ISCN Global Mixer 46

Tectonic shift in urban disaster response

How GeoAI enables effective response
when disaster strikes cities

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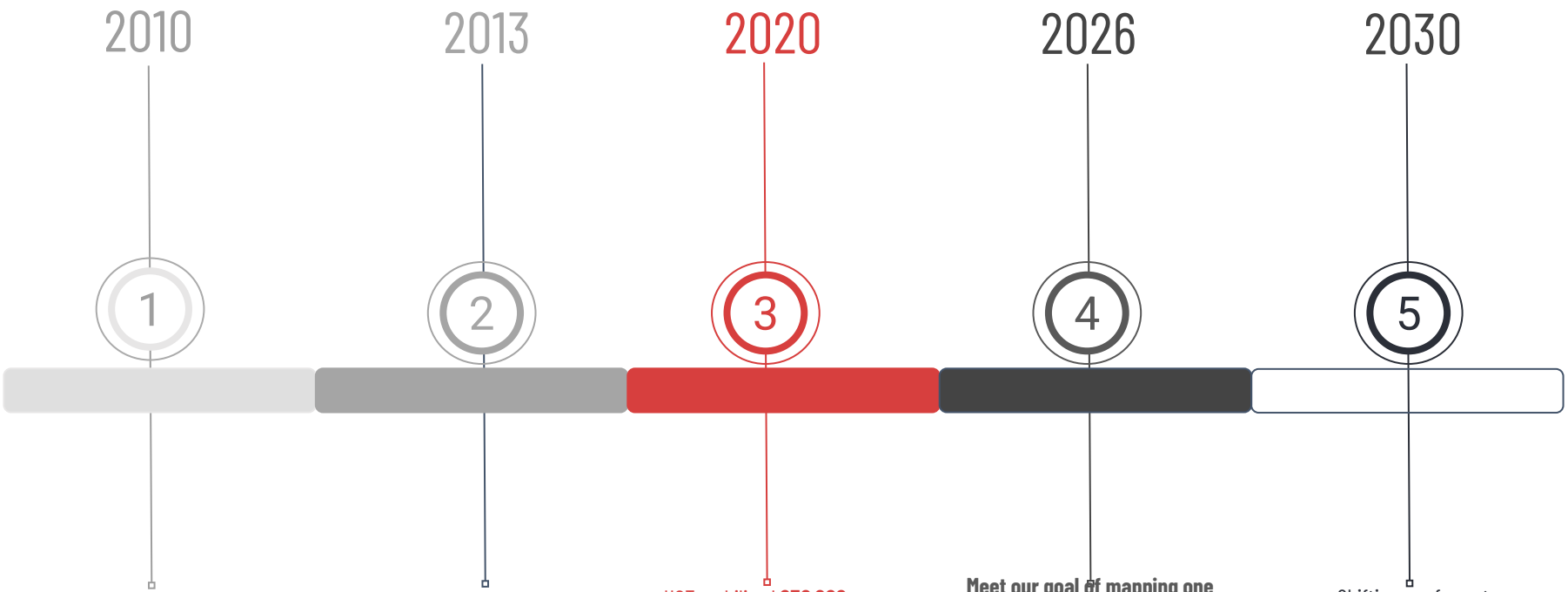
Federal Ministry
for Housing, Urban Development
and Building

