AI for Good

The role of GeoAI and Foundational Models in shaping an AI-driven future for all

9 July 2025

14:00 - 17:15 CEST

GeoAI and the UN Geospatial Network

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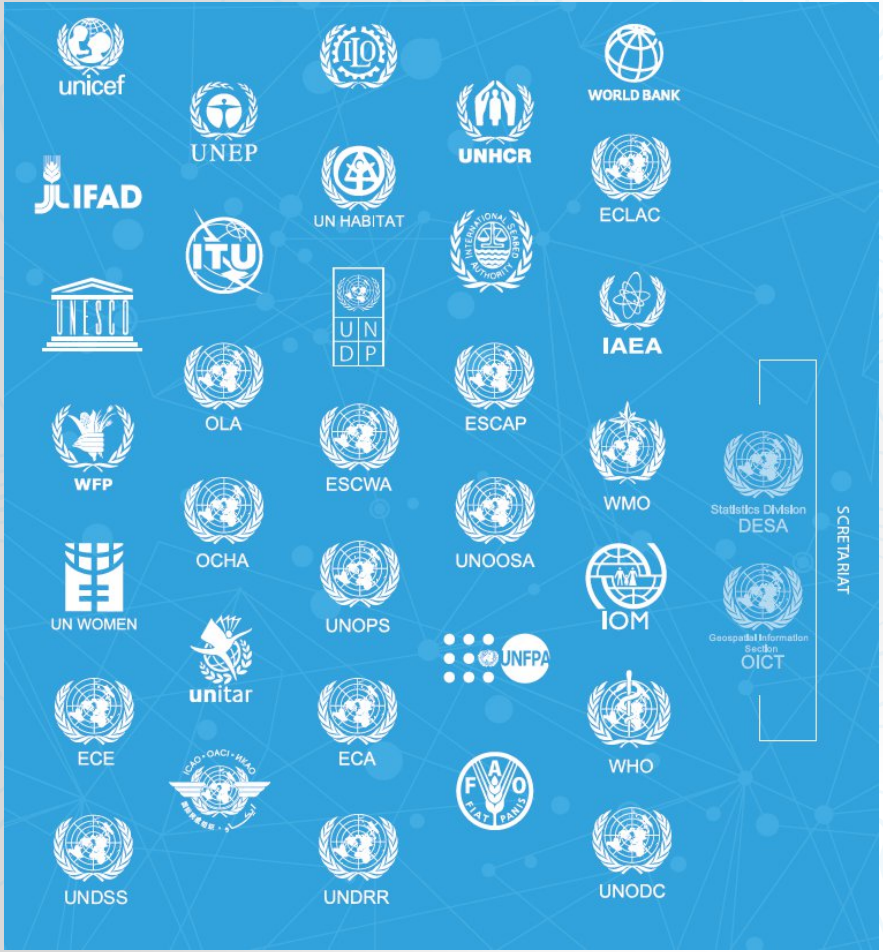
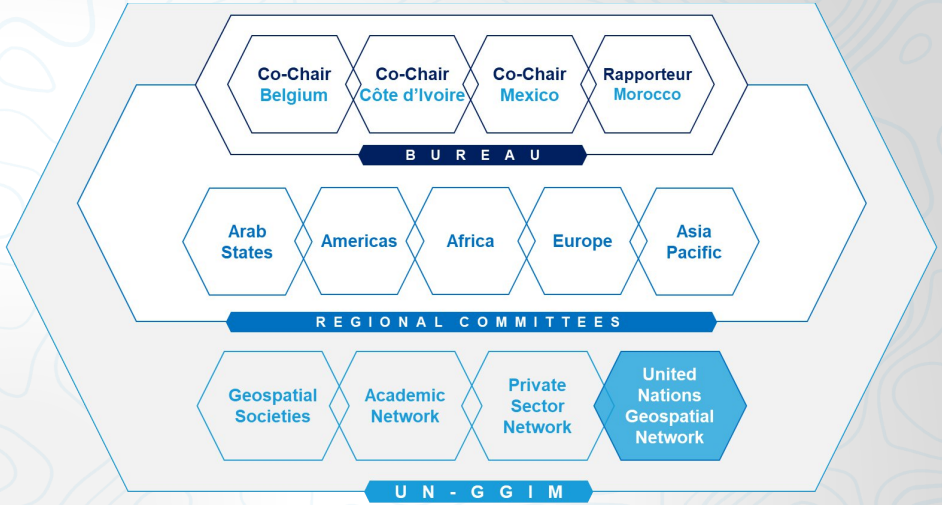
UN GEOSPATIAL NETWORK
UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT





