Enabling Multiple Voices in the Museum: Challenges and Approaches

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Within the recently launched SPICE project, citizen curation methods and tools are being co-designed through five museum case studies in Finland, Ireland, Spain, Italy and Israel. In each case study a museum is working with partner groups and organisations to introduce tools and methods that support citizen curation for visitor groups that tend to be underrepresented in cultural engagement, including people living with disability, older people, asylum seekers and minority religious communities.

Museums, rather than providing an authoritative account, increasingly attempt to present multiple voices related to their collection and exhibitions. Our question is "how can museum visitors be helped to engage with multiple voices?" Citizen curation is proposed as a way of achieving this aim by supporting citizens to share their own interpretations of museum objects and reflect on the variety of interpretations contributed by others.

We define citizen curation as *users applying curatorial methods to archival materials available in heritage and memory institutions as well as to items depicted in exhibitions in order to develop their own interpretations, share their own perspective and appreciate the perspectives of others*. Related uses of the term can be found in the work of Mauer (2017) and Hill et al (2018). Mauer (2017) defines citizen curating as enlisting citizens to curate exhibitions using archival materials available in museums and other institutions.

Within the SPICE project we aim to operationalize citizen curation more broadly, to encompass participatory museum activities in which citizens can productively contribute and share their personal perspectives, potentially on a larger scale and without prior training in curatorial methods. The following sections outline three challenges to be addressed in order that citizen curation can be used to create an active space for interweaving voices and perspectives.

Representing multiple subjective perspectives with metadata standards

Museum cataloguing and metadata standards (Harpring et al. 2006; Baca and Harpring 2009; Coburn et al. 2010; Cowles 2014) are primarily designed to focus on the description of denotative aspects while connotative aspects is less extensively carried out, and mainly focuses on a (more or less) shareable classification of iconographic terms in thesauri, taxonomies, or folksonomies (van de Waal 1973; Warnke 2000; Harpring 2010). Indeed, connotation as a subject of cataloguing is often meant to support discovery across collections by association, rather than to foster understanding and development of personal and subjective viewpoints.

Collecting such information during visitors' encounters with artifacts (whether these happen in presence or online) as structured data would allow more relevant or familiar concepts to be leveraged in museum decision and policy-making, providing a solid ground when developing innovative engagement strategies.

Currently, Linked Data technologies (Bizer, Heath and Berners-Lee 2011; Hyvönen 2012) allow us to formally represent complex situations as structured metadata that can be leveraged in reasoning and knowledge discovery applications. Lately, research on vocabularies and ontologies for describing aspects related to the Cultural Heritage domain has been focusing on denotative attributes (Doerr 2003; Doerr et al. 2010; Daquino et al. 2017; Carriero et al. 2019), connotative (iconographical) attributes (Carboni and de Luca 2019), provenance of information (Moreau et al. 2015), and competing (contradictory) interpretations about cultural heritage objects (Daquino and Tomasi 2015).

The challenge in the SPICE project is to design a flexible architecture of ontology design patterns (Gangemi and Presutti 2009) addressing all the aspects underlying personal encounters with artifacts in a way that new (latent) information on users' reflection can be inferred. In particular, the aim of the SPICE ontology framework is twofold: to represent interpretations having different settings and intentions, i.e. interpretations that are voluntarily shared (e.g. a user interacting with a museum curator in a forum) or indirectly shared (e.g. a user's posting on a social media platform about a museum visit) to understand differences in users' behaviours; to represent relations between connotations originally shared by artists and curators and connotations that are developed by users (as influenced by artists and museums or independently developed by users), so as to highlight the dialectic between institutions and citizens and how power dynamics may affect reflection.

In SPICE we propose a holistic, bottom-up approach based on data collection during engagement events with museum visitors and social media data analysis for framing all the aspects that are relevant to our problem. Based on the analysis of collected data, we plan to define methods and models for representing citizen curation activities, and to link this information back to museum catalogues. To

validate our approach, five project case studies with museum partners have been set up, wherein data mined and analysed in the knowledge acquisition phase are leveraged in online and in physically present engagement activities for encouraging visitors to share, compare, and develop their own perspectives. However, we need to consider these issues within the context of a technical infrastructure for sharing, publishing, accessing, and connecting cultural heritage collections. This is discussed in the next section.

