



Intelligent Natural Disasters Management

For gathering a more organic, equal, and inclusive world with no one left behind, there is an urgent need to transform the current unsustainable interactions within social ecological systems. The role of emerging technologies in achieving harmonious interactions is crucial.

Address the PROBLEM by

- **Categories (temporo-spatial)**
- **Branches of Application**
- **Risk Components (Threat - Vulnerability)**

Pre-emergency Preparedness - Immersive/Semi-immersive experiences, intelligent simulations of "fragile" (high susceptibility / low resilience) locations, mapping of danger zones (exchange of conditions to visualize the effect on the output), intelligent engines for recreation of inputs-output.

Response during the Emergency -

I. Alarms / Alerts

II. Rescue

Moments before disaster strikes: alerts, and warnings. Alert and warning systems -receivers and transmitters - what type of information and for what, what to do in communities with a minimum of communication resources. During or instants after it happens : updates, recommendations, instructions.

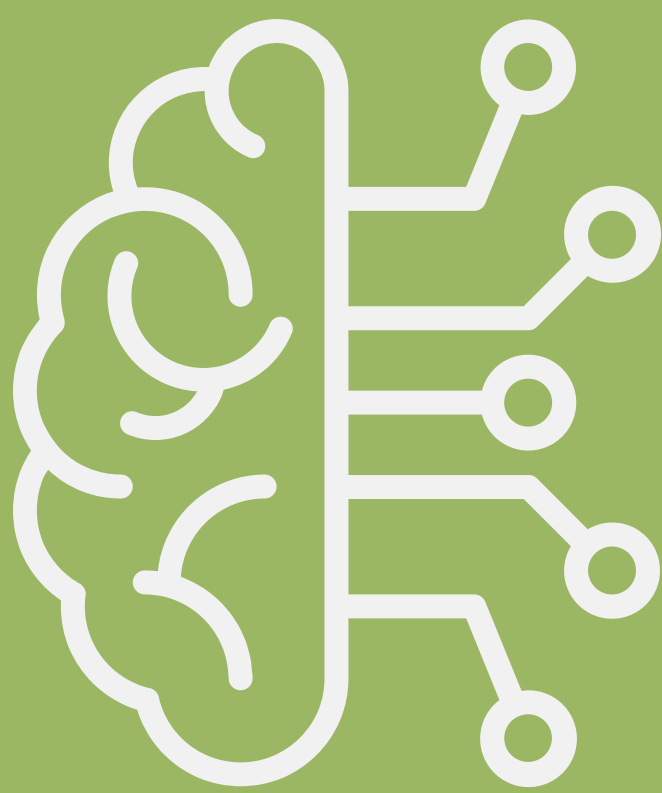
The superposition of information - in parameters maps (2D, 3D) -permits rescue/aid teams to take immediately decisions about evacuations, reparations or calls to external communities for additional help, this "superpositon" must be directed by an automatic/intelligent supervisor.

Recovery post-emergency - Teams(government, private institutions, community) are provided with integral tools to evaluate causes-effects and directly determine how many resources the city and community needs to correct (or minimize) the risk situations and how to improve its resilience for future, which is one of the most effective long-term strategies.

Why NDM must be supported by AI and hybrid technologies

Built environments, which refer to all physical environments constructed for human habitation and activities, are constantly exposed to risk from various natural and manmade disasters, such as fires, tropical cyclones (wind and storm surge), earthquakes, tsunamis, floods, landslides, and terrorist attacks, which pose a significant threat to human beings.

The broad concept of emergency management covers hazard prevention, emergency preparedness (safety planning and training), emergency response (evacuation and rescue), and disaster recovery (restoration of fundamental services and lifelines). The key point in these actions is the preparation facing of the emergency so the researchers and professionals must work to improve the understanding of the situations, processes behind and analysis methods, anticipating the adverse possible situations, their worst evolution, and forecasting how they arrive to critical states.



It has been showed how Artificial Intelligence can improve natural disaster management, particularly landslides, closing the gap between knowledge and action. The integration of geological, seismic, geotechnical, urban, service, social data, to name a few, in an interchangeable and visually stimulating format, directly impacts the effectiveness, cost and execution time of activities related to each stage of a NDM project.

DON'T FORGET VISUALIZATION!! : Virtual Reality -Augmented Reality technology provides visual simulations to create a vivid first-person experience. Temporal, spatial, and social differences are lowered by immersing people into a certain location or experience. This immersion can be exploited in the three phases of NDM: preparedness, response, and recovery. Artificial Intelligence + VR-AR is an innovative addition to NDM as it provides a non-destructive and safe technique to recreate natural disasters.