# Towards Smart Urban Resilience: A Linked Data Approach

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### Introduction

The mission of resilience of Ukrainian cities calls for international collaboration, coordination, and reconstruction, which needs the integration and management of data and resources. Linked data technology can be used for the representation and understanding of open data from multiple sources. While there is some work about smart cities, building information modeling, and geo-spatial data management, there are few studies on resilience data and knowledge management. Our work tries to meet such requirements by taking advantage of existing data and knowledge management technologies about smart cities, road networks, households, infrastructure, ecosystems, resilience, etc.

Our research question is: how can we use linked data technology to enable damage reporting of infrastructure and public facilities in Ukrainian cities?

Keywords: Smart city ontology, linked data, and resilience data management

# Methodology

## Ontologies Reused:

- Simple Event Model Ontology
- Smart City Ontology (SCO 2.0)
- KM4City (Knowledge Model for City)
- Urban Infrastructure Ontology (UIO)
- Empathi Ontology

#### **Ontology Extended:**

Emergency Management Ontology (EMO)

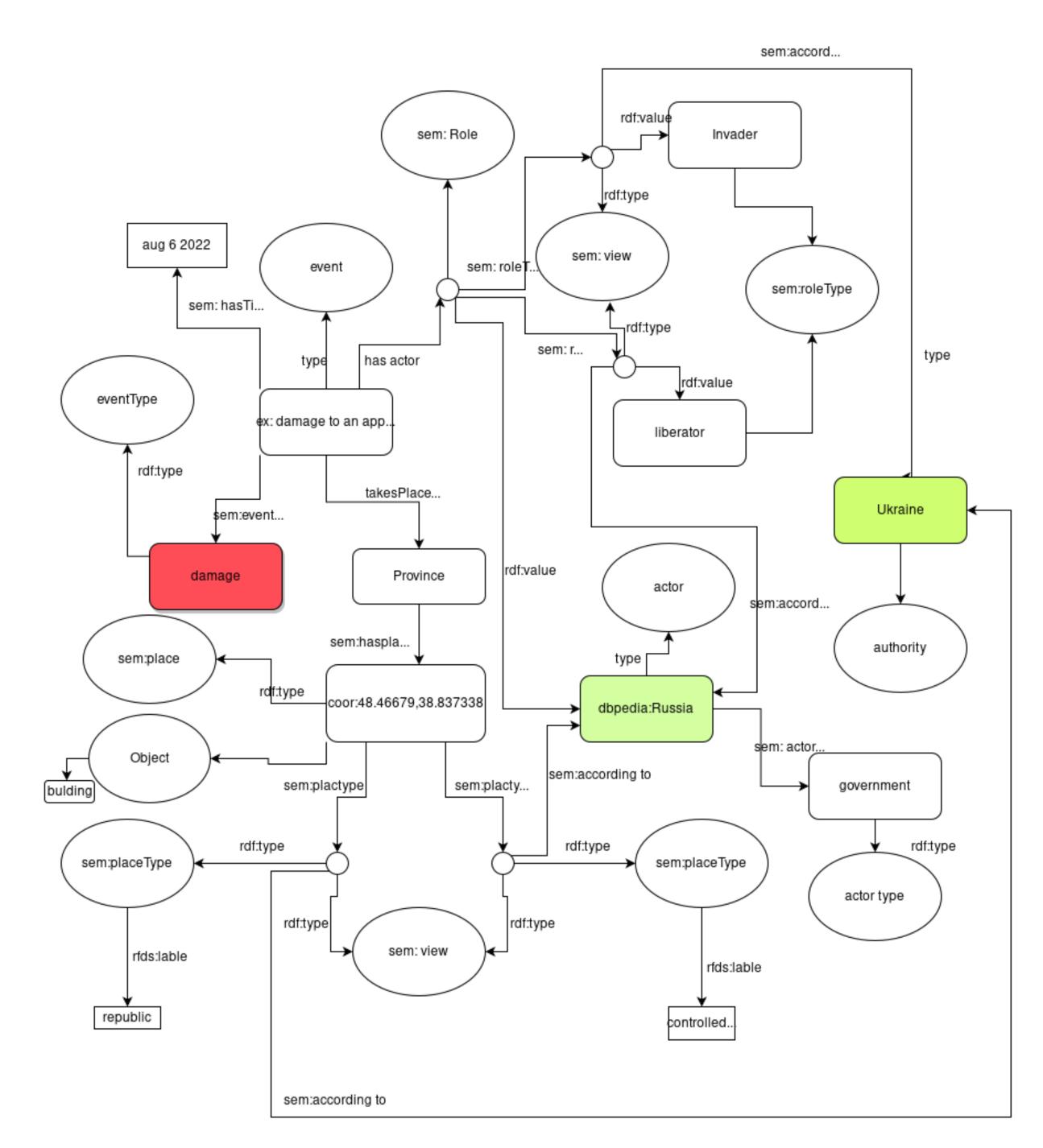


Figure 1. UML Diagram of Entities and Relations

#### Use case

- A web app that displays attacks and damages for the reporting and tracking of damage and repair of households, roads, and ecosystems in Ukrainian cities.
- Events can be downloaded as linked data in RDF format.
- Platform used: OpenStreetMap.
- Event data-sets: "Eyes on Russia" project.
- Information on display: coordinates (longitude and latitude), title, description, city, town, etc.

