Multivocal Exhibition: a user-centric application to explore symbolic interpretations of artefacts from different cultural perspectives[⋆]

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1 Introduction

Linked open data (LOD) is used extensively in the cultural heritage (CH) field by providing an unprecedented level of access to information, and enabling the development of applications used to explore and identify the relationships between artefacts, places, and people, as well as to trace their origins by integrating data from different sources [2]. In this paper, we present Multivocal Exhibition, a LOD-based application that lets users explore how one concept is symbolically expressed by different cultural contexts through a 3D exhibition of artefacts. We focus on elements depicted in artefacts that carry symbolic meanings in several cultural contexts. For example, a pearl depicted in Johannes Vermeer's "Girl with a Pearl Earring" symbolises "femininity" in multiple cultures, while in the Chinese cultural context a pearl symbolises "immortality" [4]. Our application allows users to access such differences in symbolic interpretations. With the app, we demonstrate the multivocality of different interpretations, fostering an open cross-cultural discussion about them.

As an exploratory medium, we build an interactive 3D environment that resembles a virtual museum exhibition. We find connections between objects in the collection of the Dutch National Museum of World Cultures (NMVW)[6], the general knowledge base Wikidata [6], and the knowledge graph about symbols and their meanings HyperReal [5]. We rely on multiple sources of linked data, resulting in a comprehensive amount of information that is currently not present in sole digital collections [7]. The NMVW museum collection provides metadata

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[6] Collections of the National Museum of World Cultures and the World Museum: https://collectie.wereldculturen.nl/

about objects from multiple cultures, Wikidata contains artworks with information about which objects depicted on them, and HyperReal adds the symbolism layer to objects.

2   Data

Wikidata is a collaborative knowledge graph that covers various domains, including information about artworks and their depictions. We extracted titles, images, and labels of the depicted elements from all the artworks described in Wikidata using its SPARQL endpoint.[7] The digital collection of the Dutch National Museum of World Cultures (NMVW) contains metadata about more than 450,000 ethnographic objects, including ancient artefacts, religious icons, and craftwork from a variety of cultures. We extracted images, titles, and descriptions (in Dutch) of the artefacts in NMVW from a data dump of the collection.[8] HyperReal [5] is a knowledge graph that contains around 40,000 instances of cultural symbolism, also called *simulations*. A simulation links together a symbol (like a carp), its symbolic meaning (courage), and the cultural context(s) in which it exists (Chinese, Japanese), along with the source of that claim (in this case, a dictionary of symbols [4]). In this knowledge graph, symbols are spread across more than 300 cultural contexts, which are grouped together in different macro areas. For instance, on the one hand, the "Geo-socio-political" macro area contains, among many, Italian, German, Mexican cultural contexts. On the other hand, the "religious" macro area contains contexts such as Christian, Buddhist, Taoist. Other macro areas deal with Philosophy, Esotericism, science.[9] We extracted information about symbols and what they symbolize in different cultural contexts from the data dump of HyperReal.[10]

3   Application development

First, we reconciled the depicted elements of artworks in Wikidata with the symbols in HyperReal by matching the corresponding labels (both in English). Second, to associate the artefacts from NMVW with the symbols in HyperReal, we translated the latter in Dutch using the Google Translate API[11] and then performed an exact match string search with the translated symbol on the whole NMVW collection on artefacts' titles and descriptions. Third, we developed a graphical user interface (GUI) using the Python package PyQT[12] that lets users choose a concept and up to three cultural contexts of interest. The list of available

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[7] https://query.wikidata.org/

[8] https://collectie.wereldculturen.nl/thesaurus/

[9] A taxonomy about the cultural contexts of HyperReal is available at https://w3id.org/simulation/contexts

[10] https://w3id.org/simulation/data/

[11] https://cloud.google.com/translate/?hl=en

[12] https://pypi.org/project/PyQt5/

concepts corresponds to the symbolic meanings of HyperReal. The same applies to cultural contexts: given that HyperReal already contains numerous cultural contexts, we reuse its taxonomy. After the user's selection of concept and context, the app finds paintings that depict objects that symbolize the chosen concept in the chosen context. Then, The GUI outputs a JSON file with metadata about the relevant paintings, labels of objects they depict, the symbols that relate to the objects, and their symbolic meanings. Finally, this JSON file is then used as a base for a Unity[13] script that automatically generates a 3-room 3D exhibition of the extracted artefacts, each room dedicated to a different culture. In the exhibition, all artefacts come with (i) a description that specifies which symbol(s), in the corresponding cultural context, refer(s) to the concept chosen by the user, and (ii) a direct link to their metadata pages from Wikidata or NMVW.

4   Purpose and target audience

The purpose of this app is to foster an open dialogue about the uniqueness and similarities of cultures, by showing how artefacts and what they depict can be interpreted in different cultural contexts, according to their symbology. The application is mainly intended for such users who are interested in the symbolism of artworks. The app does not require any technical skills, as it compiles a dataset according to users' input through an intuitive interface. By emphasizing on fostering dialogues about cultures and their symbolisms, and giving the power of choice to users, we adhere to the principles of citizen curation [1].

Citizen curation is a novel approach to engaging with CH that emphasizes the significance of receiving input from diverse individuals, even non-museum visitors. It promotes interaction between various groups and encourages diverse opinions [1].

5   Evaluation strategies and future work

Multivocal Exhibition is still a demo.[14] Currently, the app can generate a 3D exhibition with nine artefacts and three rooms, explorable in first-person using a laptop. The dataset that we have collected to build Multivocal Exhibition does not contain "right" or "gold standard" links between artworks, objects depicted on them, and their symbolic meanings due to the automatic approach we used to find the links (string matching and string search). Thus, the current dataset is a pool for exploration of such links by users themselves, enabled by the interface. Further refinement of the dataset with the involvement of domain experts can be useful in constructing curated virtual exhibitions.

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[13] https://unity.com/

[14] The source code and the data used to develop Multivocal Exhibition are available on GitHub at https://github.com/cultural-ai/HackaLOD

As future work, we plan to evaluate the app by letting small groups of users experience Multivocal Exhibition together. First, on a general level, we will refer to the criteria of authenticity, interaction, navigation, and learning, explained in [3]. Then, we aim to specifically collect data about any debates emerging from the multicultural perspective provided by this app. We hope to stimulate users to share their perspectives, from their cultural background, about artefacts and their symbolism. Analysing these debates will provide us with information about the impact of this application (and, more in general, the inclusion of symbolic linked open data in CH collections) on cultural fruition and engagement.

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