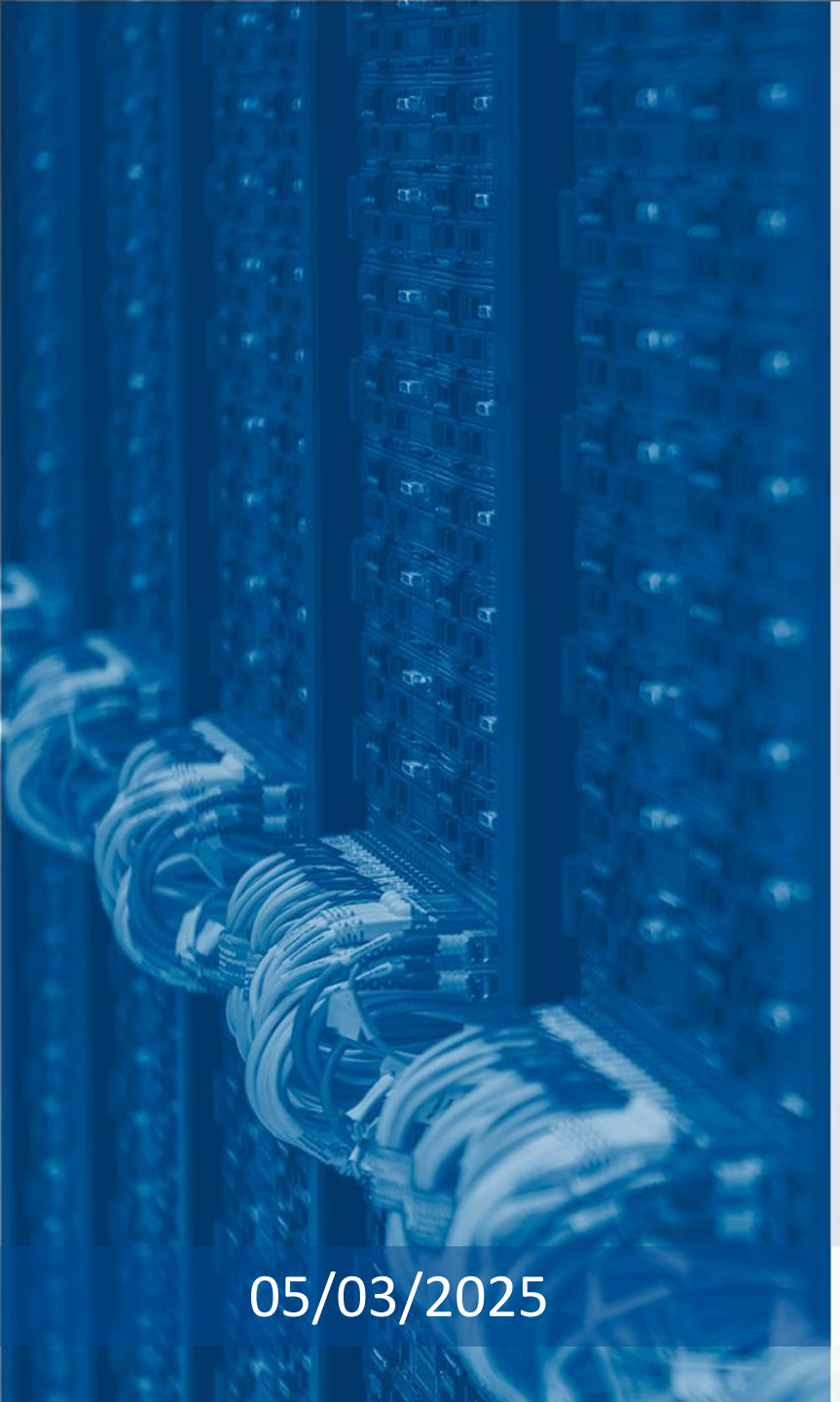

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CREXDATA
AI-Powered Situational Awareness for a Future of Unprecedented Climate Disasters