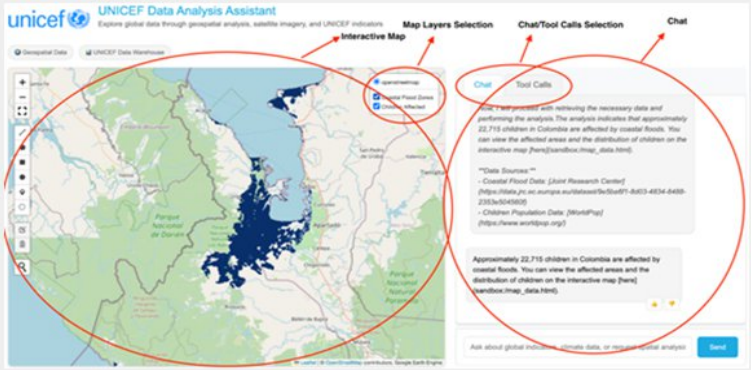
UN-GGIM Objectives

- Reports directly to ECOSOC as a formal inter-governmental body
- Coordinates global geospatial information management among Member States
- Sets joint directions for geospatial use in national and global policy
- Addresses global issues through shared geospatial knowledge
- Strengthens geospatial capacity, especially in developing countries
- Promotes timely, reliable, and accessible geospatial data for development.

GeoAI applications in UNICEF

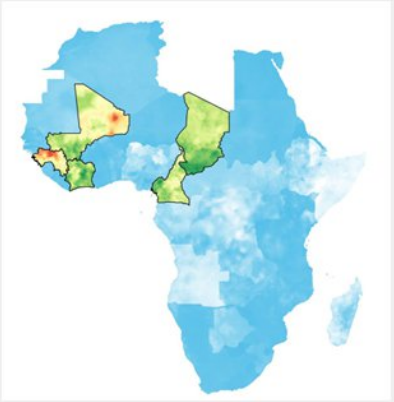
Geosphere – Generative GeoAI to directly query global hazard and children vulnerability data

UNICEF has developed a prototype of a generative GeoAI tool that can be used to query curated, authoritative dataset on hazards, exposure and vulnerability of children. The tool can be expanded to query any geospatial data. One could ask 'how many children are exposed to coastal floods in Colombia' and the tool automatically does a zonal statistics and zooms to the location of the results.



High-resolution mapping of unvaccinated children in Western and Central Africa

UNICEF Combines Satellite-based Machine-Learning population estimates with geostatistical products of vaccination status coverage to provide highly granular datasets of unvaccinated children ("zero-dose") to accelerate identification and reach of missed children with combined vaccination and birth registration services. (Chad, Coite D'Ivoire, Mali, Cameroon, Guinea)



SKAI – Satellite Imagery Damage Assessments: Project partners and status

disha

- Data Insights for Social and Humanitarian Action (DISHA) is the flagship AI work of the UN Global Pulse, the Secretary-General's Innovation Lab
- DISHA works to make it easier for humanitarian organizations to access operationally relevant insights for disaster management

Google Research

- SKAI Project: machine learning-based damage assessment for disaster relief, open source
- Base model developed in collaboration with the United Nations World Food Programme (WFP) Innovation Accelerator

