



# CRISIS MANAGEMENT 4.0

## Navigating Chaos with Cutting-Edge Data-Driven Technologies

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Data Engineering and Semantics  
هندسة البيانات و دلالاتها

# Introduction

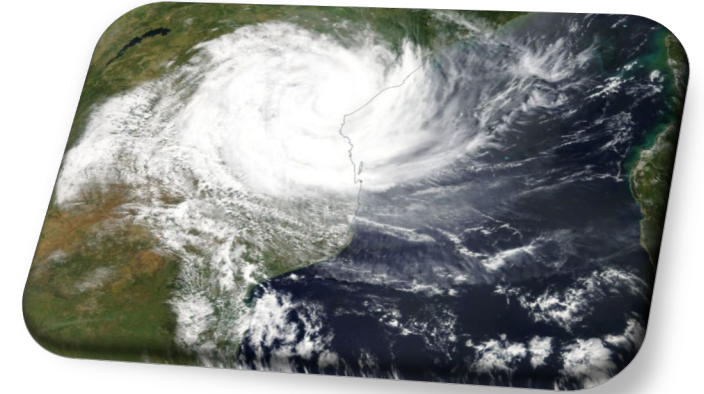
- **Data Engineering and Semantics (DES)** is a research unit at the University of Sfax, Tunisia
- **Founded in 2021**
- **> 40 researchers**
- **Research Topics:** Big Data Analytics, Data Management, Semantic Technologies



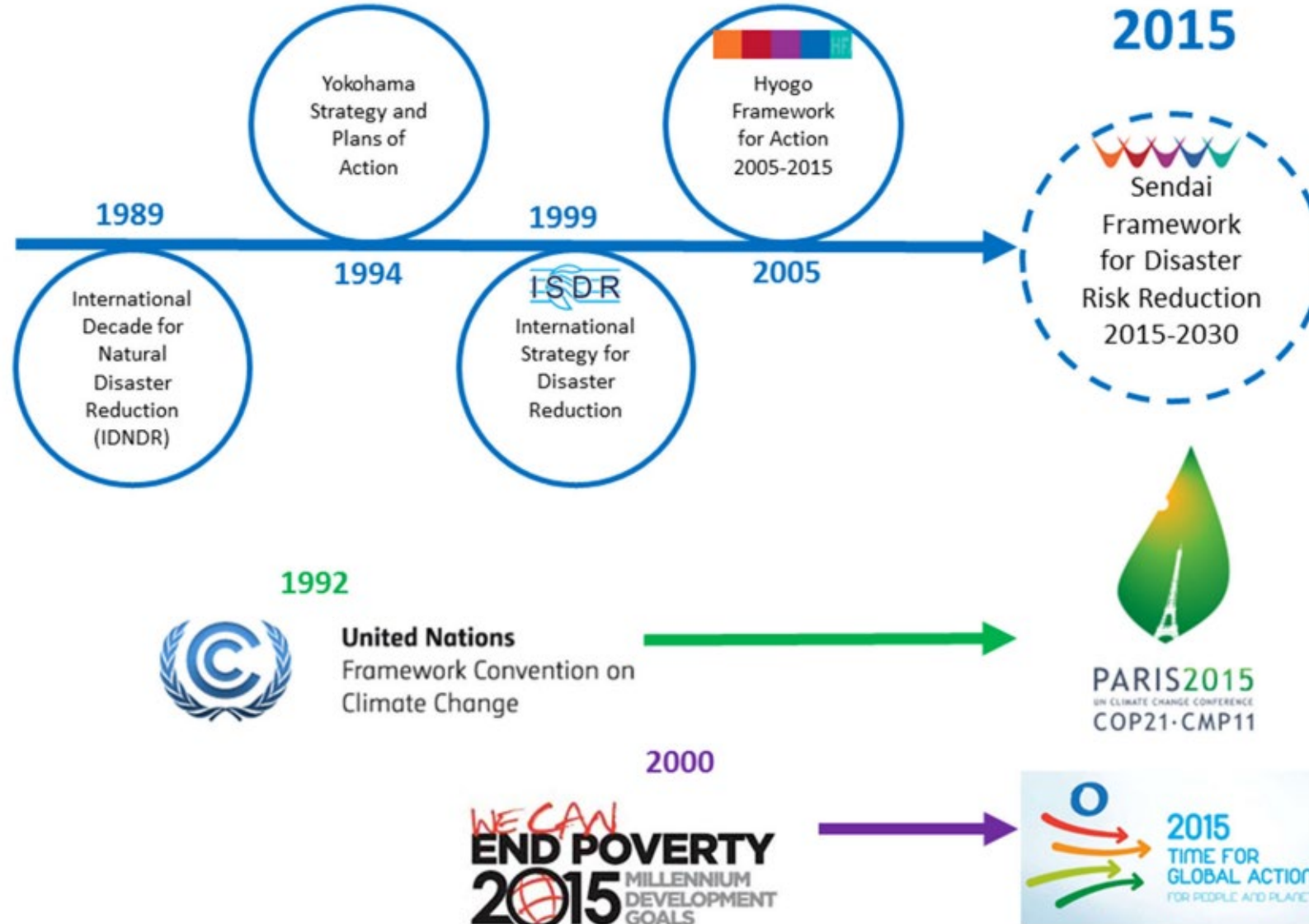
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# Overview: CRISIS MANAGEMENT 4.0