Enabling museum and citizen control of data and identities

Social media platforms are ill-suited for reflective experiences that draw on individual or collective social media histories. This has led Facebook to devise methods for bringing social media history into people's timelines. However, inadequate access to social media history, the diversity of platforms (e.g. Twitter, Facebook, Instagram) and their various APIs and terms and conditions, produce fragmentation which is a barrier to the creation of social spaces bringing together museum artefacts and resources with the responses of visitors. There is also a fundamental imbalance in the power relation between content producers and social media service providers, where the latter makes all efforts to enable free user expression but reject liability for the messages. Additionally, museum Collection Management Systems (e.g. TMS Collections, MuseumIndex+) have limited visitor-facing functionality, separating the collection from the responses of the visitors.

Within the framework of the SPICE project, we seek to develop a distributed Linked Data layer to support the management of content (museum objects, related museum resources, citizens' contributions, and models of citizens and groups). This will build on the principles of Social Linked Data (SOLID) (Mansour 2016). In SOLID, agents (both users and organisations) are identified by a decentralized protocol for identity management, such as WebID, and agents can expose their content on the Web using self-managed repositories, known as Solid PODs, and declare access control policies. The basic building blocks of SOLID allow the development of applications that are fully decentralised, where the data can remain stored on the user's device, for example, the mobile phone, without needing to be transferred to a central hosting organisation. However, the requirements of citizen curation go beyond the use case of decentralised identity and data access control management. For example, heritage institutions will need to access and process user contributions at scale, connecting simultaneously to a potentially very large number of devices - a known problem of distributed database systems (Özsu 1999). The role of systems acting as mediators will be of crucial importance in supporting this data ecosystem.

Clearly, users and organisations need to share also *non-open data* and choose who can access or reuse them, by making rights statements and enabling and revoking usage rights to some or all of the assets and associated metadata. However,

this issue goes beyond access control and touches the problem of expressing and negotiating terms and conditions tailored to each unique situation. This is common practice in museum organisations, when assets are asked to be used for certain activities, for example, to build derived assets for the advertisement industry or, closer to our domain of interest, to allow a school teacher to make photographs of an artwork in the context of a workshop, for educational purposes. Many of these constraints can be limited in time. One may have the right to display a certain image on a screen during a special event but not one month after the event has finished. The management of copyright is a significant part of the administration of cultural heritage that falls under the scope of copyright law, such as contemporary art and design. Being able to express constraints such as time and place when some usage right is granted is of fundamental importance. For these reasons it is necessary that the digital ecosystem is capable of supporting the expression, exchange, and negotiation of usage policies, so that organisations can request access to digital assets and express why they want to do that, how they are going to use the asset, how long, for what purpose, and so on. Similarly, museum organisations may want to express the general requirements to be satisfied, by detailing how the integrity of the digital assets need to be preserved, or how to report on attribution.

Recommending diverse voices to the museum visitor

As citizen curation enables citizens to express their perspectives about cultural objects, current Information and Communication Technology (ICT) may be applied to engage the visitor in further discussion with the content provided by other visitors about the object of interest. With technology, visitors may be able to interact with museums, exhibitions and exhibits (Ciolfi et al., 2008). Visitors may share their impressions and perspectives about exhibits on social media. If the museum (or the exhibition) has a website, then visitors may respond and comment on the exhibits – if this is possible. By analysing the textual content provided by a visitor as a post about a cultural object, one may learn about the perspectives expressed in the text and its sentiment, whether it is positive or negative – whether the visitor liked or disliked the object and / or the explanation. The ability to comment about exhibits may enable discussion between visitors and, moreover, enable the museum to guide the interaction (Black, 2010). Once the text (or audio) of the visitor's comment is analysed, the museum system, by applying classical content-based recommendation techniques (Pazzani & Billsus, 2007) (which means using similarity of textual content for recommending additional content to users), may consider suggesting additional information (if the visitor expressed an interest to learn more), or present comments of other visitors expressing similar/different perspectives (if there is an interest to present visitors with diversity of perspectives). In this way, the museum may achieve the goal