Smart City
DIALOG
International Smart Cities Network

Role of GeoAI in Damage Assessment for Disaster Response

HOT MapSwipe

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


2010
2013
2020
2026
2030
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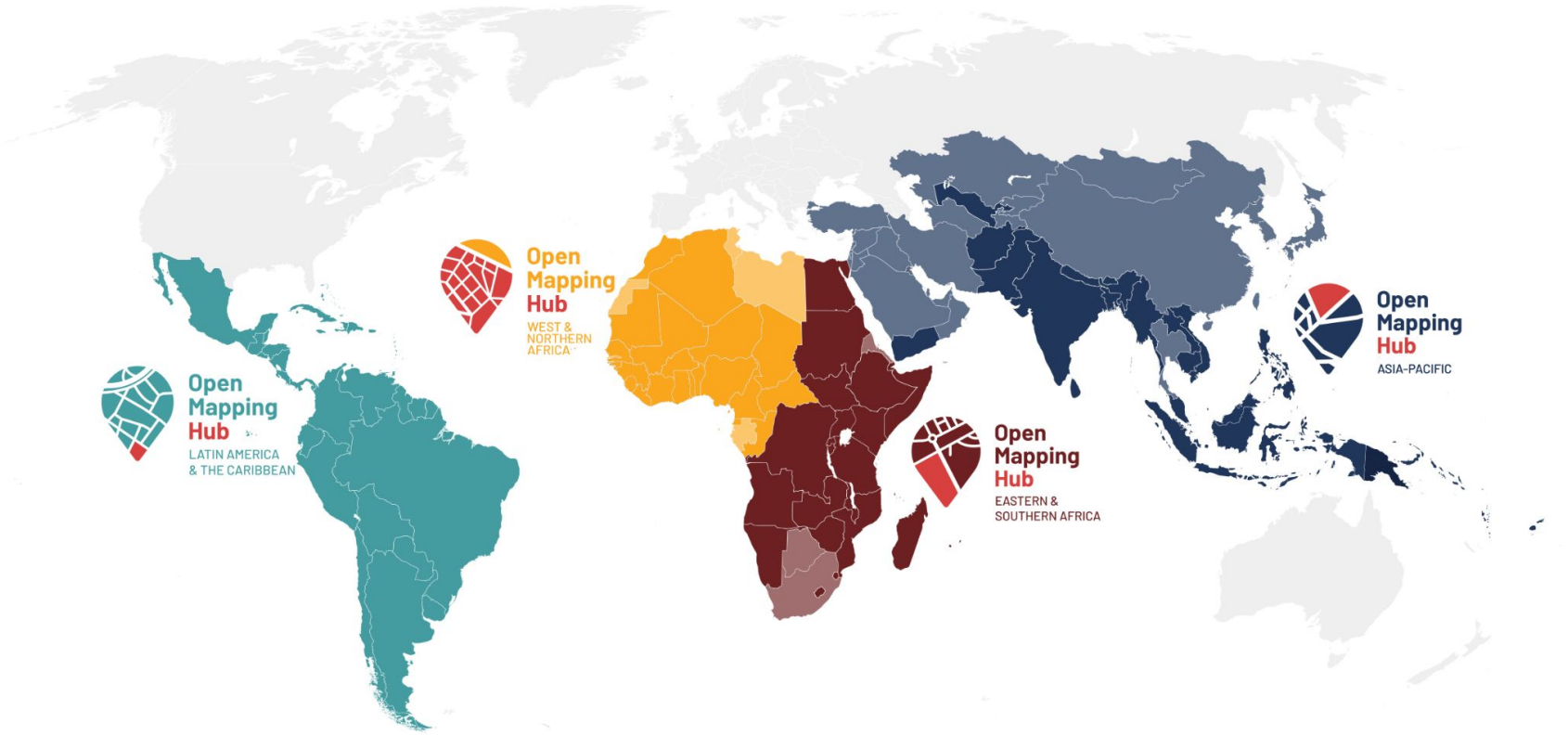
HOT was created to tackle an urgent and critical issue for vulnerable communities in regions facing climate crises, natural disasters and poverty. Vast areas of the world, home to **one billion people, were unmapped**
HOT is registered as a 501(c)3 charitable organization.
HOT mobilized **250,000 mappers**, partnered with leading global humanitarian and development organizations, and built world-class open source technology for those living and working in the most resource constrained places worldwide
Meet our goal of mapping one billion people mobilizing 750,000 mappers in 60+ countries. Created a global movement, driving resilience and equity through geospatial data. Our data has now been downloaded 1,000,000 times, influencing hundreds of millions of dollars investments .
....Shifting our focus to building local capacity and strengthening local mapping