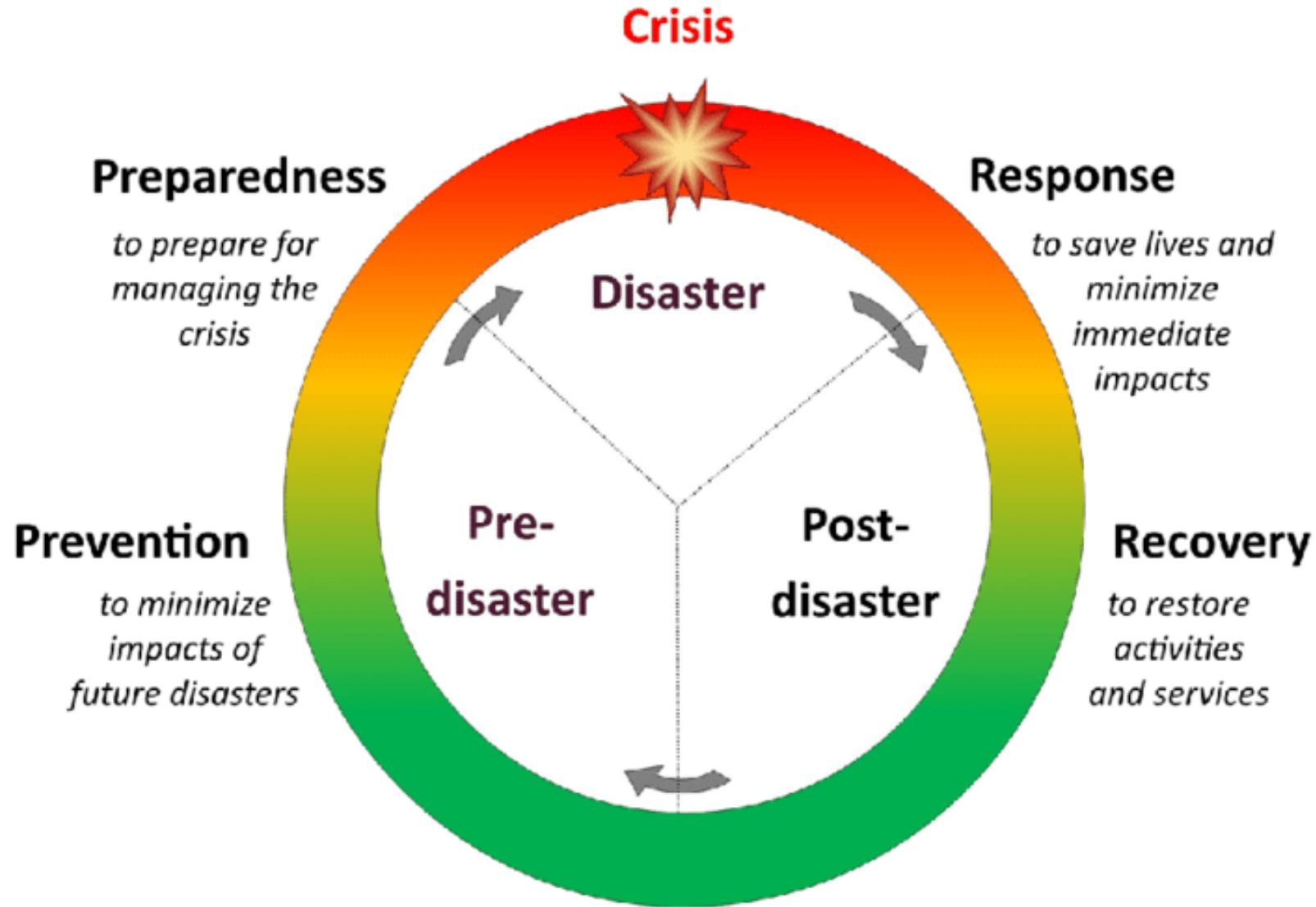
# Disaster Risk Reduction: 30 years ...