of engaging visitors and fostering interaction of visitors with the museum and between them about objects of interests, expressing and sharing perspectives, reflecting on their experience and in general, enabling discussion and expression of diverse perspectives. By reasoning on the visitors' contributions and especially if they are returning visitors that are known to the museum, a system may be able to understand who they are and what they are interested in and act accordingly to engage them in further discussion about cultural heritage, their experience as well as others' experience.

It is worth noting the different approach taken by the SPICE project, compared with classical applications of recommender systems (even though the techniques are similar). In classical applications of recommender systems, the goal of the system is to provide the "best" or the "highest rated" suggestion (or the "top k") to its user (Ricci et al., 2015). The "highest" may be according to the end user or according to the site owner. Usually, the actual reasoning process is not known to the end user, even though sometimes explanations are provided. This includes product recommendations in e-commerce applications, points of interest in tourism applications, content in news applications and people to follow on social media. Specifically, these techniques were also applied in cultural heritage for enhancing the museum visit experience (Kuflik et al., 2010; Ardissono et al., 2012; Kuflik et al., 2015). In recent years, "beyond accuracy" criteria have been applied to recommendation systems such as diversity, serendipity, novelty and coverage (Kaminskas et al 2016, Kolkov et al, 2020). SPICE builds on these trends by aiming to increase awareness of the variety of perspectives about a specific topic – not just "more of the same", highly rated items, but by suggesting to the user to explore a diversity of perspectives - to understand, respect, and acknowledge other points of view. In order to do that, in SPICE we will present the user a selection of alternatives, following interaction scripts and taking into account the user's characteristics – the "user model" (Wahlster and Kobsa, 1989, Nguyen et al 2018), with the aim to persuade the user to explore the diversity of existing perspectives rather than the highest-rated or most similar to their own. The criteria for success are not just user satisfaction but also the increase in awareness and understanding of other perspectives.

Acknowledgements

References

Ardissono, L., Kuflik, T., & Petrelli, D. (2012). Personalization in cultural heritage: the road travelled and the one ahead. User modeling and user-adapted interaction, 22(1-2), 73-99.

Baca, M., & Harpring, P. (2009). Categories for the Description of Works of Art (CDWA).

Bizer, C., Heath, T., & Berners-Lee, T. (2011). Linked data: The story so far. In Semantic services, interoperability and web applications: emerging concepts (pp. 205-227). IGI global.

Black, G. (2010). Embedding civil engagement in museums. Museum management and curatorship, 25(2), 129-146.

Carboni, N., & de Luca, L. (2019). An Ontological Approach to the Description of Visual and Iconographical Representations. Heritage, 2(2), 1191-1210.

Carriero, V. A., Gangemi, A., Mancinelli, M. L., Marinucci, L., Nuzzolese, A. G., Presutti, V., & Veninata, C. (2019, October). ArCo: The Italian cultural heritage knowledge graph. In International Semantic Web Conference (pp. 36-52). Springer, Cham.

Ciolfi, L., Bannon, L. J., & Fernström, M. (2008). Including visitor contributions in cultural heritage installations: designing for participation. Museum Management and Curatorship, 23(4), 353-365.

Coburn, E., Light, R., McKenna, G., Stein, R., & Vitzthum, A. (2010). LIDO-lightweight information describing objects version 1.0. ICOM International Committee of Museums.

Cowles, E. (2014). *VRA Core Schemas and Documentation*.

Daquino, M., & Tomasi, F. (2015, September). Historical Context Ontology (HiCO): a conceptual model for describing context information of cultural heritage objects. In Research Conference on Metadata and Semantics Research (pp. 424-436). Springer, Cham.