HOT is working to strengthen open data in 4 priority regions

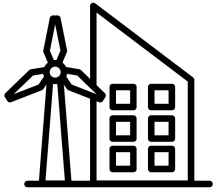
Humanitarian OpenStreetMap Team



Key Outcomes

Humanitarian OpenStreetMap Team

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

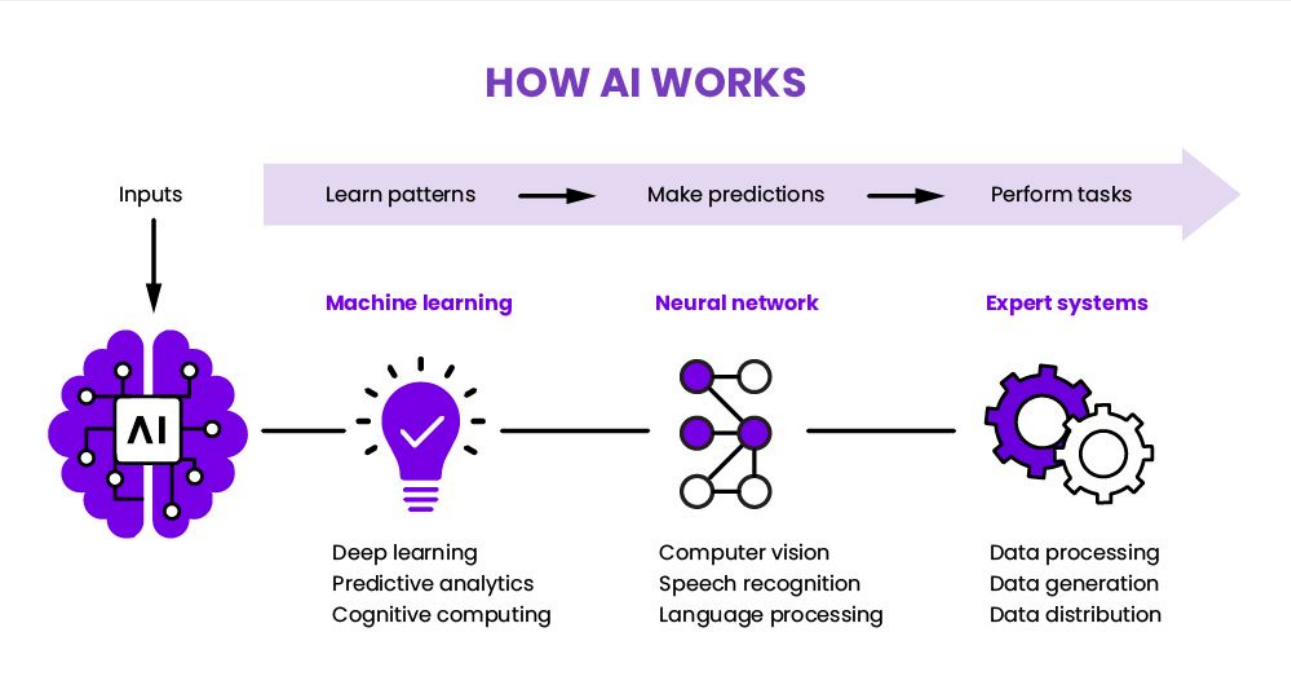
Urban resilience, access to basic services, waste mgmt, transport, etc.

Created by John Kock
from Noun Project

Displacement & Safe Migration

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

What is AI ? How it works ?



https://www.pageon.ai/blog/deep-search

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

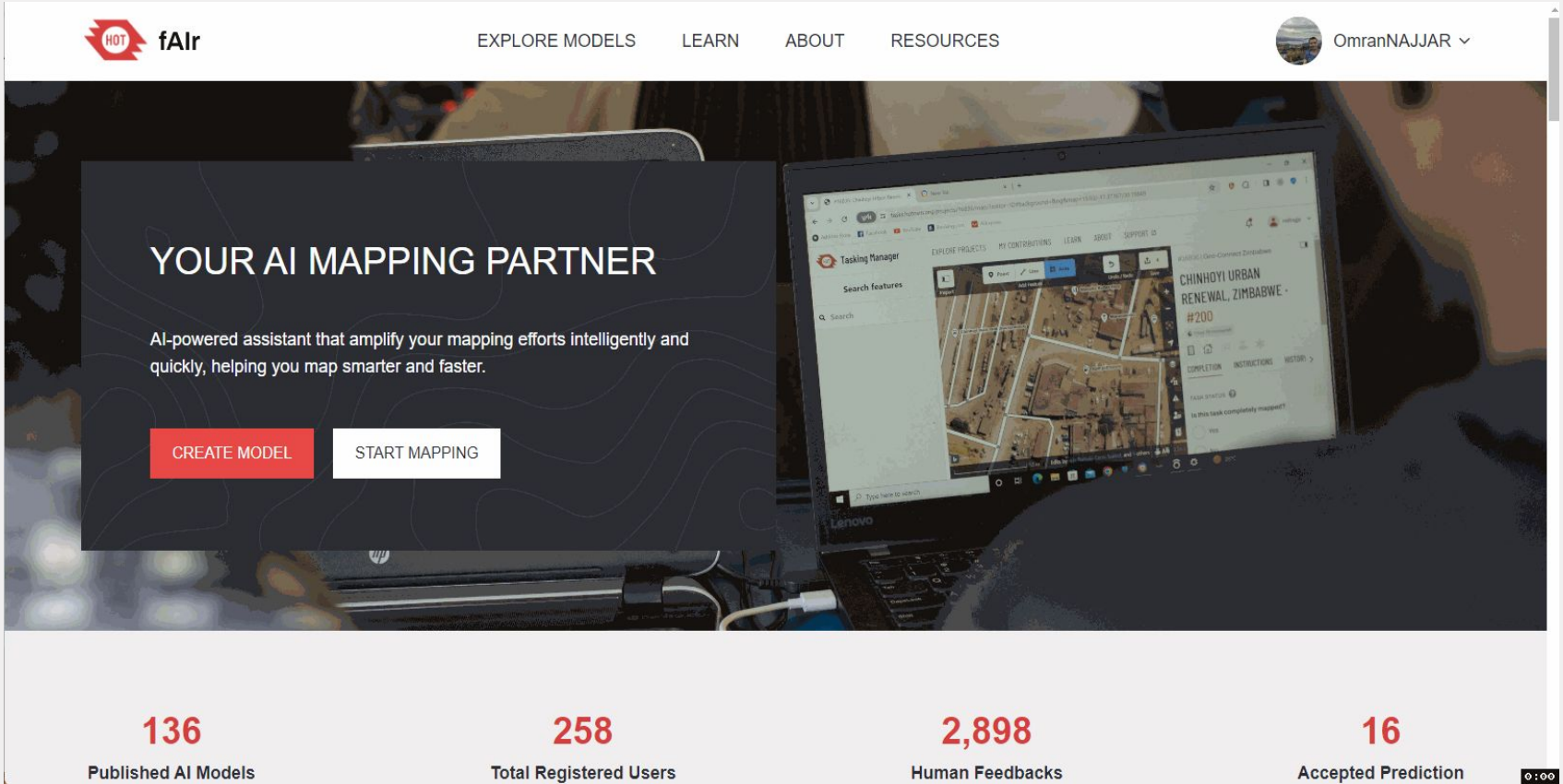
Organizations and communities responding to climate-related disasters frequently lack accurate and timely map data relating to damaged infrastructure.