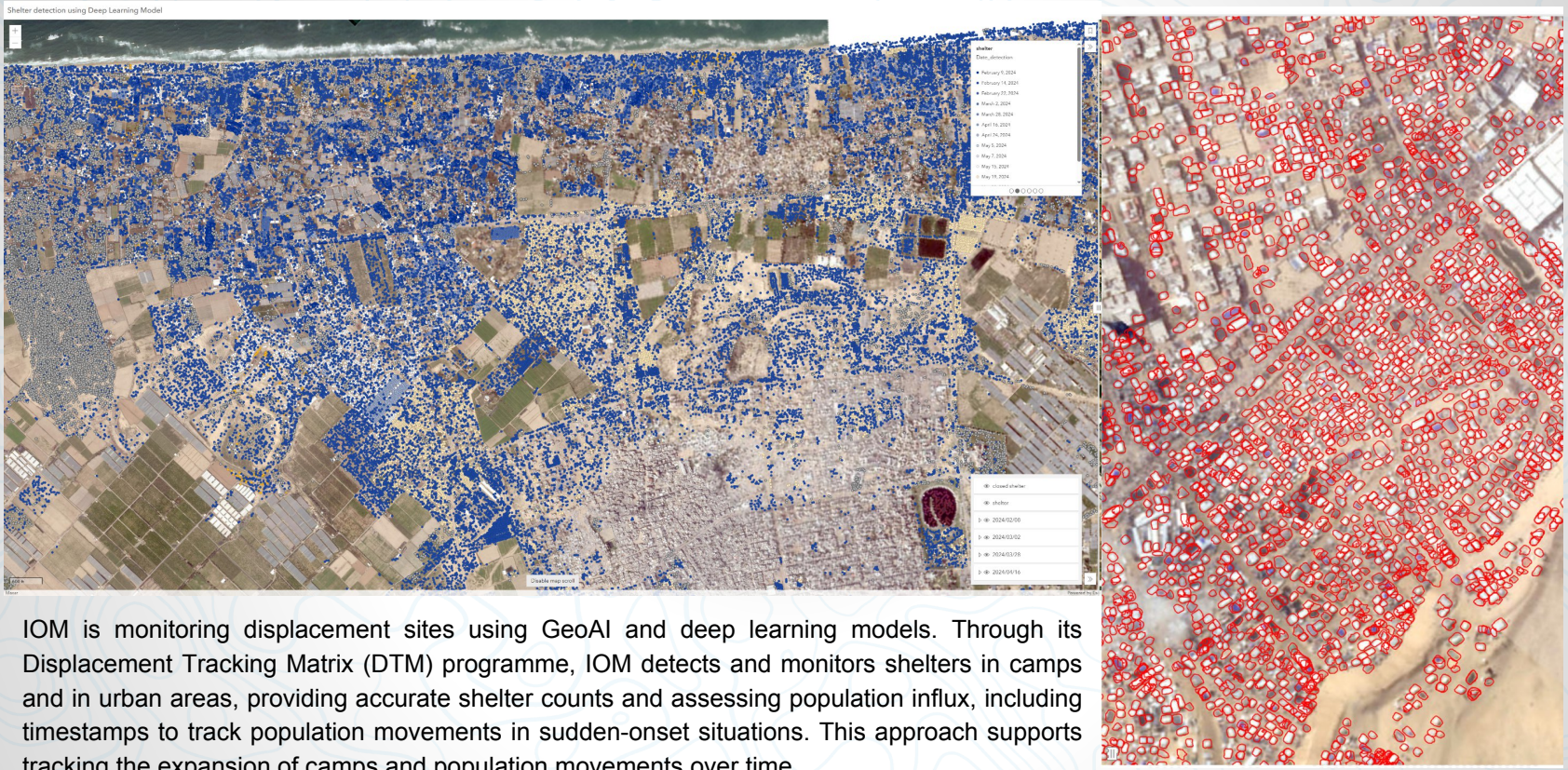
UNOSAT

- Provide advice and guidance on operational use
- Develop and deploy SKAI with Google and UN Global Pulse
- Test results and provide feedback

Current Status

- Accuracy ranging from 66%-89% when applied to large scale 'catastrophic' events. Much larger areas addressed than with human analysts only.
- UNOSAT analysts training to use the SKAI system operationally.
- Model and system improvements scheduled throughout 2025 (on github).

Leveraging GeoAI for Displacement Monitoring

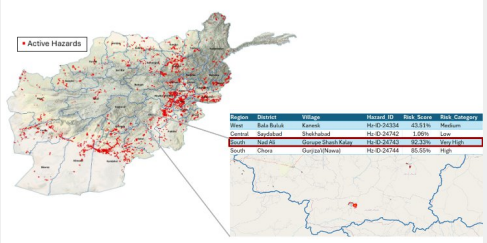


IOM is monitoring displacement sites using GeoAI and deep learning models. Through its Displacement Tracking Matrix (DTM) programme, IOM detects and monitors shelters in camps and in urban areas, providing accurate shelter counts and assessing population influx, including timestamps to track population movements in sudden-onset situations. This approach supports tracking the expansion of camps and population movements over time.