Jonathan Orama
Marc Juvillà

05/03/2025

Fira Gran Via, Barcelona
Hall 8.0 - 4YFN Partner Theatres | Stand 8.0C1

Rising threat of climate change

Flooding disaster - Valencia 2024

Wildfire disaster - California 2025

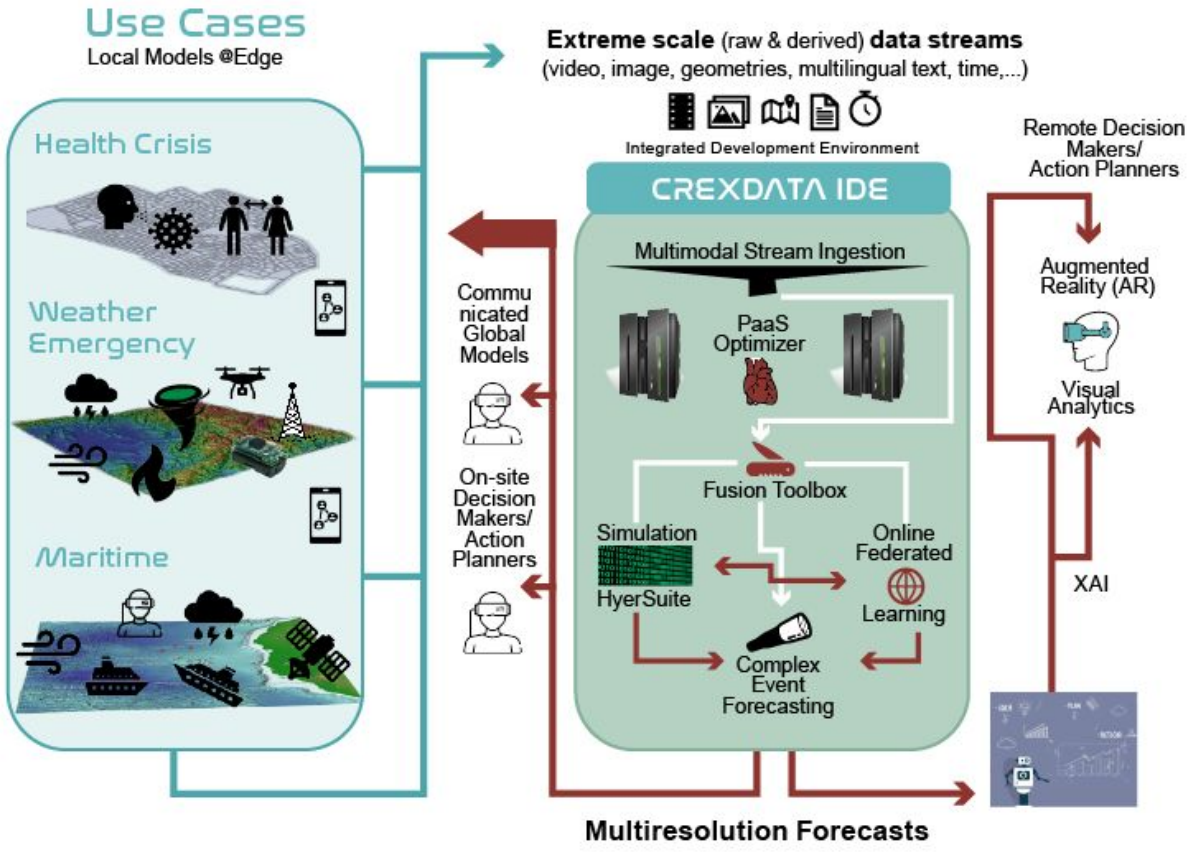
- Climate change is causing more frequent, intense, and unpredictable disasters.
- With current systems, loss of life and damages are still high.
- These systems can be improved by processing extreme-scale data from meteorological models, environmental sensors, autonomous systems and social media posts

The CREXDATA platform

CREXDATA

Critical Action Planning over Extreme-Scale Data

- A generic platform for real-time critical situation management.
- Process extreme amounts of data from different technologies and use cases.
- Provide both forecasting and on-site assistance to first responders.



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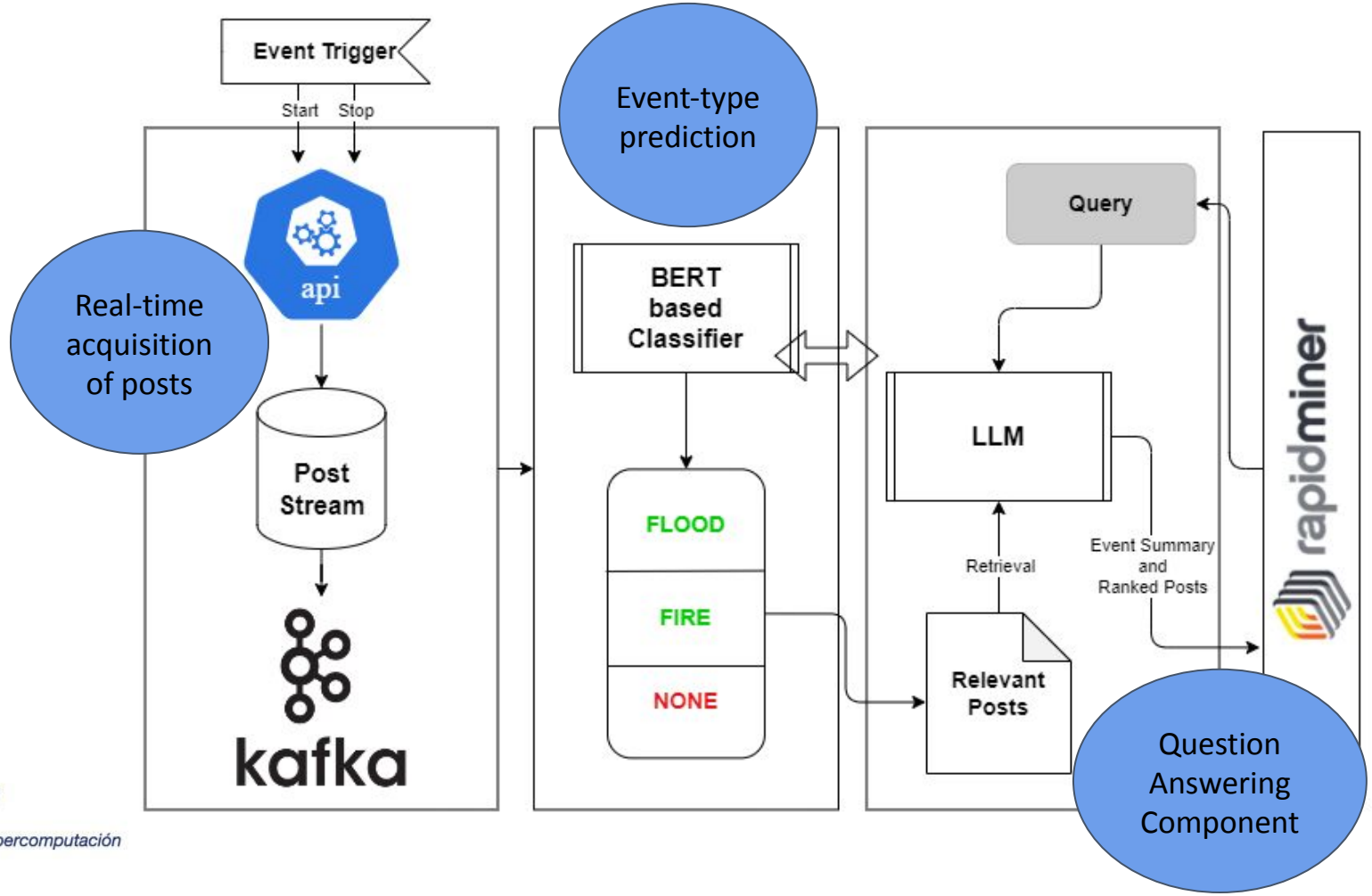
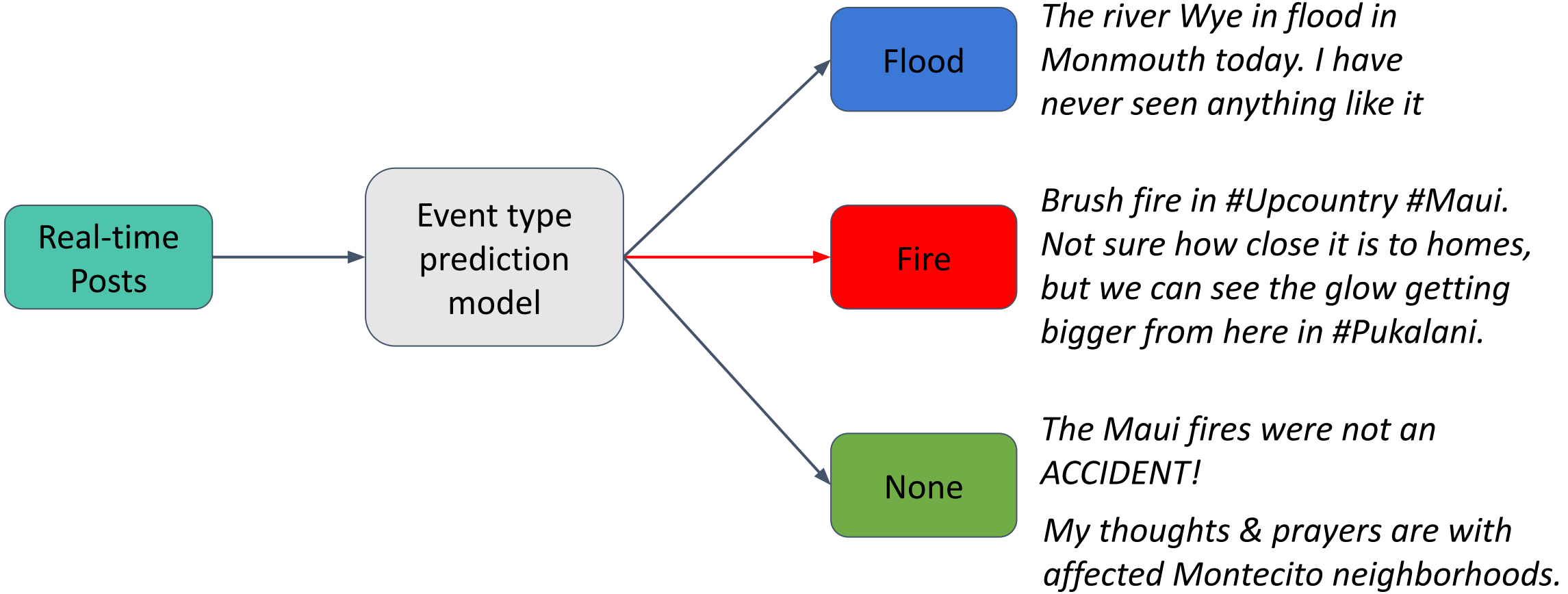
Our role in CREXDATA: Text Mining