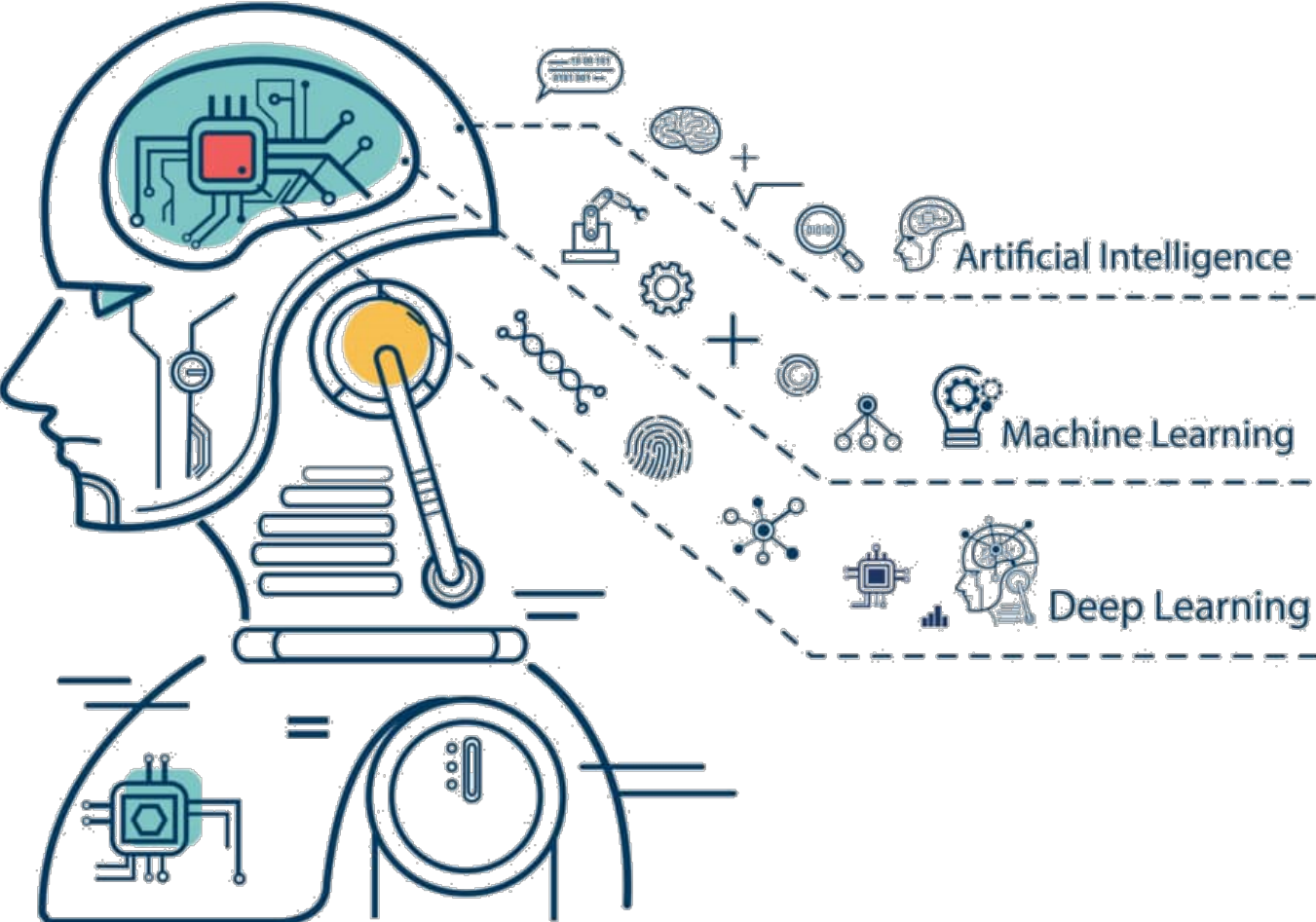
**AFRICA@COP27**  
Together for Climate  
Action Now  
**Egypt 6-18  
November,  
2022**



# Disaster Management Cycle



# Crisis Management 4.0: Cutting edge technologies

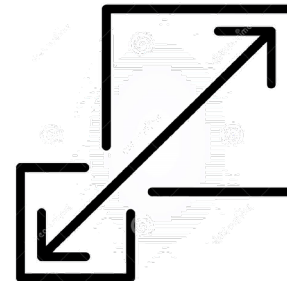
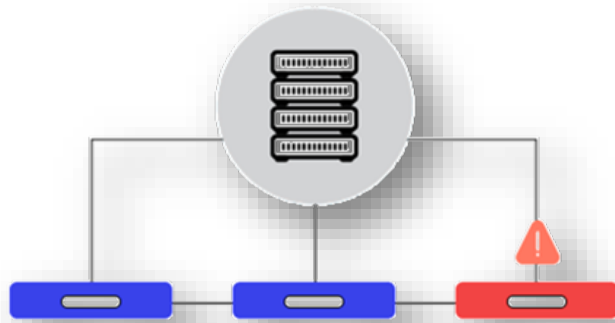
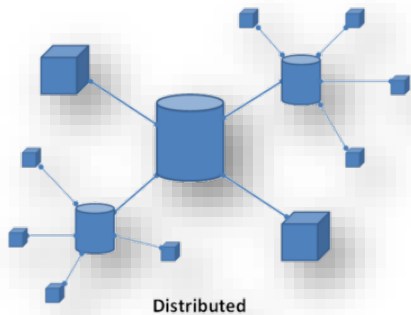


