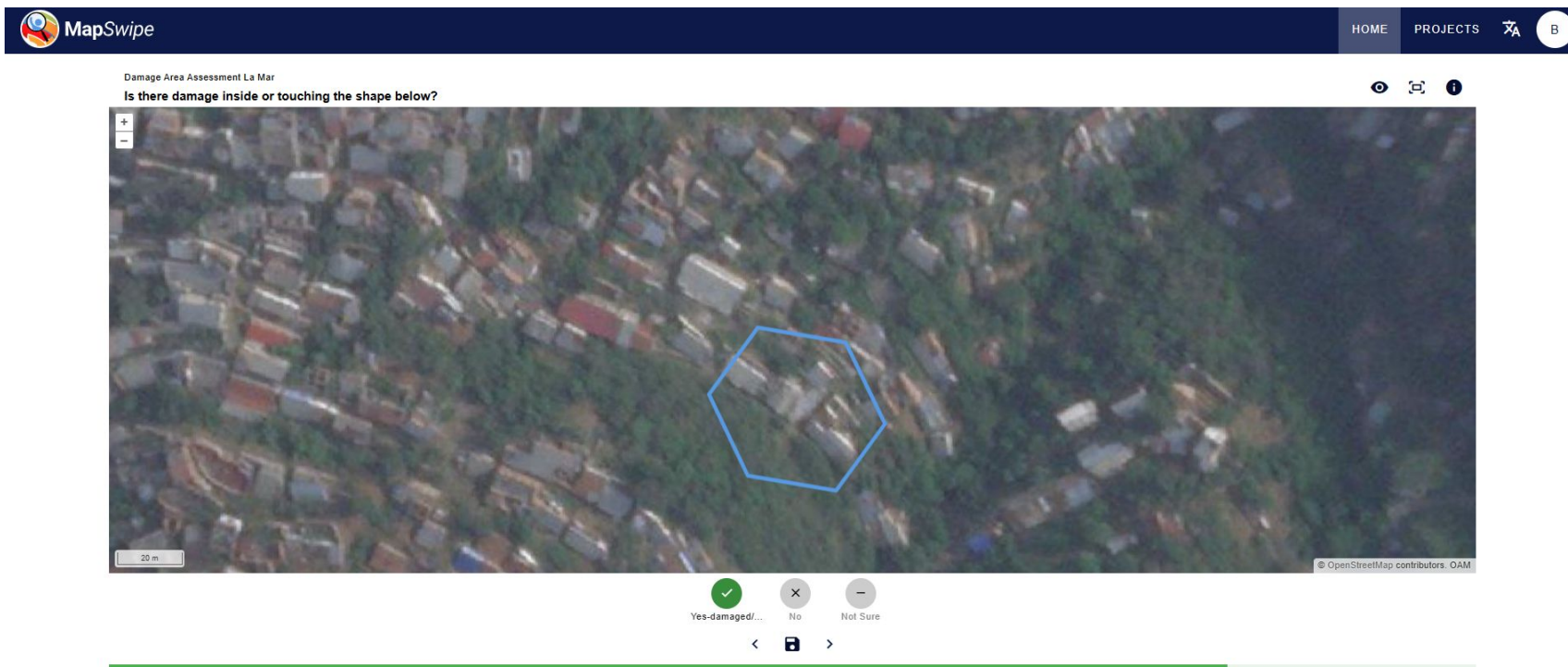


Buildings Damage assessment: AI-derived building footprints and building-level damage. Damage comes from up to three independent AI sources.



Community contributing on MapSwipe to include Human in the loop verifying AI building damage predictions

Human in the Loop: Human Validating buildings damage in Venezuela



In **4 days**

600 volunteers contributed to different MapSwipe damage Assessment projects

Human Validation

While the fusion was helpful for quick validation we further extended effort to validate the sources with human Asking the question :

Does this Area suffered from any damage ?