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).

*Our world in data Link

The Solution : fAIr



Use of GeoAI in disaster

Problem :

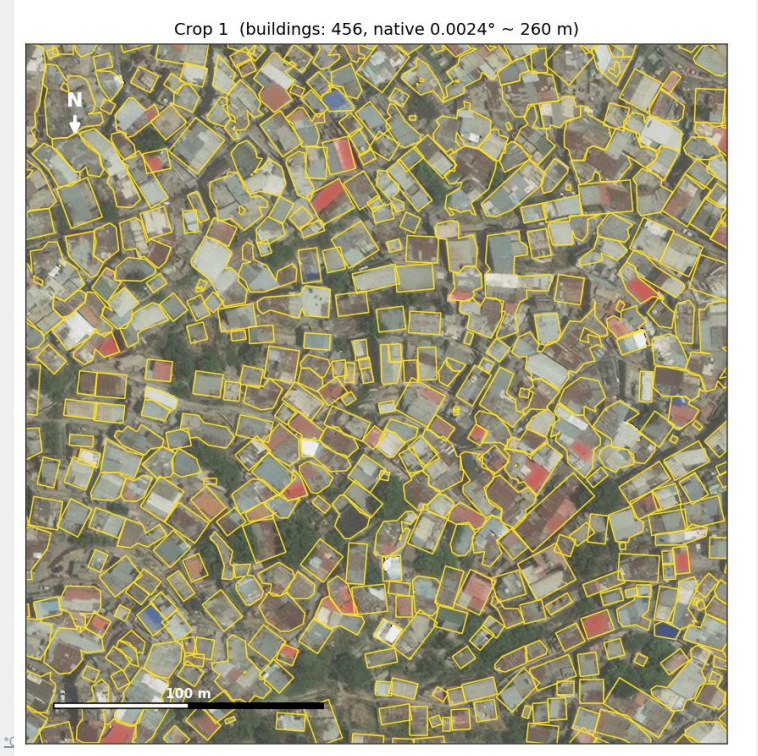
- **Lot of different AI** sources out there
- Rapid data generation but How can we increase the **trust** ?
- **Human in the loop** is important in disaster
- Estimation might help , there are different stages in disaster and based on when we respond the product differs ! How can we insure how it can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

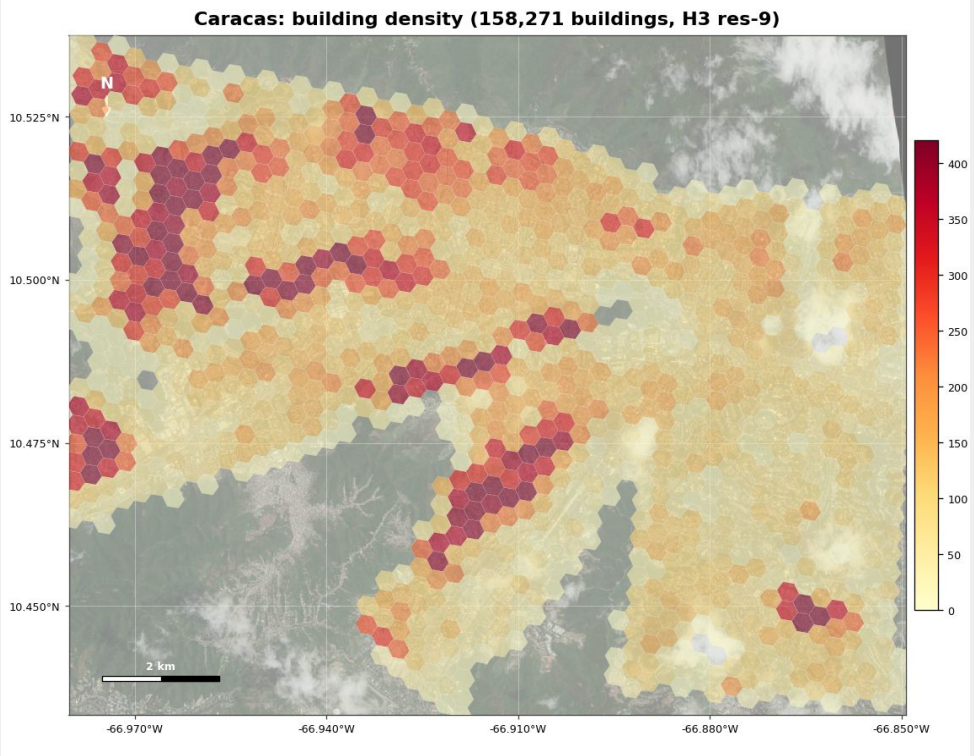
How AI Helped ?