**Data Strategy**

# Crisis Management 4.0: Big Data & Data Management

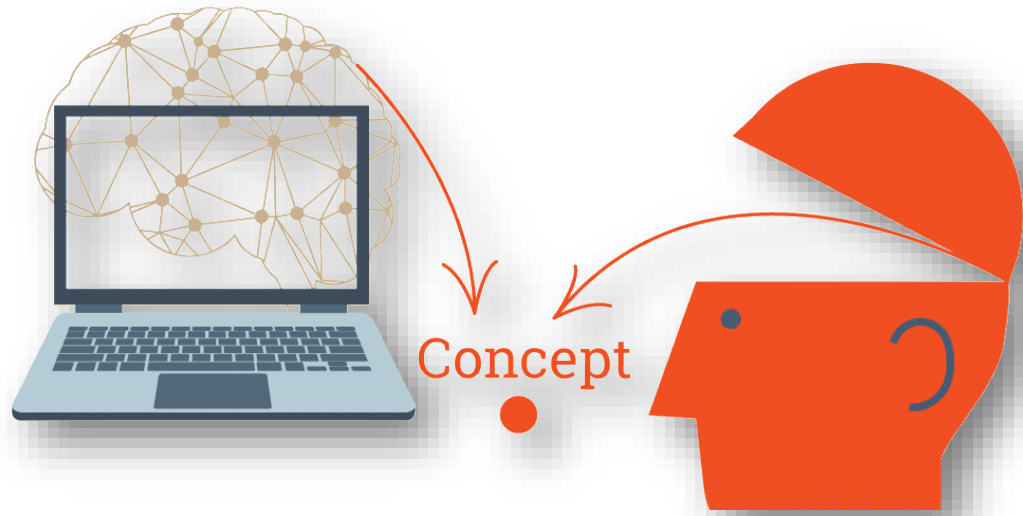


**Distributed + Fault Tolerance + Scalability + High Availability**

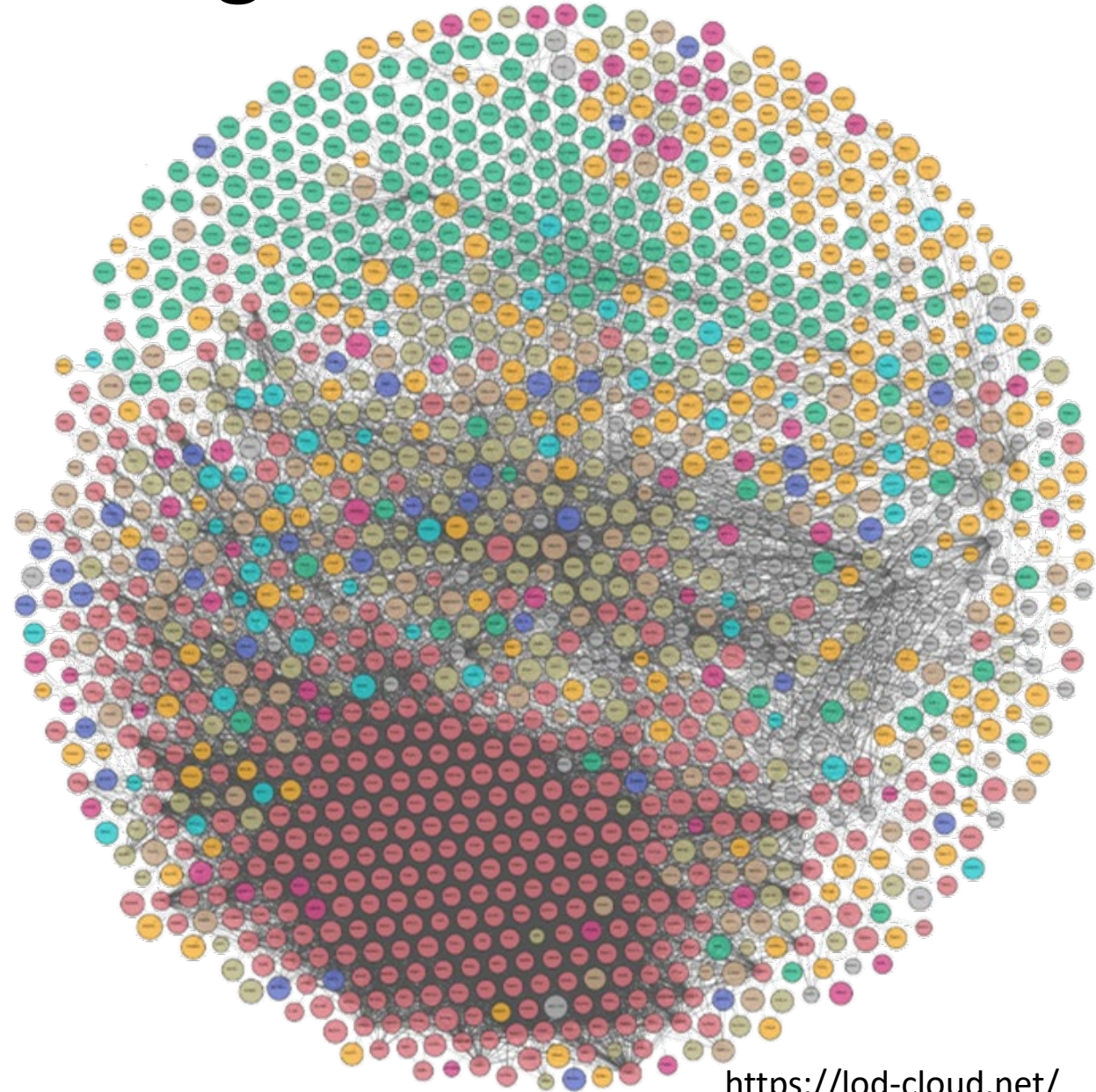




# Crisis Management 4.0: Knowledge Bases

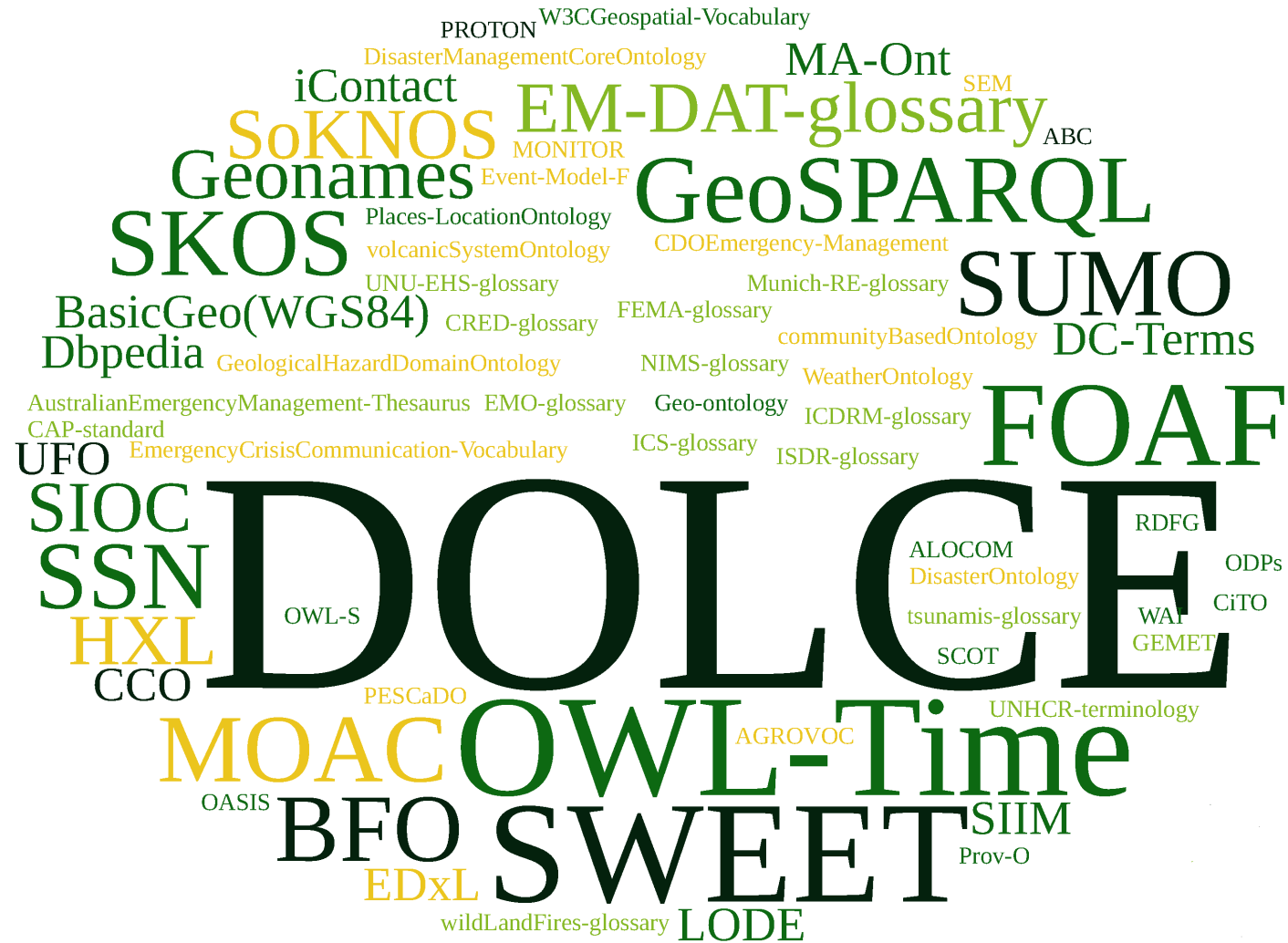