Daquino, M., Mambelli, F., Peroni, S., Tomasi, F., & Vitali, F. (2017). Enhancing semantic expressivity in the cultural heritage domain: exposing the Zeri Photo Archive as Linked Open Data. Journal on Computing and Cultural Heritage (JOCCH), 10(4), 1-21.

Doerr, M. (2003). The CIDOC conceptual reference module: an ontological approach to semantic interoperability of metadata. AI magazine, 24(3), 75-75.

Doerr, M., Gradmann, S., Hennicke, S., Isaac, A., Meghini, C., & Van de Sompel, H. (2010, August). The europeana data model (edm). In World Library and Information Congress: 76th IFLA general conference and assembly (Vol. 10, p. 15).

Fuchs, C. (2012). The political economy of privacy on Facebook. Television & New Media, 13(2), 139-159.

Gangemi, A., & Presutti, V. (2009). Ontology design patterns. In Handbook on ontologies (pp. 221-243). Springer, Berlin, Heidelberg

Harpring, P. (2010). Development of the Getty vocabularies: AAT, TGN, ULAN, and CONA. Art Documentation: Journal of the Art Libraries Society of North America, 29(1), 67-72.

Harpring, P., Lanzi, E., & McRae, L. (2006). Cataloging cultural objects: A guide to describing cultural works and their images. American Library Association.

Hill, A., Kretzschmar, M., Morton, D., & Raffel, S. (2018). "Eenie Meenie Miney Mose": Using Experimental Citizen Curating to Engage Visitors with Racial Ephemera. *Florida Studies Review*, 62.

Hyvönen, E. (2012). Publishing and using cultural heritage linked data on the semantic web. Synthesis Lectures on the Semantic Web: Theory and Technology, 2(1), 1-159.

Kaminskas, M., & Bridge, D. (2016). Diversity, serendipity, novelty, and coverage: a survey and empirical analysis of beyond-accuracy objectives in recommender systems. ACM Transactions on Interactive Intelligent Systems (TiiS), 7(1), 1-42.

Kuflik, T., Kay, J., & Kummerfeld, B. (2010). Lifelong personalized museum experiences. *Proc. Pervasive User Modeling and Personalization (PUMP'10)*, 9-16.

Kuflik, T., Wecker, A. J., Lanir, J., & Stock, O. (2015). An integrative framework for extending the boundaries of the museum visit experience: linking the pre, during and post visit phases. *Information Technology & Tourism*, 15(1), 17-47.

Mansour, E., Sambra, A. V., Hawke, S., Zereba, M., Capadisli, S., Ghanem, A., ... & Berners-Lee, T. (2016, April). A demonstration of the solid platform for social web applications. In Proceedings of the 25th International Conference Companion on World Wide Web (pp. 223-226).

Mauer, B. J. (2017). The Citizen Curating Project Confronts the Pulse Nightclub Shooting. Special Issue on The Humanities as Activism, M. Carosone guest editor, *The St. John's University Humanities Review*, 14 (1), Spring 2017.

Moreau, L., Groth, P., Cheney, J., Lebo, T., & Miles, S. (2015). The rationale of PROV. *Journal of Web Semantics*, 35, 235-257.

Nguyen, T. T., Harper, F. M., Terveen, L., & Konstan, J. A. (2018). User personality and user satisfaction with recommender systems. *Information Systems Frontiers*, 20(6), 1173-1189.

Özsu, M. T., & Valduriez, P. (1999). Principles of distributed database systems (Vol. 2). Englewood Cliffs: Prentice Hall.

Pazzani, M. J., & Billsus, D. (2007). Content-based recommendation systems. In *The adaptive web* (pp. 325-341). Springer, Berlin, Heidelberg.

Ricci, F., Rokach, L., & Shapira, B. (2015). Recommender systems: introduction and challenges. In *Recommender systems handbook* (pp. 1-34). Springer, Boston, MA.

Wahlster, W., & Kobsa, A. (1989). User models in dialog systems. In *User models in dialog systems* (pp. 4-34). Springer, Berlin, Heidelberg.

Warnke M. (ed.) (2000). *Der Bilderatlas Mnemosyne*. Akademie Verlag: Berlin.