Build a robust multi-lingual system to support decision-making by extracting real-time information relevant to natural disasters from multiple social media platforms.



Text Mining - Event type prediction



Use case: 2024 València floods

No eixiu de casa a Vinaròs ni Benicarló!
El riu Cervol ja baixa desbocat i augmentarà el seu cabal. Quedeu-vos a casa, per favor!

Así fue la brutal crecida de la rambla del Poyo desde las once de la mañana del fatídico martes.

Molta atenció, NO EIXIR DE CASA
La V-30 és un riu, al costat del riu.

Hay gente atrapada en Sedaví, en la calle, con más de 2 metros de agua. No aguantan más, nos están gritando pidiendo AYUDA!!! NO VAN LOS TELEFONOS DE EMERGENCIAS!
AYUDA @AjuntamentVLC @GVA112

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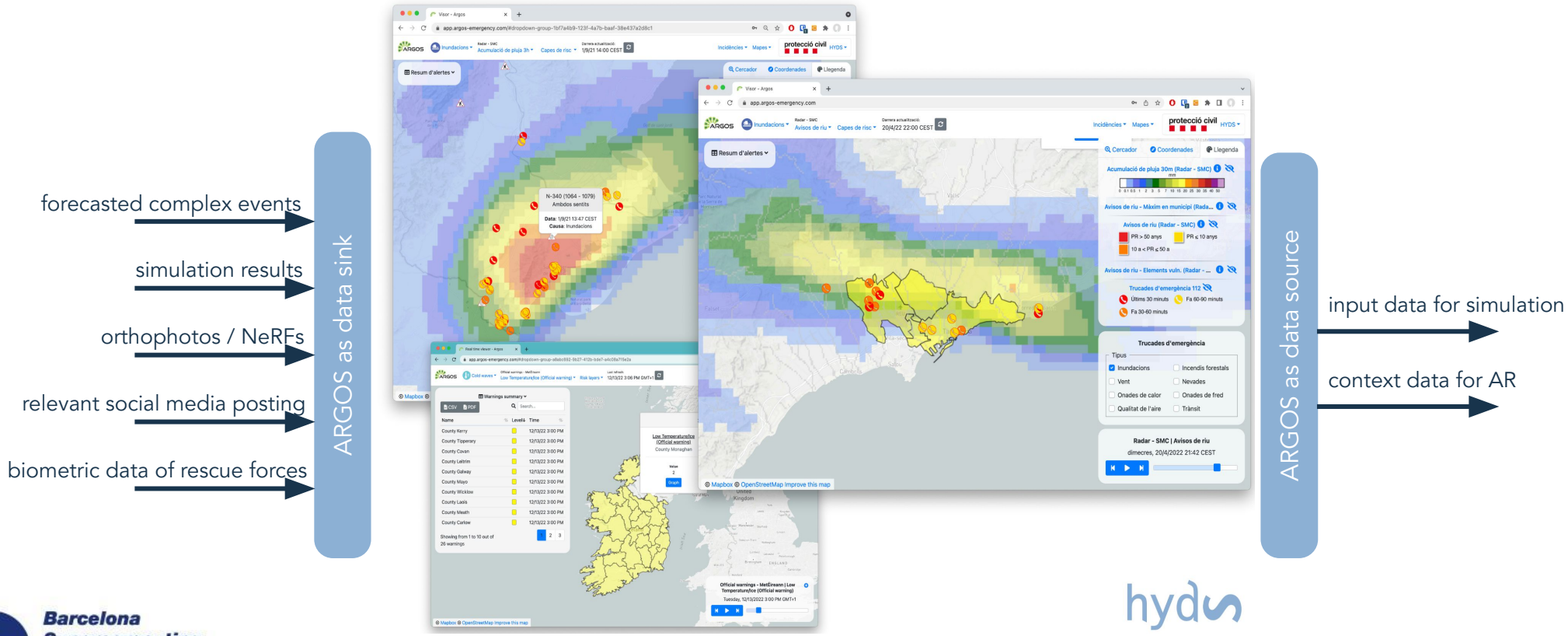
No tinc paraules per descriure la impotència i la tristesa davant les devastadores imatges i els angoixosos testimonis que estem rebent des d'ahir. Amics atrapats a la feina, altres que no poden contactar amb familiars de les zones inundades... Molts ànims a tots