- **AI reasoning**
- **Ontology**
- **RDF**
- **SPARQL**
- **Knowledge Bases**
- **Linked Data**
- **Recommandation Systems**





# Crisis Management 4.0: Knowledge Bases

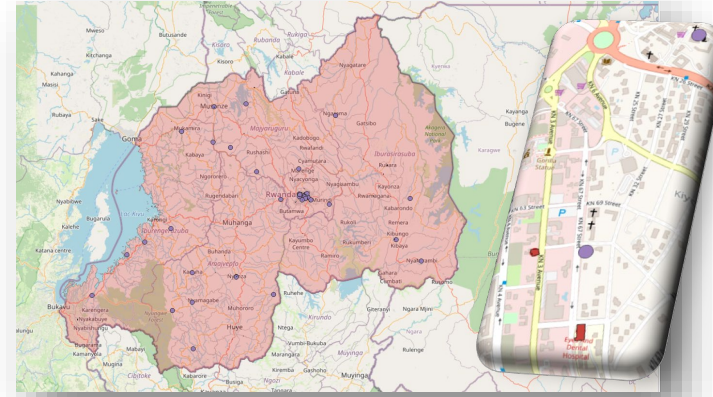
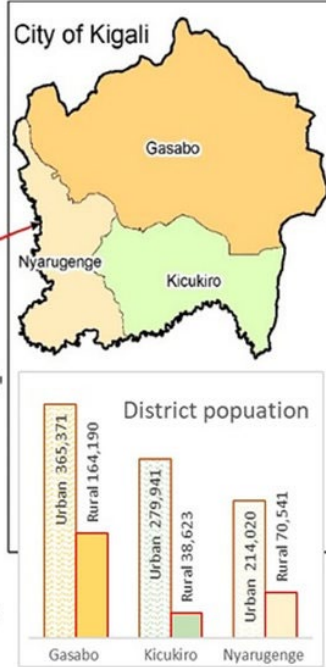
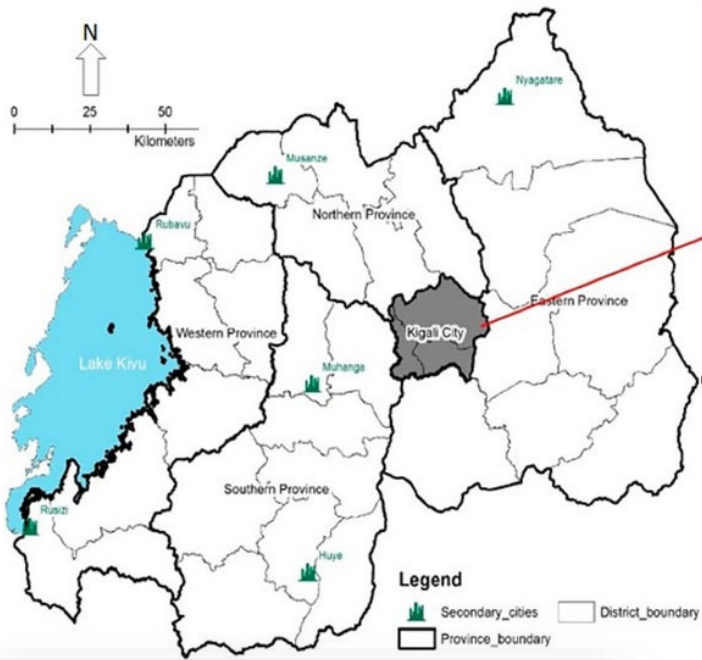