Yes

Uncertain

- ☒ Confirmed damage
- ☐ Uncertain
- ... HOT Activation Area
- ☒ Post-event imagery

8 people reviewed this

What they said:

Damaged : 8 (100%)

Not sure : 0 (0%)

Result: **Confirmed damage**

AI source: **fAlr + Microsoft**, La Guaira

MapSwipe

Get Involved Data Community EN

Validate Footprints – Damage Area Assessment – La Guaira , Venezuela (1) HOT

Validate Footprints Finished

La Guaira , Venezuela

HOT

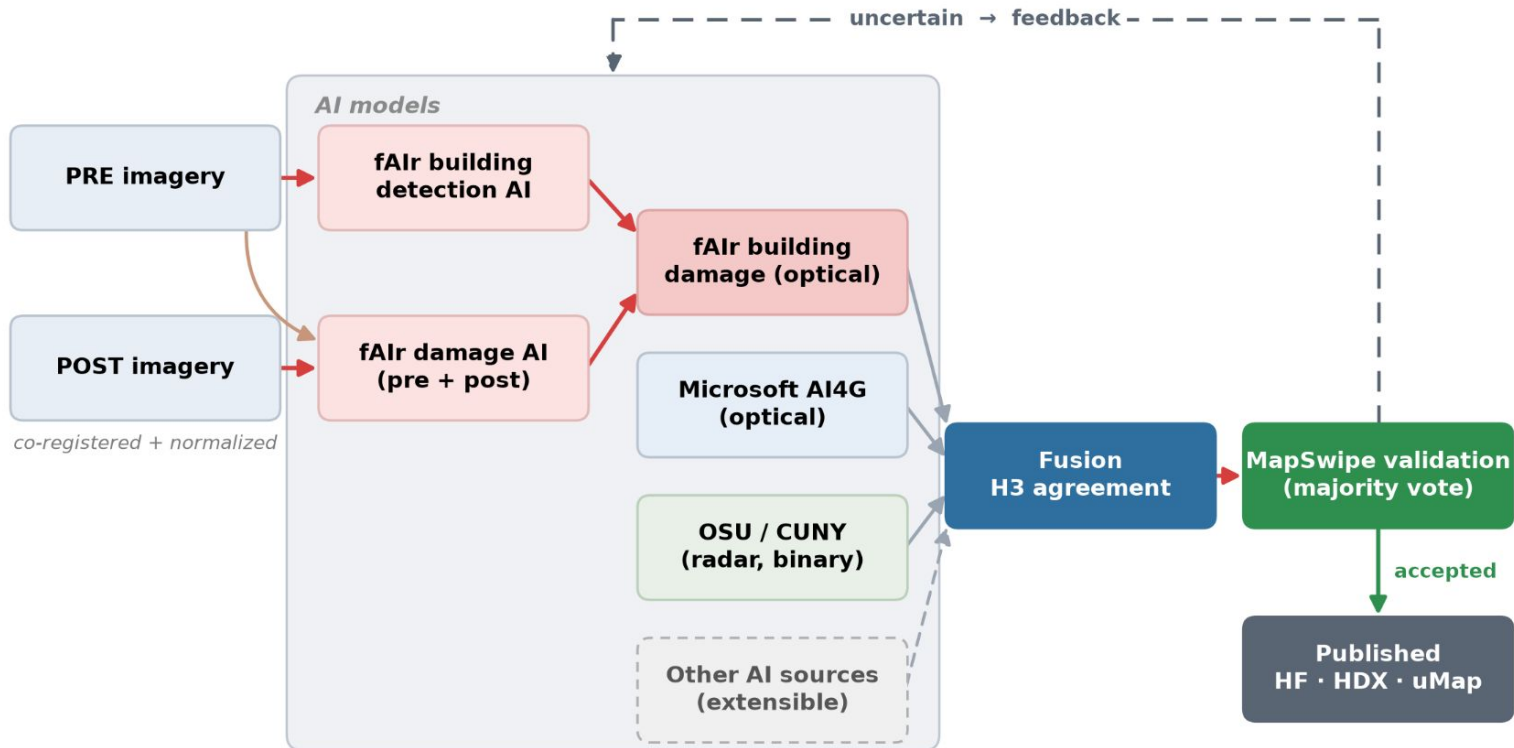
Jun 28, 2026



How all fits together ?