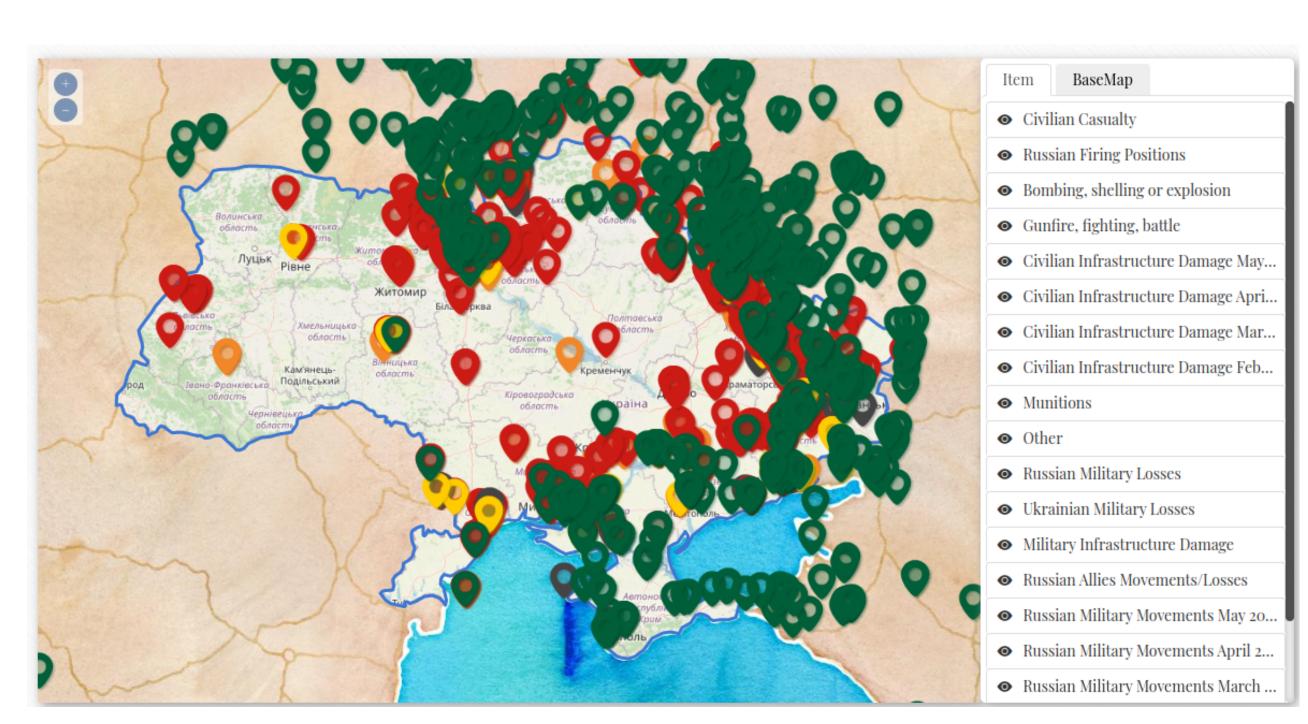


Figure 2. The Interface of Web App

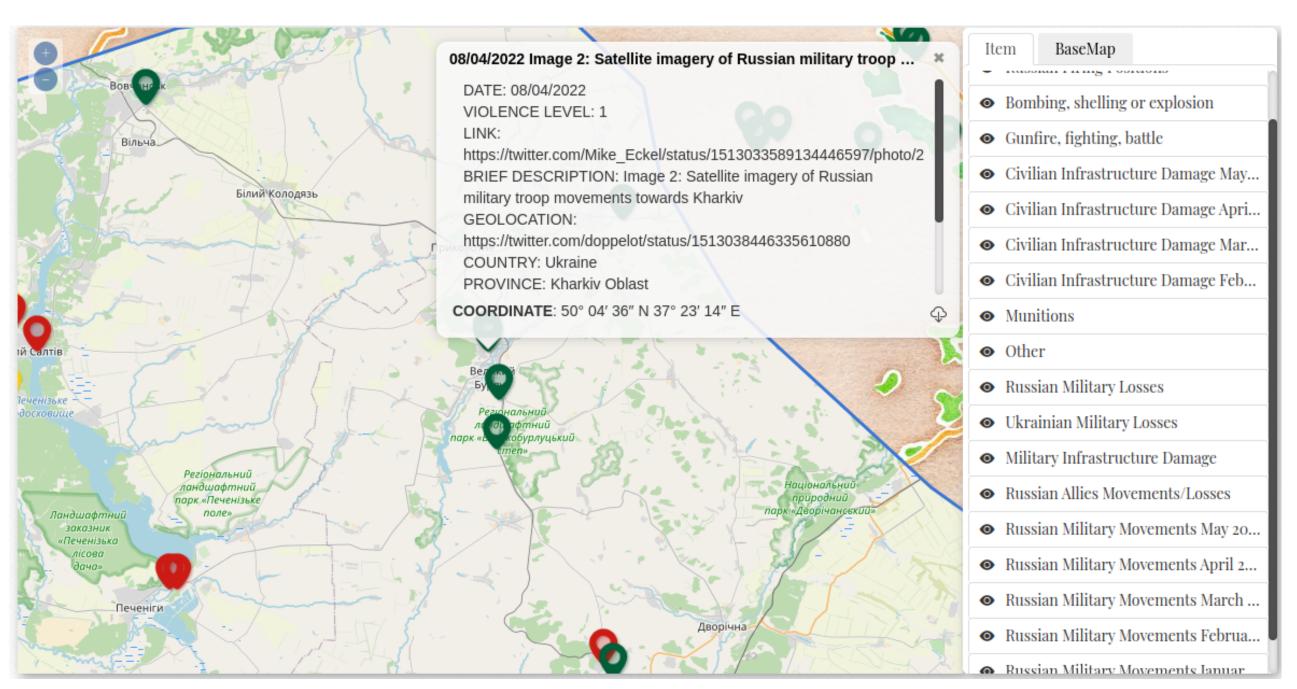


Figure 3. Display of Event