## Ontologies for the Disaster Domain

# DES Achievements

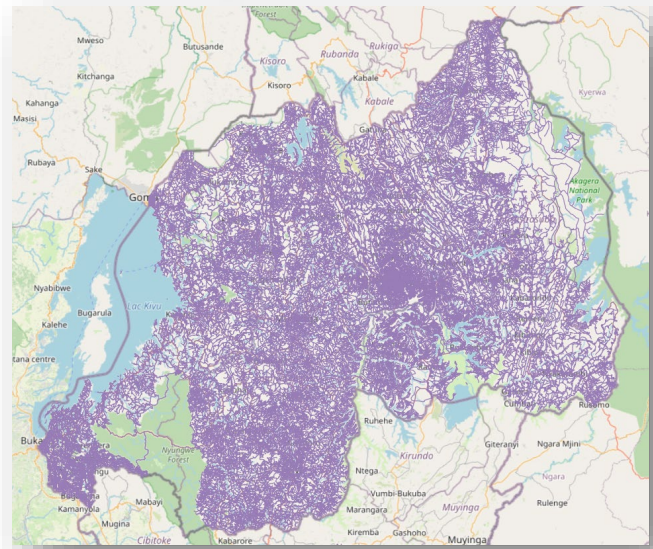
Relative Distance:  Paving the Path to Informed Decisions  
*Optimizing Healthcare accessibility to Leave no one behind*