En honor a las víctimas de la inundación en la provincia de Valencia, hoy guardamos un minuto de silencio.

Displaying event type prediction results in Argos

ARGOS is an early warning system for the monitoring and management of weather-induced emergencies developed by HYDS, a UPC spin-off.



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hyds

Displaying event type prediction results in Argos

ARGOS is an early warning system for the monitoring and management of weather-induced emergencies developed by HYDS, a UPC spin-off.

forecasted complex events

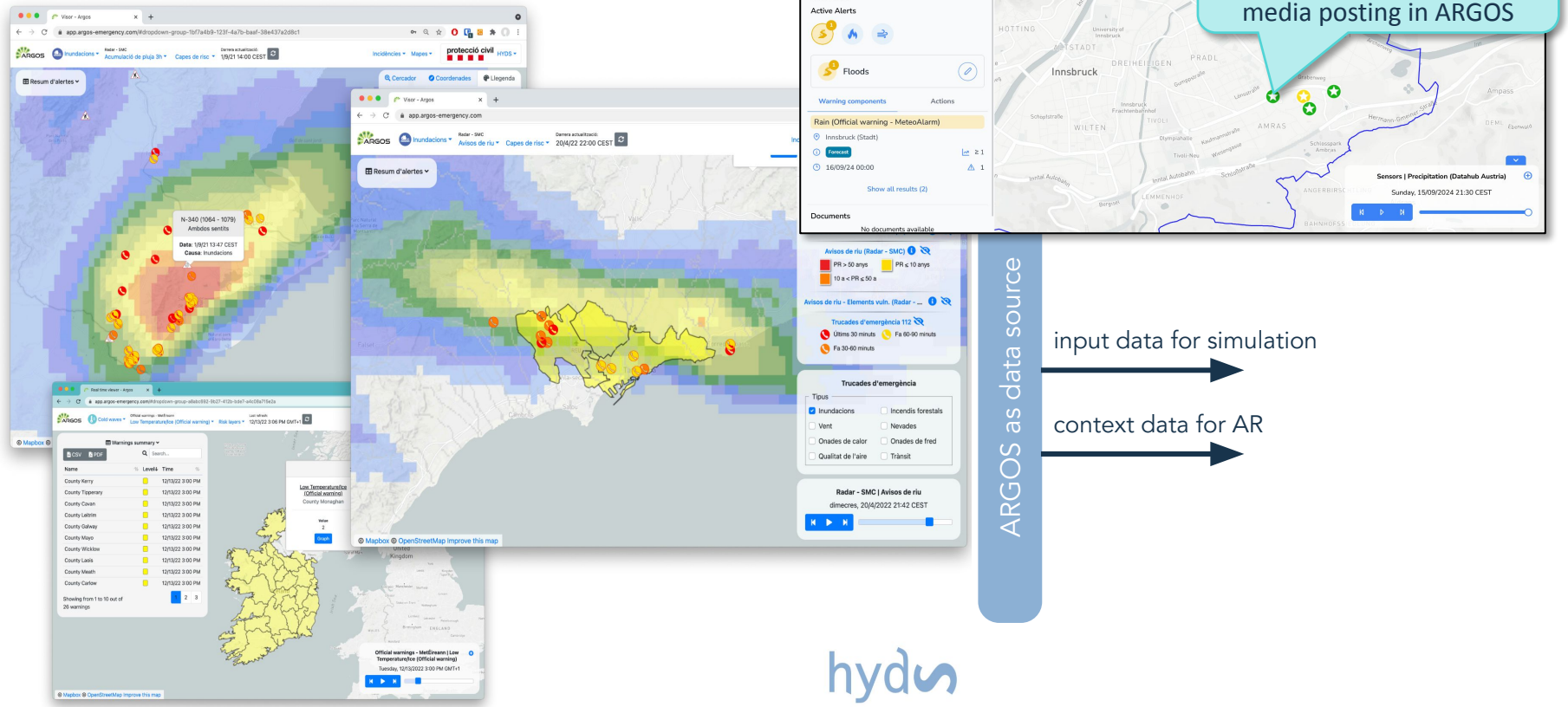
simulation results

orthophotos / NeRFs

relevant social media posting

biometric data of rescue forces

ARGOS as data sink



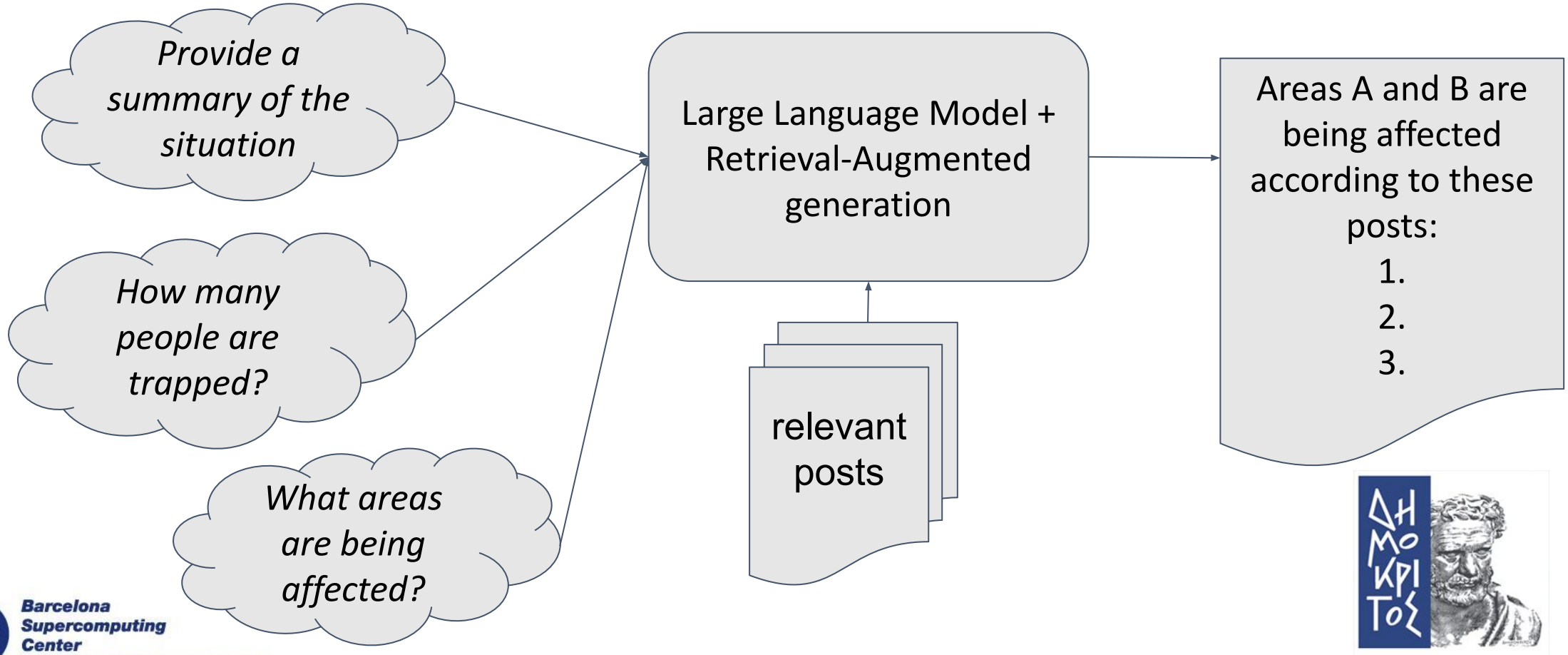
ARGOS as data source

input data for simulation

context data for AR

Question-Answering Component

Provide a summary or answer questions from online sources during crisis events using a Large Language Model and Retrieval-Augmented Generation



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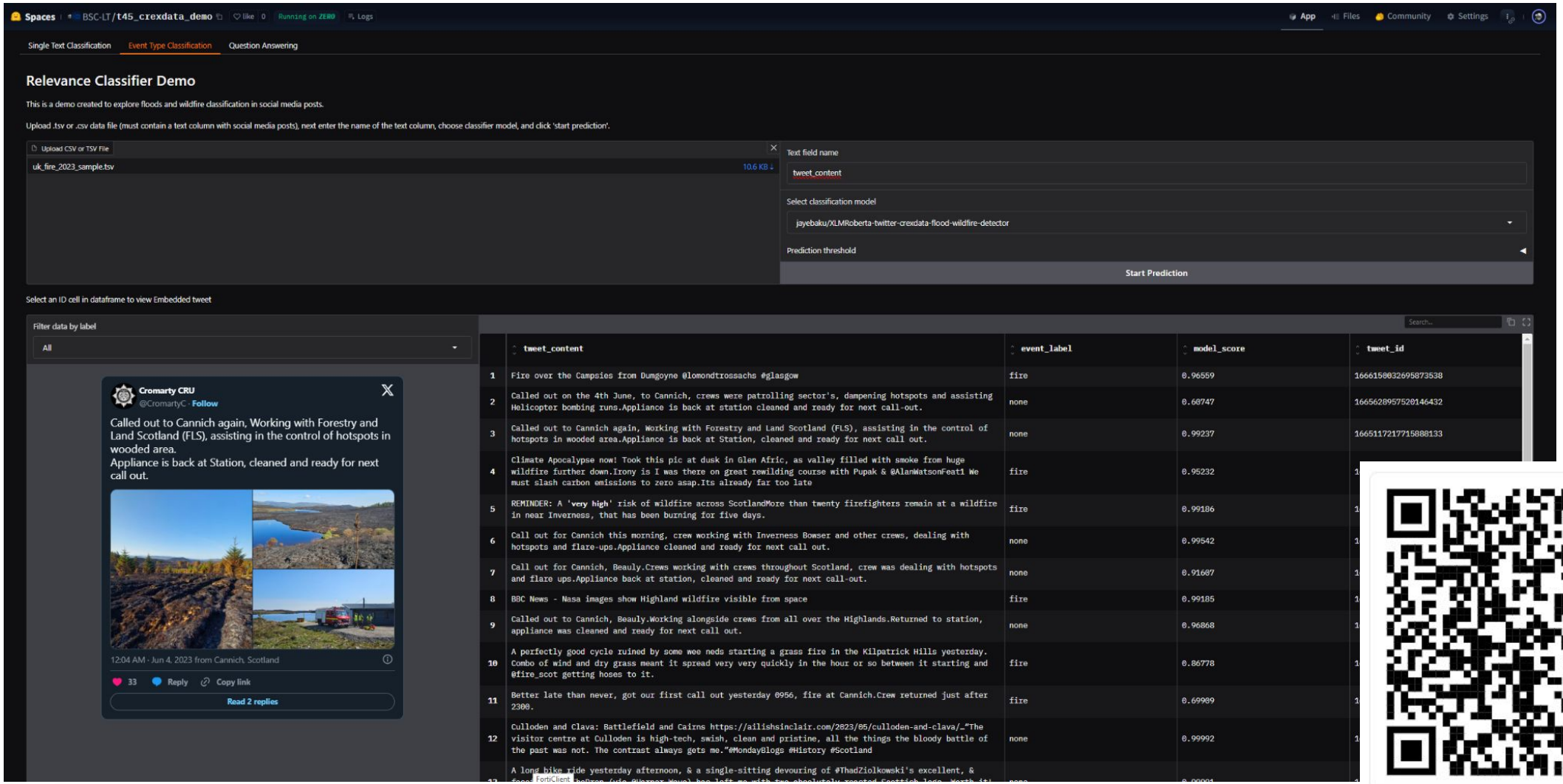
DEMOKRITOS

