

UGESCO

Upscaling the Geo-temporal Enrichment, exploration and exploitation of Scientific Collections

The majority of digital collections at the FSIs (*Federal Scientific Institutions*) still have **(meta)data issues affecting the exploration, interpretation and exploitation of their content**. The coherence between the collection items and their searchability is rather limited, which sometimes makes it difficult to generate scientific/added value out of it. The current metadata scope of the photo archives, for example, is too narrow and too high-level to allow easy and adequate exploration of the collection data. The UGESCO project developed geo-temporal (meta)data extraction and enrichment tools to **extend and link the existing collection items** and facilitate **spatio-temporal collection mapping** for interactive querying. In order to optimize the quality of the temporal and spatial annotations that are retrieved by our automatic extraction/enrichment tools, the UGESCO project also investigated the added value of **microtask crowdsourcing** in validating and improving the generated metadata. Finally, to **ensure optimal exploitation** of the generated content, metadata management/filtering techniques were investigated to optimize the **quality and usability** of all this metadata and geo-temporal mapping services were developed to visualize and query the data in an end user-oriented way. These mappings allow **cross-collection analysis in time and space facilitating scientific interpretation of collection items in a broader sense**.

The interdisciplinary UGESCO project performed research and development activities in the domains of **named entity recognition (NER)**, **semantics-driven image analysis**, **geographic information retrieval (GIR)** and **user-generated content (UGC)**, and investigated how the Belgian Federal CegeSoma collections can benefit from technological innovations in these domains. The proposed **generic geo-temporal enrichment** framework, however, is widely applicable and our **open source building blocks for extraction, enrichment, filtering and mapping of geo-temporal metadata** can be reused and extended by all FSIs/federal departments to enrich their data and to facilitate collection access (i.e., to improve the spatio-temporal exploration and linking to other collections).

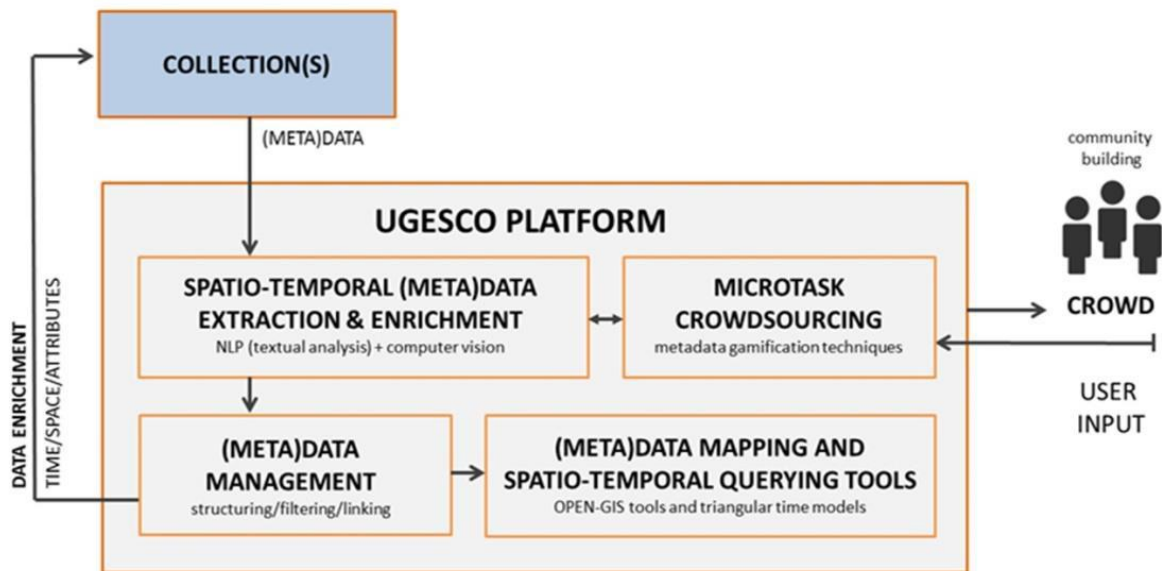
Technological realizations:

- 1) Improving spatio-temporal metadata extraction by textual analysis, e.g., named entity recognition (NER) of geo-locations / timestamps, and image clustering with computer vision techniques, such as convolutional neural networks (CNN) for object class recognition.
- 2) Crowdsourced microtasks to validate and collect geo-temporal metadata.
- 3) Metadata management and filtering tools, and a framework for geo-temporal similarity detection.
- 4) Geo-temporal mapping of collection items using geographic information system (GIS) tools and an innovative approach for temporal data exploration based on triangular models.

For each of these technological realizations, we developed (re)usable interoperable building blocks that can seamlessly interact with each other and the collection data. UGESCO allows collections to grow, to improve, and to promote its content to a broader audience. In the end, our tools enable a wider exploitation of FSIs collection data.

The main DATA focus was on photographic collections (e.g. CegeSoma WWII data), but also other media-types were investigated in the context of the (re)usability of the platform in other domains. Multimedia data of the academic heritage archives of Ghent University, for example, were used to evaluate the cross-collection performance and to develop/test tools which cannot directly be evaluated on the CegeSoma collections. The dynamic collection linking of the CegeSoma photos and other FSIs' data with the collections of academic partners showed the strength of UGESCO's spatio-temporal enrichment process.

Results of the project were presented and demonstrated at different (inter)national workshops and conferences.



Keywords: spatio-temporal enrichment, image analysis, crowdsourcing, metadata filtering, mapping

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LINKS

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