# Use case – Rwanda - Kigali

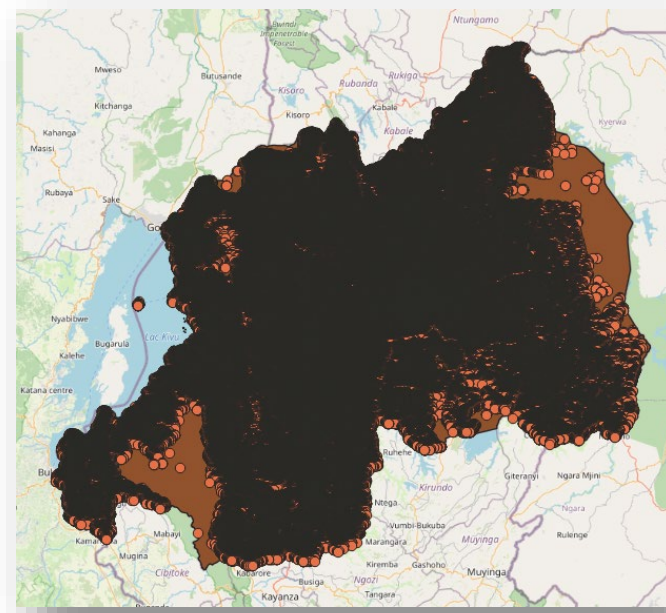


**Healthcare facilities  
Geo-data**

600



**Road  
Networks**  
123183

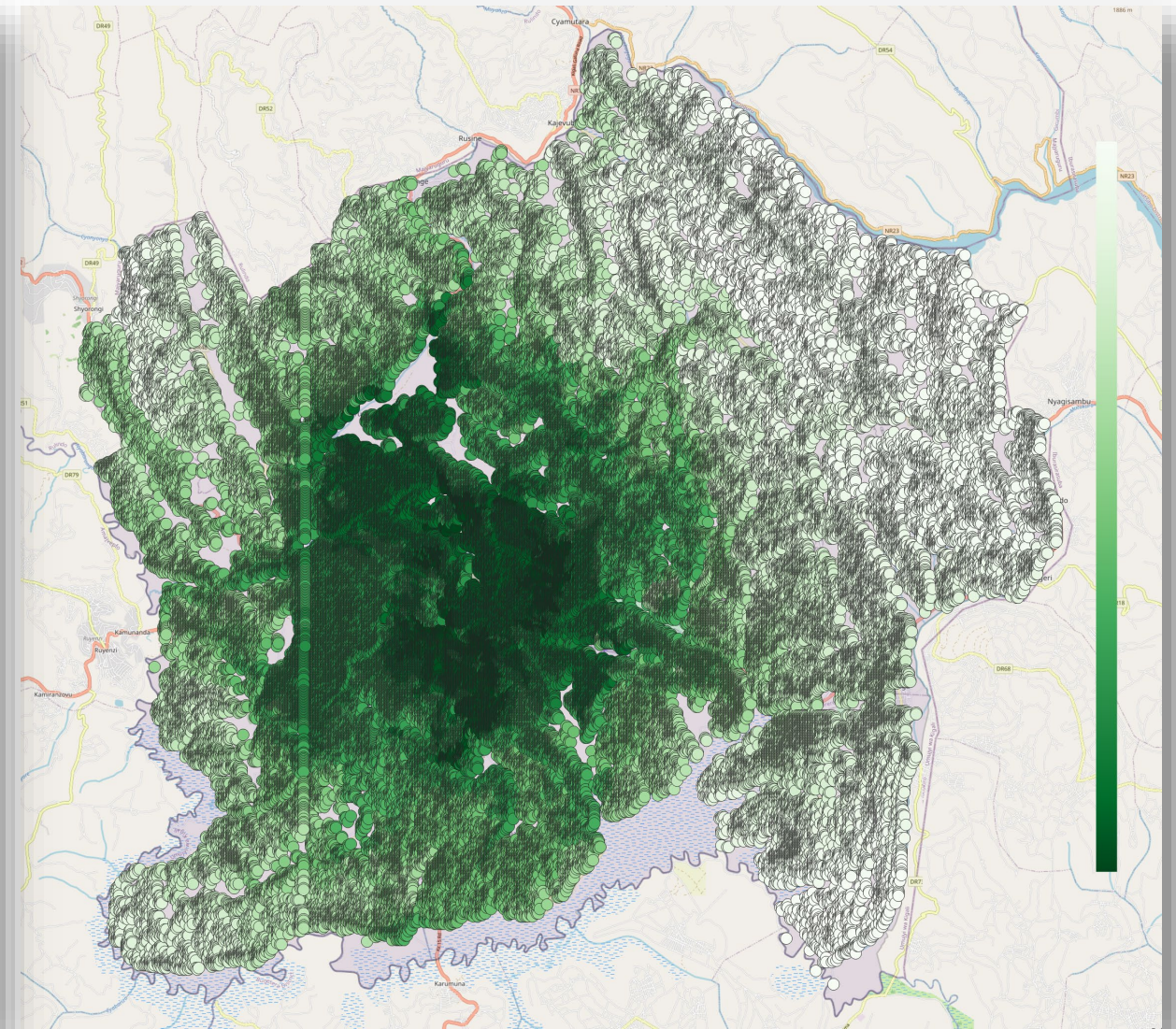
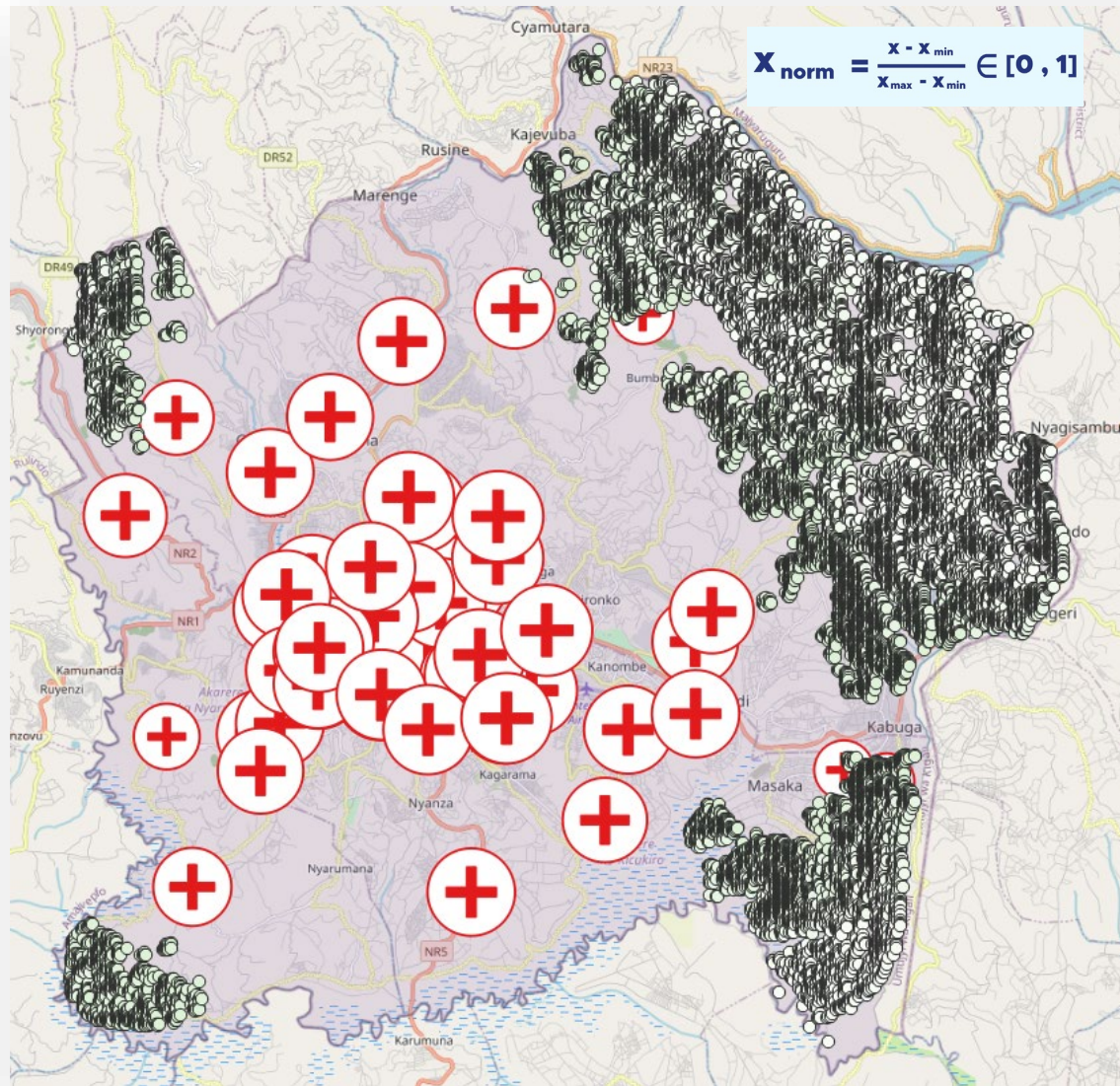