UNOPS Innovation in GIS - Leveraging GeoAI technologies

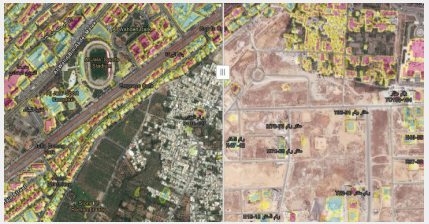
1. Predictive Risk Mapping for Explosive Ordnance (Afghanistan)

UNOPS uses machine learning on Mine Action Explosive Ordnance data, satellite imagery, and terrain factors to map high-risk contamination zones, guiding land release and clearance planning.



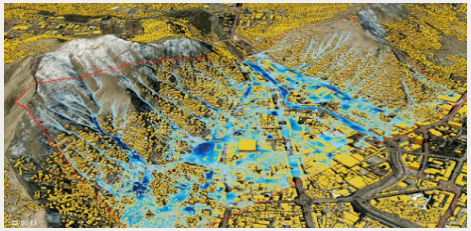
2. Damage Detection from Satellite Imagery (Gaza, Sudan, Ukraine)

GeoAI tools analyze satellite imagery to automatically detect damaged infrastructure, speeding up damage assessments and recovery planning.



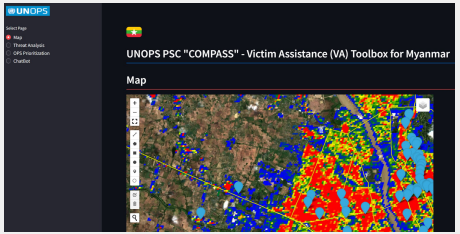
3. Climate-Health Risk Mapping (Caribbean – Hurricane Beryl Response)

GeoAI models process hydroclimatic and health data to identify areas at risk from climate-driven health impacts, supporting early action and resilience planning.



4. Planning and Prioritization for Mine Action (Myanmar)

GeoAI analyzes satellite imagery to detect informal settlements and estimate population density, improving targeting for aid and risk education.

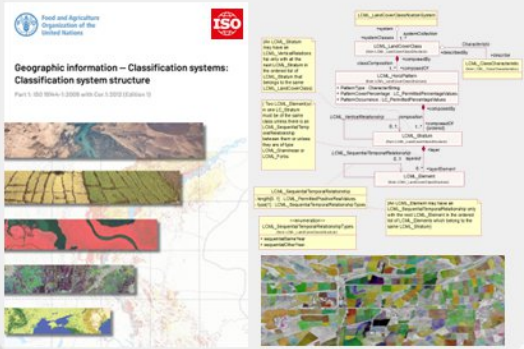


UNHCR is conducting tests on **object detection** and **feature extraction** using high-resolution satellite and drone imagery to identify shelters in refugee settlements.

Leveraging GeoAI for agricultural monitoring

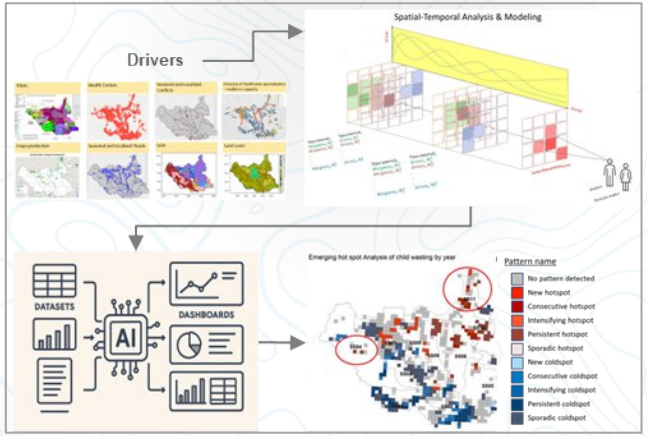
1. Integration of field data for land cover and land use

Adoption of Land Cover and Land Use meta-languages for land classification (ISO-19144-1, 2, 3 and 4). Upgrading deep-learning classification with AI-markup languages. Improving critical agri-infrastructure (e.g. greenhouse, solar panel) mapping through GeoAI.