*Our world in data Link

Estimating Density

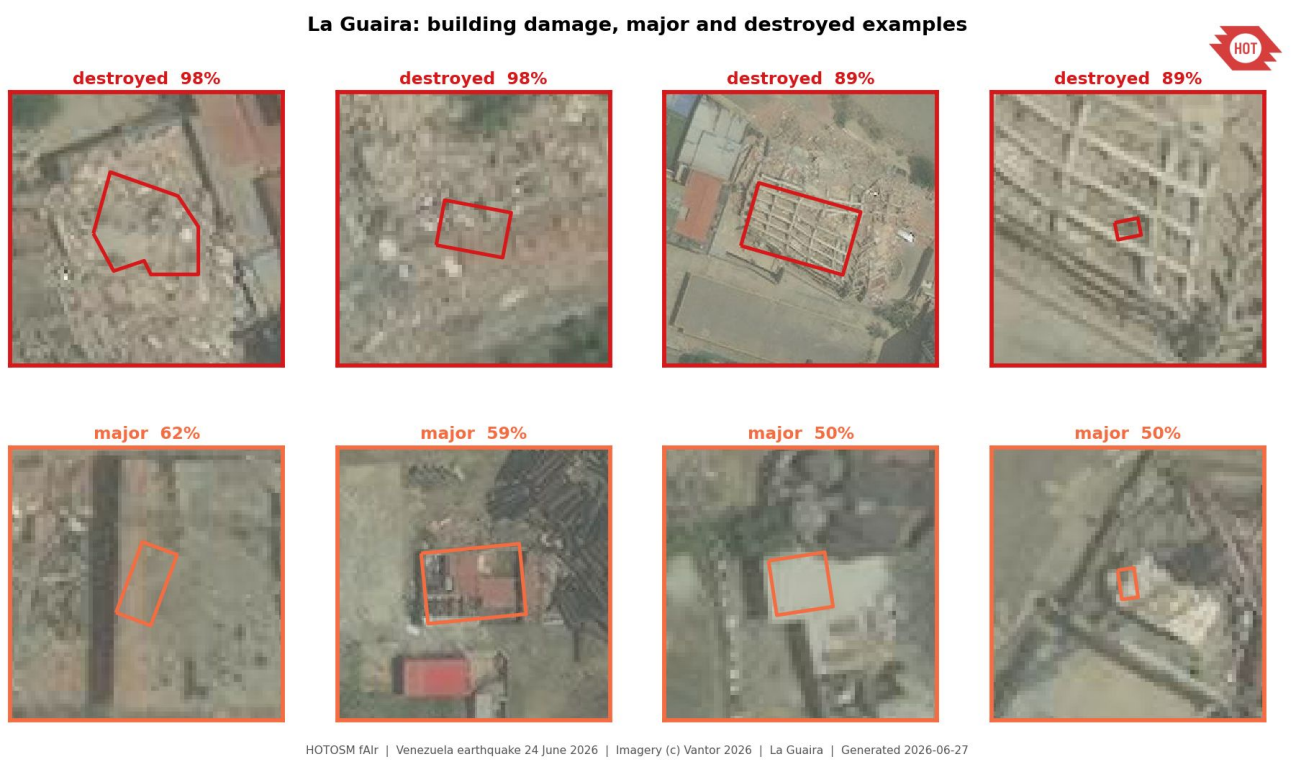
During rapid disaster estimation of where people might be in the effected area is crutial





Damage Predictions

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



*Our world in data Link

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 !

*Our world in data Link

Is it enough ?