**Fine-grained  
population  
distribution**

1733790

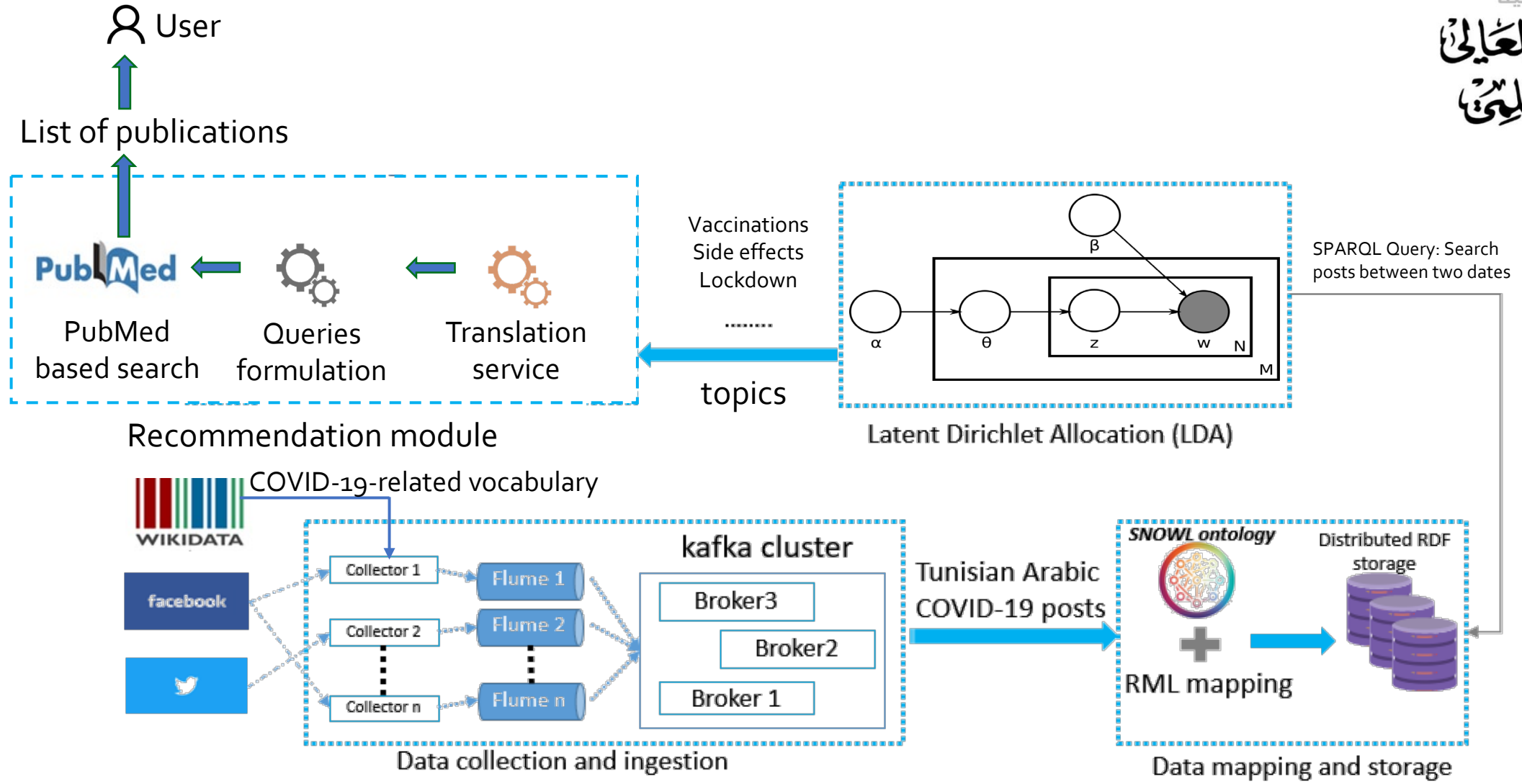


# Relative Distance: Results





# COVID-19: Tracking Trends using Social Data



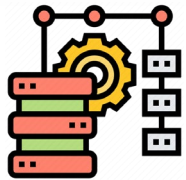




# Data Management: Big Data-based Solutions



<https://dexa.pro>



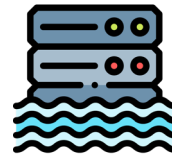
Data Governance



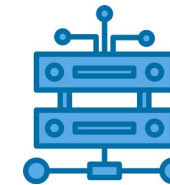
Data Lineage



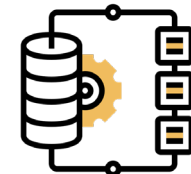
Data Quality



Data Lakehouse



Data Infrastructure



Data Integration

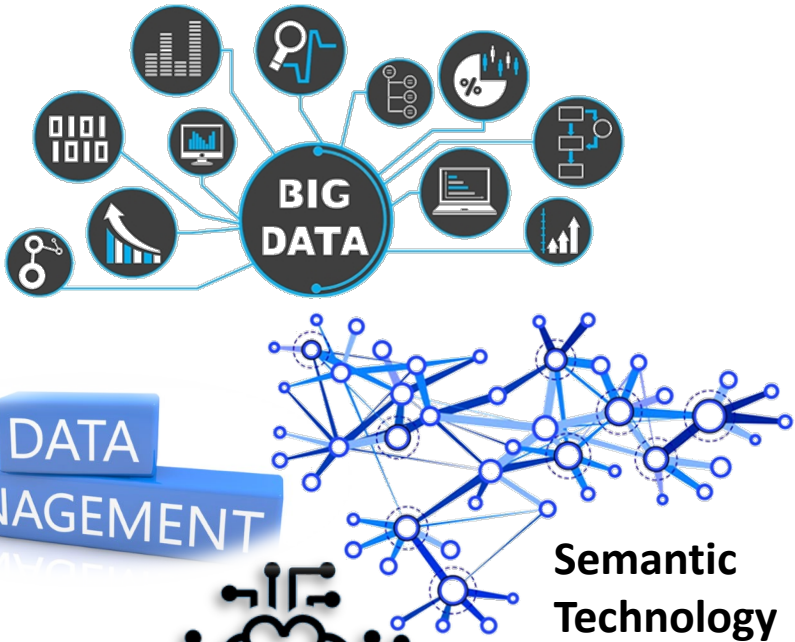
# Conclusion & Future Trends



## Technology – Data Driven

## Strategic

## Leadership & Innovation





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**Thanks**



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