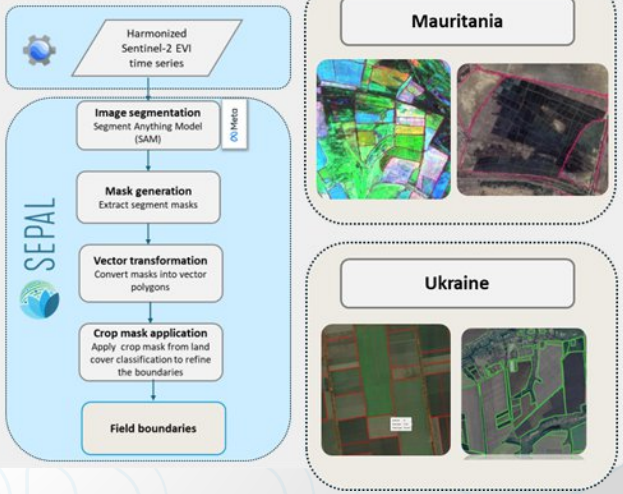
2. Testing the identification of acute malnutrition hotspots

Support malnutrition monitoring programs using GeoAI models to identify persistent and newly acute malnutrition hotspots considering drivers such as vegetation, population, terrain, rainfall, etc using SHAP (SHapley Additive exPlanations) analysis.



3. Delineation of field boundaries for local land characterization

GeoAI-powered field boundary delineation integrates high-resolution remote sensing and time-series vegetation indices to accurately identify individual fields, supporting fine-scale land use analysis, enabling evidence-based monitoring. The approach strengthens food security strategies and digital agriculture through platforms like SEPAL and GEE with standardised geospatial outputs.



Harnessing Geospatial AI for Transport Infrastructure and Energy—Water and Food Nexus in Africa

1. Innovative Technology and Management of Regional Transport Corridors: Application of Satellite Imagery and AI

Use of satellite imagery and AI to:

1. Reconstruct the routes of the African development corridors: the infrastructure network (roads, railways, pipelines, etc.)
2. Assess of the state of the infrastructure. Particularly the road infrastructure: information on the main characteristics of the various sections of road corridors.
3. Manage infrastructure assets of corridor organizations.

2. Use of Geospatial AI and spatial analytics for the energy-water-food nexus in Madagascar

Satellite imagery, geospatial AI, and spatial analytics are used to evaluate the country's renewable energy resources and identify optimal locations.

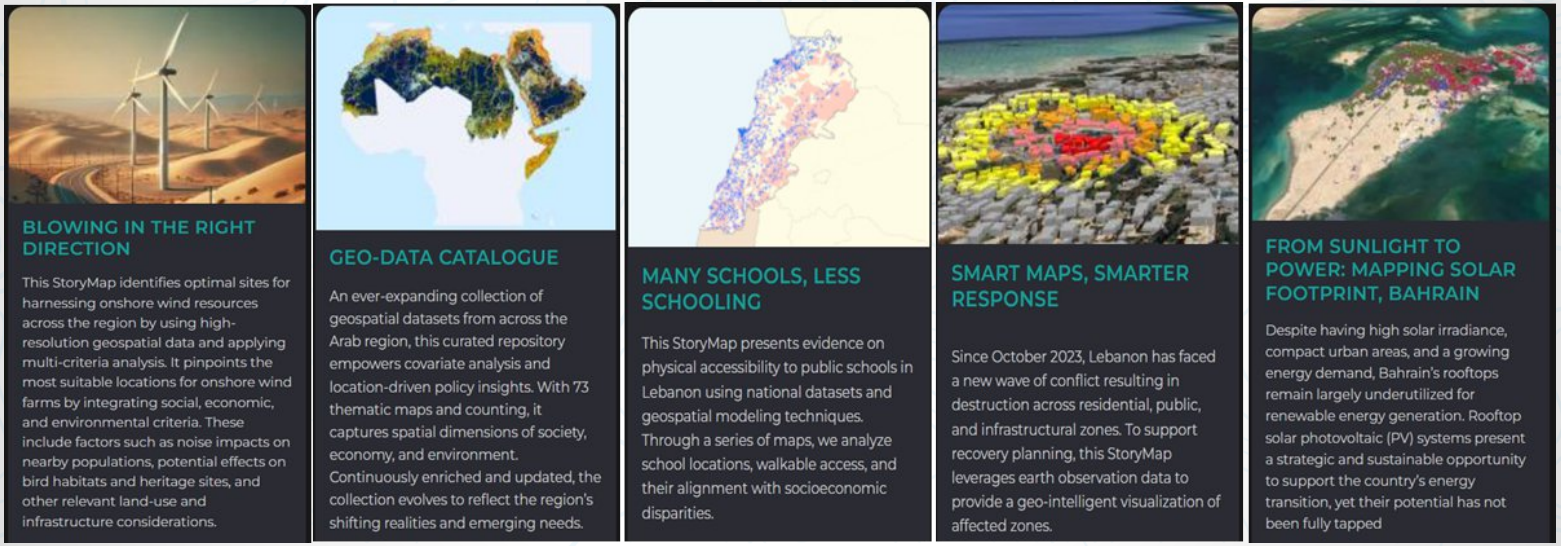
The analysis has also provided essential insights into the spatial distribution of renewable energy, agricultural, and water resources across Madagascar.

