Emerging Tastes: Considering How Preferences Evolve

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ABSTRACT

Experiencing cultural heritage is a voyage of discovery and learning, where emerging insights and serendipity play a significant role. The experience also happens in a blended personal and social context. At the broader level, engagement is longitudinal – what we learn from modern cultural experiences (daily life in our surroundings) can provide clues to analogous interests in cultural materials, and vice versa. The richness of personal experience poses challenges and opportunities for capturing preferences in ways that support a user's experience with cultural heritage across institutions and over time, both in the digital realm and where digital interaction blends with a physical space.

Author Keywords

Cultural heritage; digital humanities; personalization; context; information architecture; user experience; linked data; LODLAM.

ACM Classification Keywords

H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval—Information filtering; H.5.m [Information Interfaces and Presentation]: Miscellaneous

INTRODUCTION

Cultural heritage institutions recognize the need to extend their digital strategies as they gain an understanding of emerging technologies and web-scale linked open data. This means moving beyond "making things available" and allowing users to save "personal collections" to more sophisticated and personalized experiences. This has broad implications for data management that goes beyond publishing collection and image metadata. It prompts a new wave of design thinking for cultural sites and applications, finding ways to meet the needs of diverse user types and scenarios of use. Personalizing lifelong learning presents opportunities to suggest new areas of exploration and discovery that enrich experience, particularly when spanning multiple institutions, cultures, and subjects.

It is important to recognize that the domain's data itself is a moving target – available data (particularly linked open data) is emerging rapidly. And there are a growing number of initiatives for institutions to share and harmonize their data representations online, which means the potential to integrate information models and user profiles across cultural institutions will continue to evolve.

Our work in cultural heritage has been focused primarily on the user experience and design of applications for museums and archives, and helping institutions plan to incorporate linked data to enhance people's experience with their cultural assets. We increasingly support institutions that want to share and enrich data via federated approaches, allowing information access to expand over time and across institutional boundaries. Rich personalization is important. Many tasks will need a greater level of support as the volume of digital information – and associations via linked data capabilities – grows in the coming years. As we design interfaces, we explore the personal experiences people have with cultural heritage information, whether online or in person, and how their expectations and interactions with cultural heritage evolve over time. The considerations that arise from that work are the subject of this paper.

CONSIDERATIONS

Designing personalized interactions that are companionable, flexible, and not awkward is vital. To achieve that aim, personalization models need to provide a great degree of user transparency [9], control and be open to many outside signals that respond to new experiences and changing tastes, and are carefully aligned with a user's needs and expectations. These aspects are not static – they change in specific contexts and evolve over time, forming longitudinal patterns that may help inform how personalization models adapt.

Preferences Interact with User Knowledge

At any one time, a person's interaction with cultural heritage has a purposeful dimension – whether that is entertainment, knowledge-seeking for its own sake, or resource-seeking for some outside task.

To achieve a goal of supporting lifelong learning, it is important to focus on the general user experience with digital cultural heritage interactions. Yet there are specialized audiences who have their own needs for personalization. Scholars and practitioners in the field of cultural heritage have a driving motivation for discovering, interpreting, analyzing, synthesizing, publishing, and sharing. Their requirements are particularly rich, due to their specialized and detailed knowledge in particular subject areas. Educators have varying levels of experience and knowledge, and they act as surrogates for others who do not share their level of knowledge. An educator's interaction with cultural heritage can be largely driven by a task that is focused outside themselves, as their role is primarily communication of cultural heritage information to

others (although they also have their own personal interests to balance with their professional focus areas).

The richer a person's experiences and knowledge, the richer and more nuanced their personalized modeling may need to be. And the broader the possible goals and tasks, the more contextually aware applications need to become. At the same time, single interactions between the individual and an institution may be motivated by needs that are separate from preferences and knowledge. For example, Falk [6] outlines five ways that individual identity is reflected in their actions within an institution, including rechargers, experience-seekers, and facilitators.

Preferences have Scenarios and May be Transitory
There are often situations where a person is engaging with cultural heritage as an aspect of a very specific, directed task. This could be writing a paper as a school student, or researching a book as a scholar, or preparing a treatment for a major artwork as a museum conservator. While a person will often be clear about their particular context when interacting with cultural heritage, they may not externalize that context to a supporting technology.

When that task is completed, whether in two weeks or two years, the intensity of focus decreases. In most cases there is still an interest in a particular subject or area of culture, but the goal that prompted a strong, focused interest may have waned. The corresponding strength of the preference may need to be tuned accordingly.

Preferences Emerge over Time
When people encounter something for the first time, they may not immediately sense its significance. Tastes (and emotional connections to cultural objects or experiences) are emergent and are often recognized only on reflection, rather than "in the moment." So something "stays with you" after the experience, or you recognize something as valuable/important only in the context of subsequent experiences with other things (they form a pattern that makes a whole, and a preference forms at that higher level). Strong interests from one interaction may over time have evolved or been eclipsed by more lasting connections with what were, at the time, weaker signals of engagement.