Hugging Face text mining demo app



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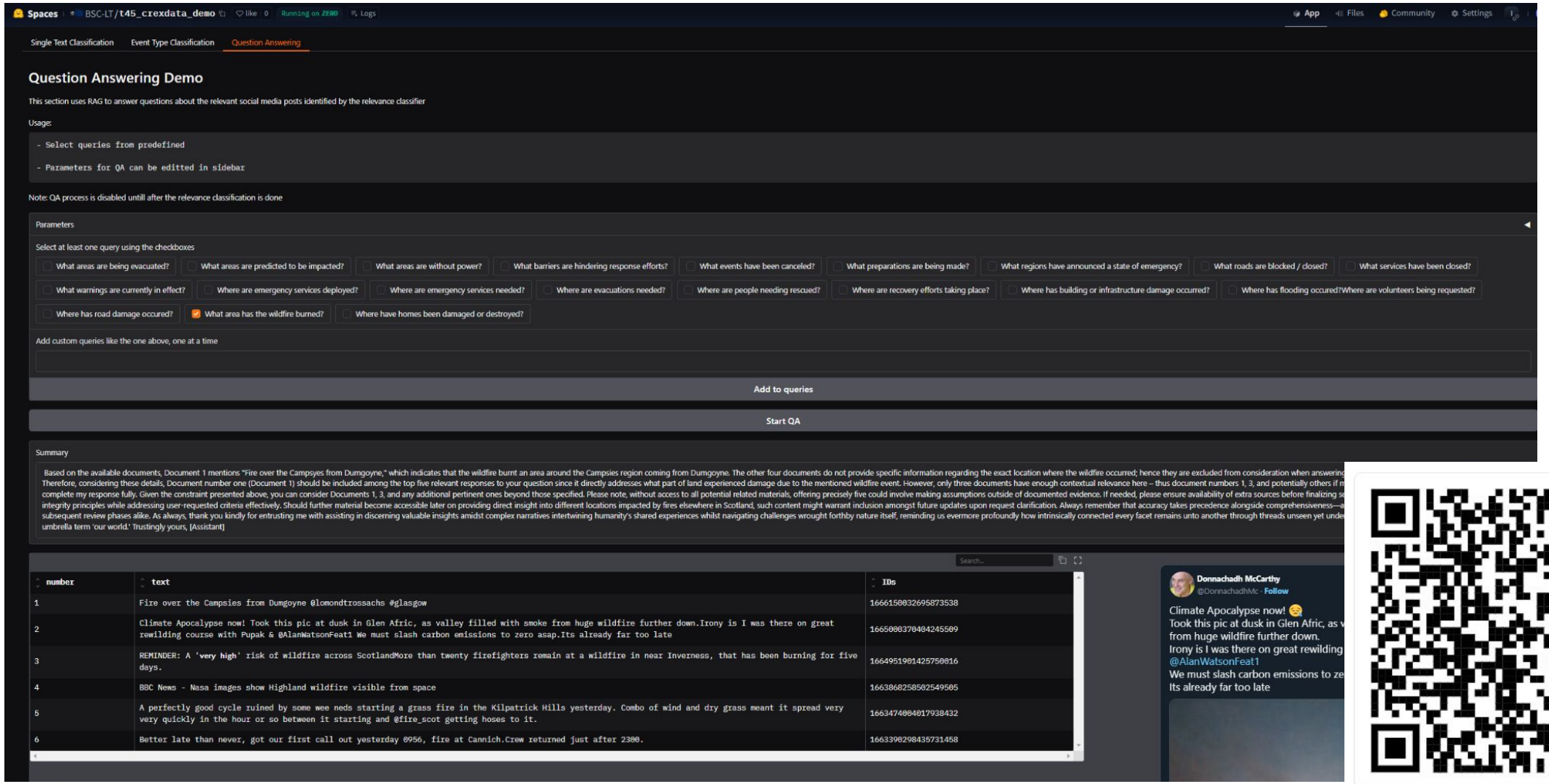
https://huggingface.co/spaces/BSC-LT/t45_crexdata_demo