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

*Our world in data Link

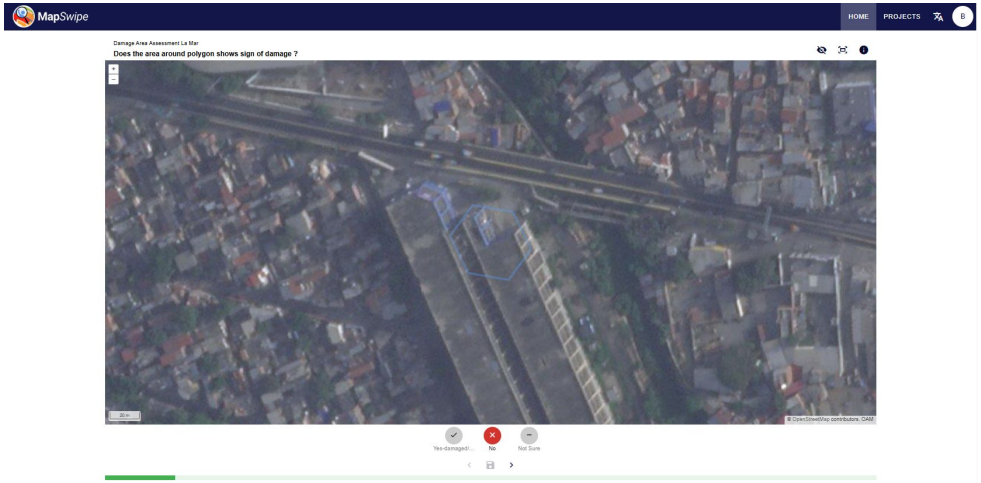
The solution: MapSwipe Powering Humanitarian Response

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.

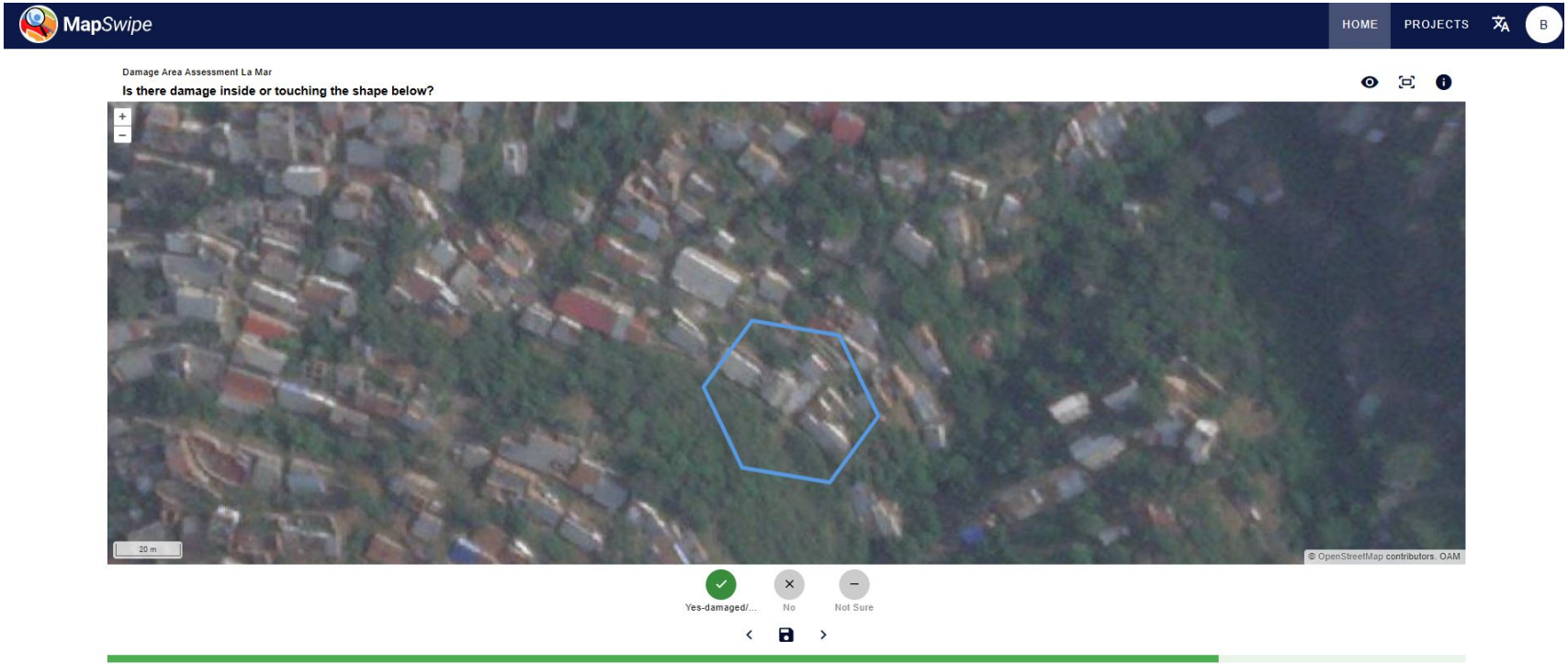
HOT has used MapSwipe to verify damage assessments made by geoAI models in response to the **Venezuela Earthquake**.