In this way, personalization for cultural heritage may be more nuanced and longitudinal than preference and recommendation modeling required in other domains.

When interacting with art and exhibitions, it is also helpful to recognize that the experience itself may be what is most important to the user, not necessarily the specific object of the experience. In a recent conversation, two museum-goers described in great detail an electronic exhibition piece where they interactively engaged with art. They described deep engagement with the *experience* but had trouble recalling the specific art that was the focus.

As systems collect data about interactions (whether clicks, views, likes, saves, shares), it becomes important to discern when and how to interpret *interaction* as *interest*, and assess their actual longevity. It is useful to identify what elements of personal interest/engagement are relevant to the activities available at a particular cultural venue (whether this is a formal cultural institution/site, an informal urban location, or a purely digital online interaction), and identify ways to interpret what someone "takes away" from the experience. And algorithmic interpretation gets harder as the time gap grows between the experience and the expression in an electronic form. More distant value judgments (ratings, suggestions from one user to another, etc.) can have lower validity in recommendation algorithms [9].

Preferences Evolve Through Lifelong Experiences
Where do personal preference signals come from? Cultural linked data used in education, media, tourism, gaming will produce aspects of personal interest that can be reflected back into cultural heritage preferences. This will require a broader – and more nuanced – way of modeling "preference", and reflects the PATCH[1] workshop goal of exploring a longitudinal perspective that encompasses lifelong learning. Various dimensions to support and evaluate models have been proposed [10, 2].

At the broader level, engagement crosses timespans – what we learn from modern cultural experiences (daily life in our surroundings) can perhaps translate to analogous interests in cultural materials from other time periods [15].

One further aspect to consider for lifelong models is identifying when a person transitions from experience to knowing, and as a result is likely to need different kinds of recommendation, as they are able to be more personally directed via their own knowledge and experience. In this way, applications and agents need to consider how much, and how little, to be involved in an experience.

Preferences are Balanced by Serendipity
Personalization models need to guard against over-simplicity or rigidity, and in that way foster discovery and learning. At a basic human level, people seek to engage with culture and art in order to find delight in something new as well as to experience known and loved objects. Serendipity and discovery are a significant motivation for exploring cultural heritage. This is particularly true among scholars and curators, whose life work centers around interpretation and discovering new perspectives. It is also true for people who engage in conservation and built cultural environments (archaeologists, historians, preservationists, architects) who want to engage in the latest science and interpretation.

Some implementations of personalization can be restrictive, even if the intention is to reduce informational "noise" and increase relevance for a user. The "filter bubble" [13] term was coined to describe a concern where a system algorithm

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[1] PATCH 2015: https://patch2015.wordpress.com/about-2

manages navigation through a significant glut of information, but users are not easily able to go beyond the boundaries of the algorithm's filters and may not encounter something that is valuable and engaging [12, 5, 4].

The overall aim of personalization needs to be transparent and controllable, so as to avoid becoming restrictive. It is vital for applications to open up new, unexpected (and yet ideally tangentially-related) experiences for users in cultural heritage. Serendipity is not simply random encounters, rather it is a process that incorporates and synthesizes new things into experience [1] – and it needs to be fostered. It is important to find patterns that can foster an *"aha!"* moment – that moment when they discover a relationship between what they know and what they experience.

Preferences are Influenced by Social Interactions
When I go to a museum with other people, we engage with things that Group/social interaction in physical space makes it harder to know what is persistently preferential for the individual rather than a reflection of an immediate social group dynamic. What do I "keep for later" and transfer between contexts, and what is purely "in the moment" for my relationship with the people and place?

One research area to consider is exemplified by the Epiphany Project [7]. This emerging research aims to analyze social media streams to identify how individual interests, and institutional influences, are mirrored in what an individual publishes via social media.

In addition, the role of intra-group profiling of personalized dimensions plays a role in weighting recommendations and interactions in situations where the experiences are social.

Another aspect of social interaction with taste-making is that a person's knowledge of participants in a community and the mutual alignment of interests can affect their interpretation of how they judge recommendations [17]. When in a social recommendation environment for some subject I don't know well, I expect to use different value judgments about other people's preferences in relation to my interests. And those judgments can grow and change over time as my interaction with those same people grows over time, calling for an evolutionary learning approach to my preferences based on social context.

Preferences are Uneven Across Descriptive Dimensions
The dimensions of description and interpretation of cultural material and places are deeply multi-faceted. As we know that not all dimensions have equal weight in a person's engagement with culture [15], finding longitudinal patterns is important for discerning relative weighting of interests derived from personal experience.