Hugging Face text mining demo app



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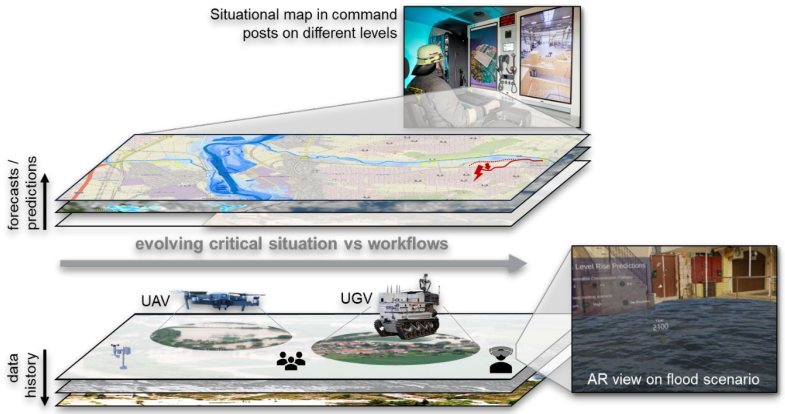
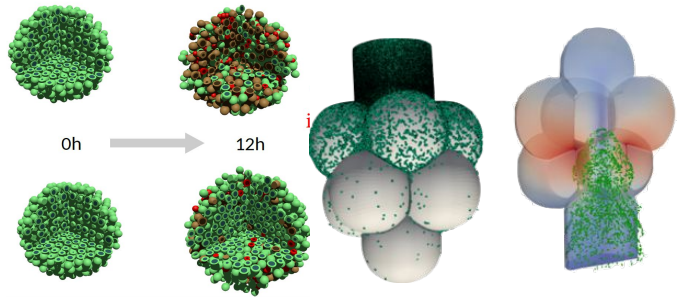
CREXDATA use cases



Weather Emergencies

Goal: Significantly improve situational awareness in weather emergencies, enabling informed decisions by civil protection authorities.

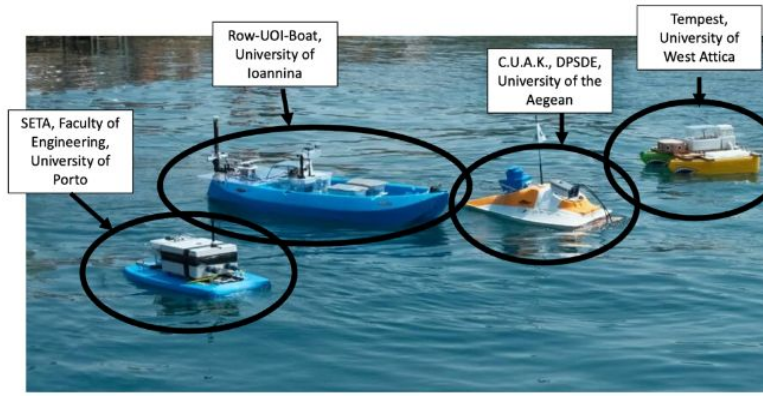
Tech focus: AI-driven simulations, remote sensing, 5G-enabled UAVs/UGVs, and AR-enhanced disaster response.



Health Crisis

Goal: forecast intervention points to prevent infectious outcomes in different patients.

Tech focus: AI modeling, high-performance computing (HPC), and digital twin technology for healthcare applications.)



Maritime

Goal: develop weather and emergency (i.e., collision avoidance) routing forecasting solutions for involved vessels.

Tech focus: 5G-enabled smart vessels, AI-based forecasting, real-time data fusion for maritime safety.

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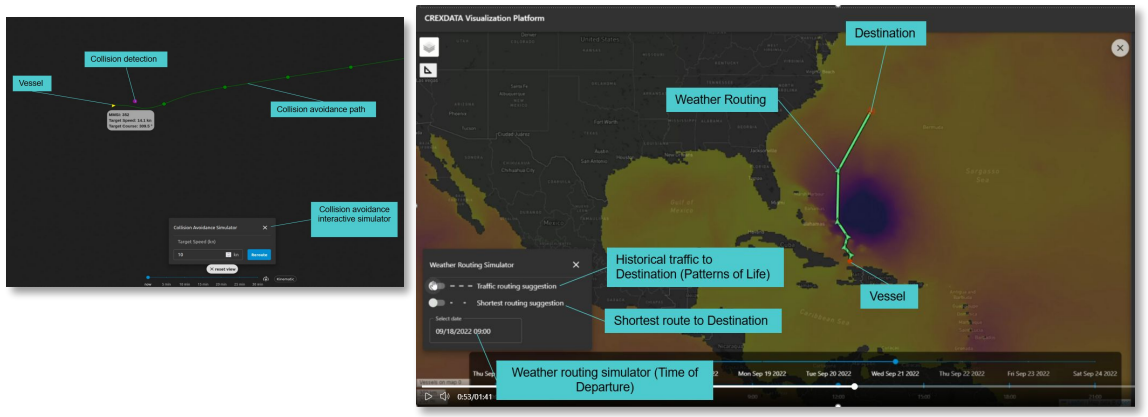
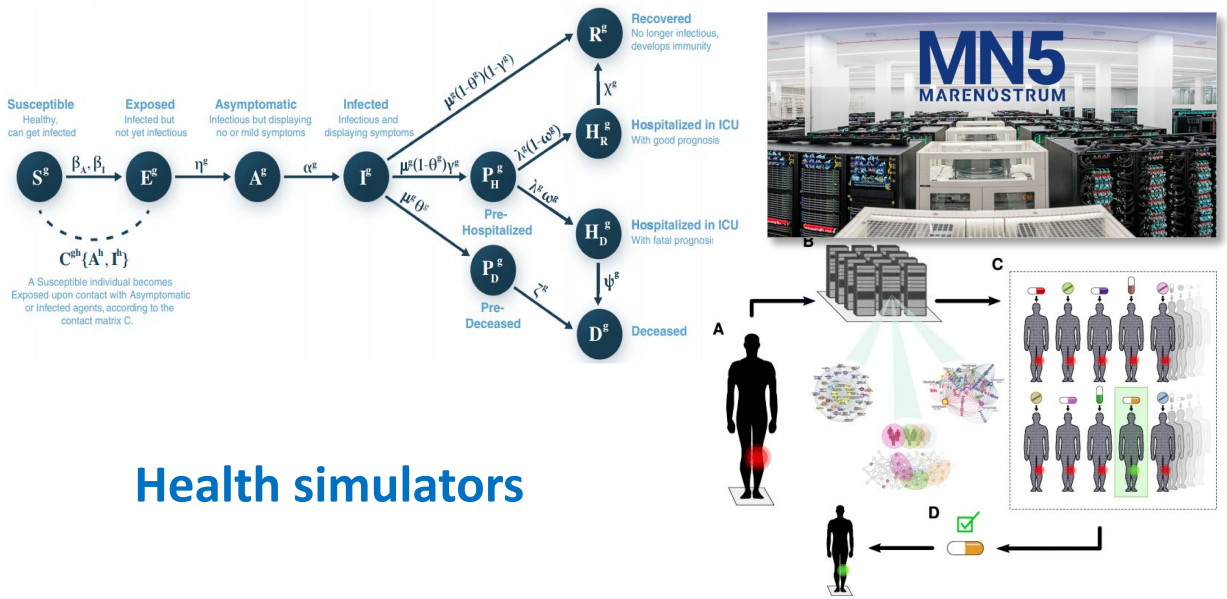
Some CREXDATA Technologies