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

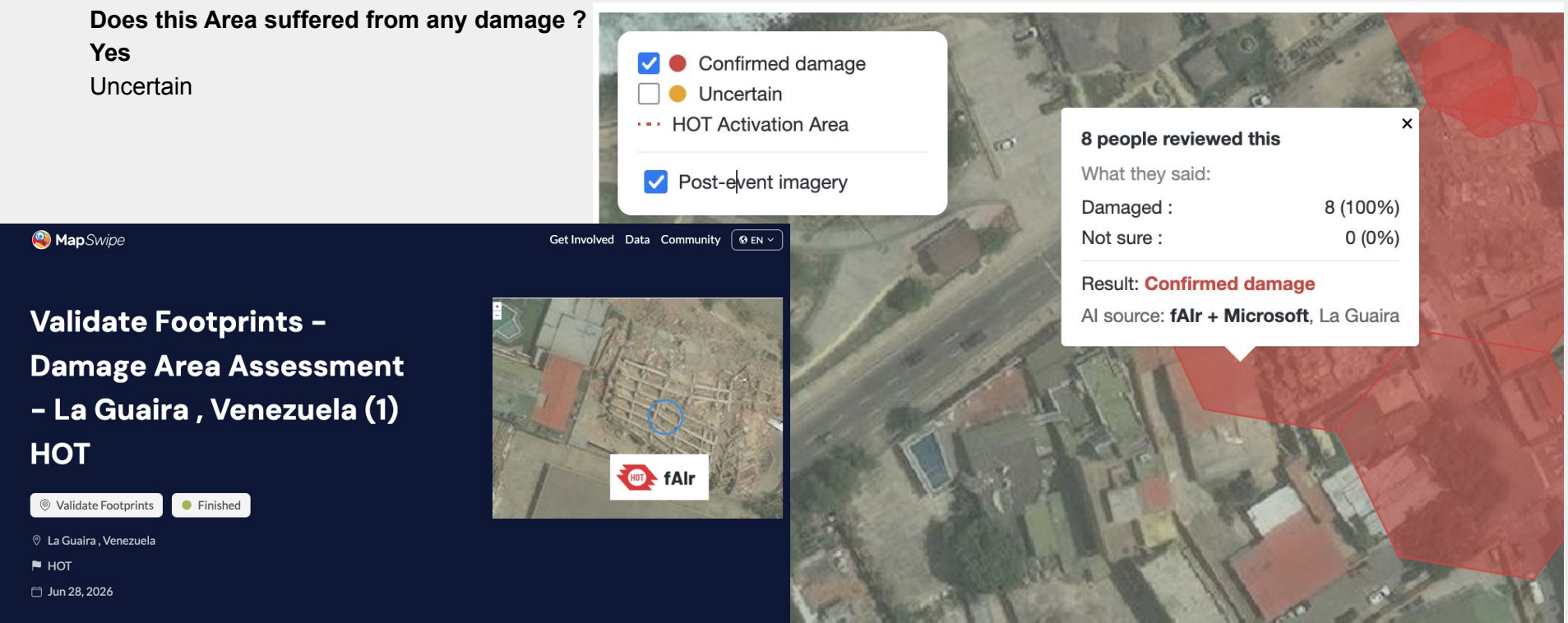
Human Validation

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

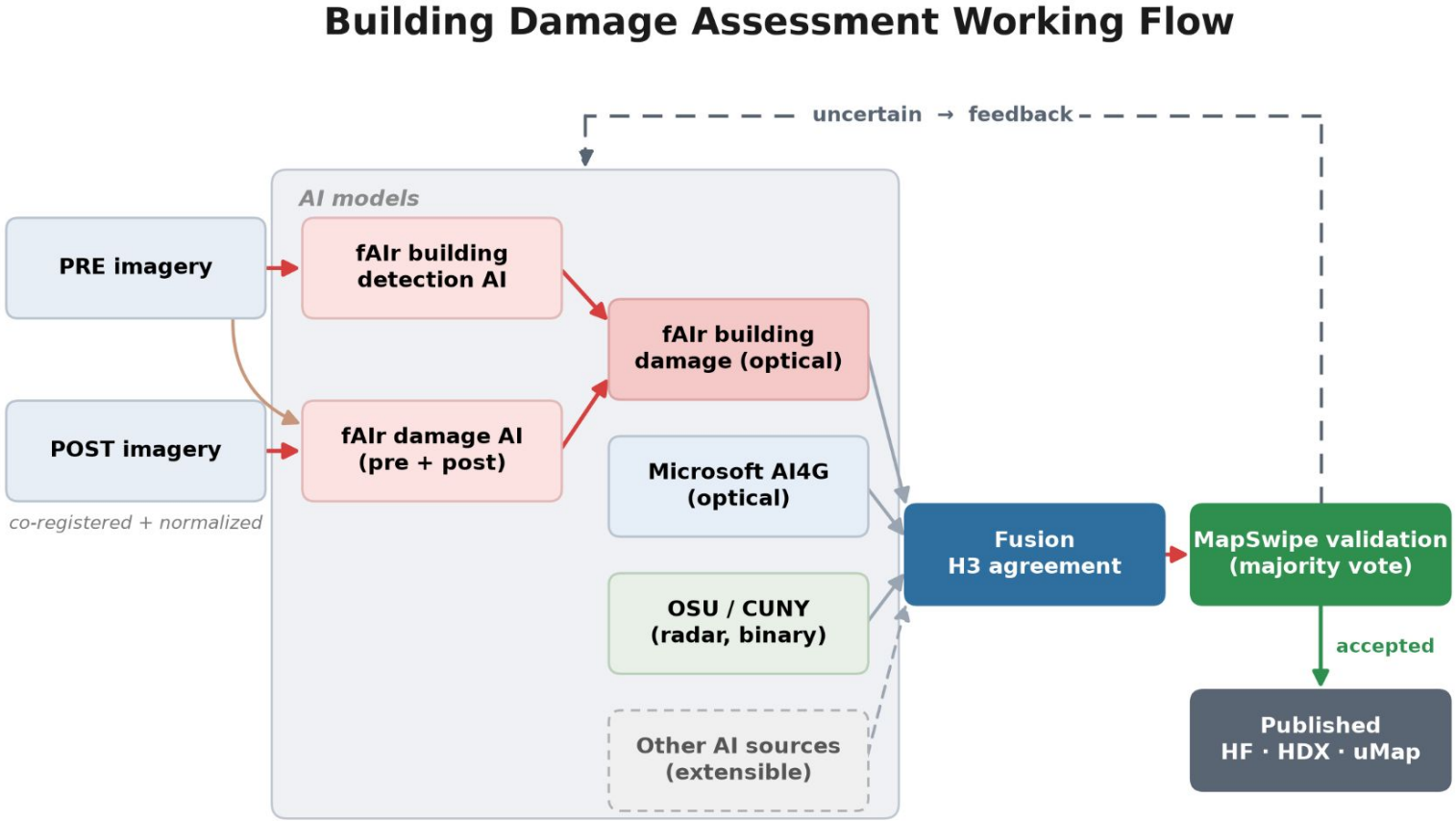
Does this Area suffered from any damage ?