As we consider rich dimensions, it is important also to consider the challenges that arise from such deepening data pools. In the recent book *Understanding Context* [8], Andrew Hinton writes:

"...no matter how enabled by artificial intelligence, such metamaps and compasses tend to become less accurate as they try to be smarter and more richly relevant to context. The bigger the gap we're trying to bridge, the more it's subject to the fog of ambiguity..." (pg.104)

Implications arise from rich multi-dimensionality, uneven interest weighting, and increasing ambiguity. Items that users select among online artwork or cultural artifacts today could themselves have a different "profile" at a future date, changing the way that automated personalization systems then map between profiles of the art and the nature of a person's interests over time. So not only is a person's longitudinal profile evolving, but the object models that are drawn upon also evolve, with uncertain consequences.

INFORMATION ARCHITECTURE AND DESIGN
At the information architecture level, how can publishers of cultural heritage information and creators of cultural experiences formulate *dynamic* information architectures that respond appropriately to personal representations and departures from those representations? And how can the technology community establish models and frameworks that reflect the inherent dynamism in this data?

At the UI level, how can we use UI frameworks to broaden and evolve experiences, without losing focus or overwhelming the user? Is it feasible to craft an "ambient" awareness of information and opportunities for engagement, without at the same time intruding on an individual's primary experience?

For the overall experience, how do we establish design patterns that make sure a person has an easy way to "turn off" aspects of personalization that become dissonant to their immediate experience, or where their digital interactions are out of the immediate context? For example, using a mobile device to look something up based on an in-progress conversation with a friend that is not related to the surrounding cultural space where they are located at that time? Their task context is separated from their physical context for some period of interaction. In other words, make sure *the algorithm is not in charge of the experience*.

The Role of a Guide or Agent
Recommendations in a cultural setting are likely not just focused on single objects, but a sequence of items in a place that help craft an experience flow. We find it helpful to consider the role of attentive guide as an aspect of personalization in cultural heritage.

Creating an emerging personal profile could involve interacting with an agent that is focused on your personalized experience; one that both guides and listens to a person's expressions of interest [14]. One perspective on this involves the role of the "information flaneur" [5]. This is an independent, knowledgeable agent who provides a perspective on overall information spaces, as well as being a guide to more specific information objects. The agent embodies properties of curious explorer, critical spectator,

and creative mind to prompt new perspectives. It is useful to consider what such a guide would need to know about the individual and the alignment with the cultural space at hand, as well as motivations for any particular interaction, for example as framed by Falk [6]. The flaneur could offer a launch point for refining the role of recommendation and guidance in subjective, interpretive learning settings.

Who Controls the Data?

Beyond the individual's experience, is there a role for an aggregation of experience patterns across many individuals and institutions? How might those aggregations be consumed and used by an institution, ideally in ways that increase diversity of experience rather than homogenize? How might they be shared among institutions, so that they can craft the way their applications respond to personalized needs in ways that create more seamless experiences for individuals as they move among cultural sites?

Personal profiling must, in this context, move beyond individual applications and institutions. Are there aspects of personal models that should not only be linked data, but linked *open* data so that the models can be extended and built upon? It is interesting and important to consider to what extent a profile of personal interests remains under the control of the person (for example, carried with the person in their mobile smart phone [11]), and how much of the profile needs to be shared with a cultural institution for a relevant experience to be crafted. It seems clear that the representation of personal interest is best held by the person rather than individual institutions or a data aggregator, but that raises questions that go beyond cultural heritage personalization.

Focusing on the institution's perspective, how does a particular cultural environment access an individual's personalized model to align the person's experience with information or an activity? What permissions might be required, and perhaps how would an automated agent be empowered to provide that on a person's behalf?

POSSIBLE ATTRIBUTES OF PERSONAL MODELS

Reflecting on the above considerations for personalization leads to attributes that could be incorporated into frameworks explored by PATCH participants, as well as others in the cognitive computing and HCI communities.

- **Longitudinal preference building**: Both the elements of preference (signals of interests expressed by an individual) and their strengths may be accrued over time, so the longevity of interest and the context in which it arose is evaluated over time.
- **Organic movement and decay**: Individuals can remain interested in things long after their focus or tastes have changed. But models need to provide a method of "decay" for interests that are not acted on, as preferences change over time, and outdated preferences can be perceived as noise by users.

- **Recognize shared and social interactions**: Models could usefully identify social contexts that people are in when preferences are engaged, and have ways of re-aligning their weightings accordingly – or prompt the user to take greater control of the experience.
- **Allow dynamic weighting**: Recognize context and user expectations, and provide an appropriate level of control for a person to express goals and needs. Then have those expressions reflect back into the preference model.
- **Provide simple frameworks for permission-giving**: Plan for an emerging ecosystem of information around personal interests information and preferences. Identify how to make the collection and use of information as transparent as possible, to foster trust and communication among the parties involved (whether humans, institutions, or digital agents) [3].

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