ARAB DEVELOPMENT GEO-INSIGHTS PORTAL

Open Maps, Deeper Insights, Informed Governance

Through its Geo-Insights Laboratory under the Decision-Support and Data-Science Division, ESCWA is positioning itself as a regional pivot for Geo-AI data fusion and analysis, providing location-assisted policy insights via multilayered earth observations and enabling pattern recognition to support user-centric policy generation across the Arab region.

For location-assisted policy insights, please visit the Arab Development Geo-Insights Portal.



WHO GeoAI Work: Advancing AI for health through Geospatial Innovation
Key initiatives from the GIS Centre for Health (GISC)

ABLE Project – Building Footprint Extraction

- AI model for detecting building footprints in conflict-affected areas (e.g., Afghanistan, Somalia)
- Fine-tuned using high-resolution imagery and local data
- Supports health infrastructure planning and emergency response

Predictions for Asadabad , Kunar

Shelter & IDP Identification

- Automated detection of tents and shelters in IDP camps (e.g., Baidoa, Kismayo)
- Integration of AI results with online platforms for easy access and analysis
- Used for urban displacement mapping

WHO GeoAI Work: Advancing AI for health through Geospatial Innovation

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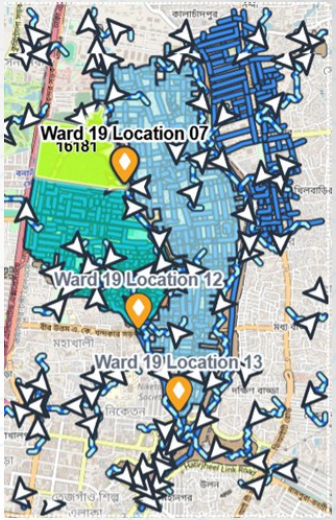
Experimental Detection of Urban Infrastructure Manholes & Blue Lines (rivers/streams)

- Detection using AI/ML Models
- Leverages DEM data and high-res imagery for hydrological and urban planning applications



Generative AI (GenAI) for Health Intelligence

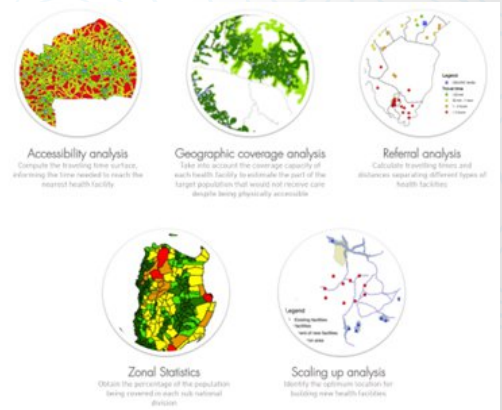
- Internal documents generation (e.g., National Action Plans, Grant Reports)
- Proof-of-concept models trained on WHO documents
- Demonstrated time savings and higher coherence in strategic planning outputs

AI for Trauma Referral Pathways

•Model categorizes hospitals by trauma care capacity

•Uses road network and GIS data to propose optimal referral chains

•Piloted in humanitarian contexts for faster decision-making and evacuation planning



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