Yes

Uncertain

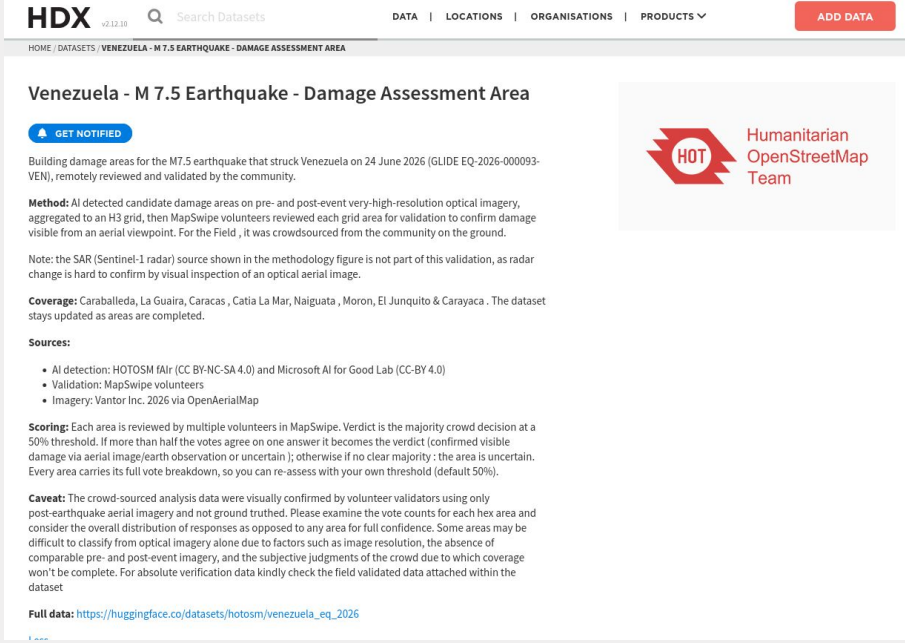


How all fits together ?



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



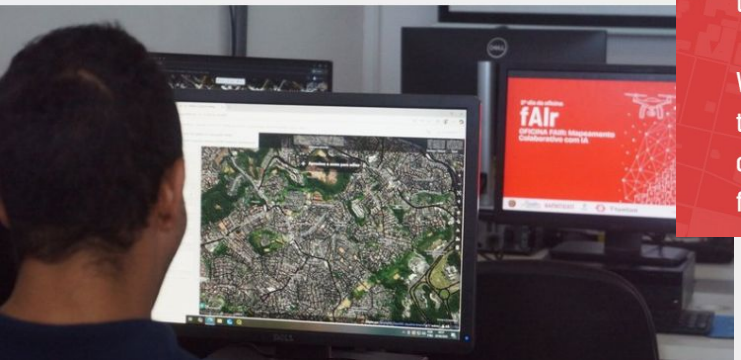
*Our world in data Link

Open Calls

Humanitarian OpenStreetMap Team

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

Humanitarian OpenStreetMap Team


HOT
THANK YOU