Building Damage Assessment Working Flow



Learnings

- AI Can be deployed in disasters if validated properly in scale
- It should be responsible and we should only publish with caveats
- While it might sound astonishing how AI can help but the real impact can only be enhanced if multiple sources are fused like field data , multiple human validation
- Crowd sourced validation still has caveats but can be improved (Multiple people can be wrong as well)
- Hard to make decisions when vote collide , easy when many people agree but difficult when there is conflict
- Remote validation adds on top as value addition something can be done on scale but doesn't represent the full scale until combined with the field data

HDX

v2.12.10

Search Datasets

DATA

LOCATIONS

ORGANISATIONS

PRODUCTS

ADD DATA

HOME / DATASETS / VENEZUELA - M 7.5 EARTHQUAKE - DAMAGE ASSESSMENT AREA

Venezuela - M 7.5 Earthquake - Damage Assessment Area

GET NOTIFIED

Building damage areas for the M7.5 earthquake that struck Venezuela on 24 June 2026 (GLIDE EQ-2026-000093-VEN), remotely reviewed and validated by the community.

Method: AI detected candidate damage areas on pre- and post-event very-high-resolution optical imagery, aggregated to an H3 grid, then MapSwipe volunteers reviewed each grid area for validation to confirm damage visible from an aerial viewpoint. For the Field, it was crowdsourced from the community on the ground.

Note: the SAR (Sentinel-1 radar) source shown in the methodology figure is not part of this validation, as radar change is hard to confirm by visual inspection of an optical aerial image.

Coverage: Caraballeda, La Guaira, Caracas , Catia La Mar, Naiguata , Moron, El Junquito & Carayaca . The dataset stays updated as areas are completed.

Sources:

- AI detection: HOTOSM fAir (CC BY-NC-SA 4.0) and Microsoft AI for Good Lab (CC-BY 4.0)
- Validation: MapSwipe volunteers
- Imagery: Vantor Inc. 2026 via OpenAerialMap

Scoring: Each area is reviewed by multiple volunteers in MapSwipe. Verdict is the majority crowd decision at a 50% threshold. If more than half the votes agree on one answer it becomes the verdict (confirmed visible damage via aerial image/earth observation or uncertain); otherwise if no clear majority : the area is uncertain. Every area carries its full vote breakdown, so you can re-assess with your own threshold (default 50%).

Caveat: The crowd-sourced analysis data were visually confirmed by volunteer validators using only post-earthquake aerial imagery and not ground truthed. Please examine the vote counts for each hex area and consider the overall distribution of responses as opposed to any area for full confidence. Some areas may be difficult to classify from optical imagery alone due to factors such as image resolution, the absence of comparable pre- and post-event imagery, and the subjective judgments of the crowd due to which coverage won't be complete. For absolute verification data kindly check the field validated data attached within the dataset

Full data: https://huggingface.co/datasets/hotosm/venezuela_eq_2026

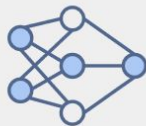


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Open Calls



Open Call for Earth Observation GeoAI Models



Up to USD \$3,000 per accepted model

Our vision

GeoAI models are being developed in universities, research labs, and companies around the world. At the same time, communities are working to map the places where they live but often lack access to these technologies.

We're inviting the global GeoAI community to collaborate with HOT and help make open, community-driven GeoAI more accessible for humanitarian action.



Ready to collaborate with HOT?

Submit your proposal!

Scan the QR code or visit:

<https://bit.ly/4bF4lha>





THANK YOU