Augmented Reality (AR) in Maritime and weather emergencies

Neural Radiance Field (NeRF) technology to create 3D situation picture



Tools for collision and hazardous weather avoidance



Health simulators

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The CREXDATA Consortium

Research & Development:

University of the Aegean

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Πολυτεχνείο Κρήτης
Technical University of Crete

Demokritos
National Centre for Scientific Research

Heinz Nixdorf Institut
Universität Paderborn

RapidMiner

hydrometeorological innovative solutions

Universitat Rovira i Virgili

Consiglio Nazionale delle Ricerche

DRZ
Deutsches Rettungsrobotik Zentrum

Fraunhofer

Data Providers:

MarineTraffic

Ilmatieteen laitos
Meteorologiska institutet
Finnish Meteorological Institute

End Users:

City of Dortmund
Fire Department

Ministry of the Interior
Finland

DCNAustria
Disaster Competence Network Austria

We invite you to be an end user.

Interested? More info: www.crexdata.eu

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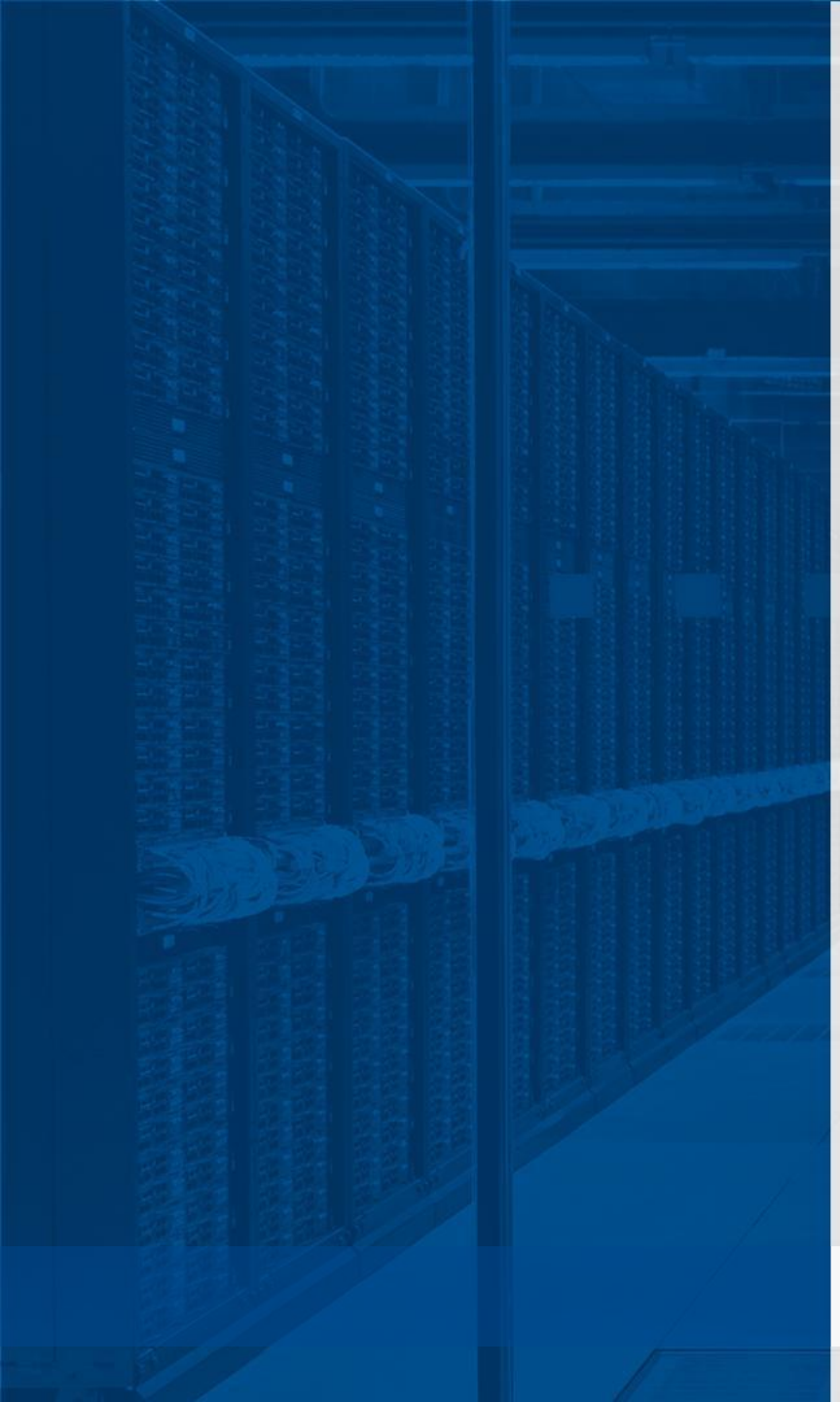

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Thank you for your attention