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In Pursuit of an Expressive Vocabulary for Preserved New Media Art

Andrew McHugh and Leo Konstantelos

Humanities Advanced Technology and Information Institute
University of Glasgow, UK,
a.mchugh@hatii.arts.gla.ac.uk
l.konstantelos@hatii.arts.gla.ac.uk

Abstract. The status of the new media, interactive and performance art context appears to complicate our ability to follow conventional preservation approaches. Documentation of digital art materials has been determined to be an appropriate means of resolving associated difficulties, but this demands high levels of expressiveness to support the encapsulation of the myriad elements and qualities of content and context that may influence value and reproducibility. We discuss a proposed *Vocabulary for Preserved New Media Works*, a means of encapsulating the various information and material dimensions implicit within a work and required to ensure its ongoing availability.

1 Introduction

Numerous layers (both physical and conceptual) support encapsulation of and access to digital information, in contrast with analogue information, which is largely atomic. Within a new media creative context, Rinehart [7] expresses this layeral complexity in terms of the separability of the physical and the logical, which in turn creates opportunities for variation of behaviour and performance. It also limits self-evidence of such materials, and introduces difficulties from a preservation perspective.

For performative works and for complex interactive installations the most critical dimension of preservation role is not maintaining a work *per se*, but instead preserving sufficient information to facilitate its recreation at a later date, in a manner consistent with the original creative intention. This might appear detached from the preservation objectives of libraries or archives that focus largely on the object or record, and on maintaining its availability and authenticity throughout temporal and contextual change. But the difference is one of skewed emphases rather than substantively different priorities. More so than preserving a tangible thing, the real purpose is the preservation of the end user's experience, irrespective of material specificities.

Interestingly, despite the shared purpose that art conservators and curators share with library and archival communities, there is little evidence of cross-pollination of theory or practice. For instance, despite its exploration of many

aspects of information and bit-level preservation, the *Conservation Guide* published by the *Documentation and Conservation of the Media Arts Heritage Group* (DOCAM) contains no references to mainstream preservation literature [3]. Work in characterisation and preservation planning illustrated in Planets¹ with the eXtensible Characterisation Language and the Plato [9] planning tool, and work in empirical evaluation supported by tools like the Planets Testbed [1] must find their applicability in this and other contexts. This demands a common, mutually applicable approach to the preservation challenge.

2 Previous Work

With the Media Art Notation System (MANS), Rinehart [7] acknowledges the performative characteristics of new media art materials, and seeks to conceive implementation agnostic means of describing materials' value. A noted shortcoming for preservation applications is MANS' association of *Descriptor* elements with each material *Resource*, intended to enable the explication of appropriate preservation strategy. However, this appears to prioritise physical aspects of preservation with less focus on the origins of particular information properties of value. The relationship between MANS' logical *Parts* and material *Resources* is not explicit, introducing difficulties in forming links between proposed preservation solutions (or, much more usefully, potential preservation risks).

The InSPECT project presents a workflow [5] aimed at the identification of significant properties, adopting a terminological foundation traceable to but distinct from MANS. Its FBS model (derived from Gero's *Function-Behaviour-Structure* Framework [4]) defines *Function* as broad purpose, *Behaviour* as a stakeholder's perceived outcome or consequence, and *Structure* as those elements of a given digital object that support a behaviour's realisation (significant properties). Stakeholder and object analyses demand and engagement with diverse stakeholders and identification of functional facets of value.

Within the National Archives of Australia's Performance model, also visible within OAI's representation information concept [2], we synonymise software performance with data's associated process. Its application to a data source yields a data performance. A JISC Framework for Software Preservation, which followed on from an earlier study into significant properties of software [6] presents a four layer model for software as *Product*, *Version*, *Variant* and *Instance* that is roughly analogous to the FRBR model of Work, Expression, Manifestation and Items [8]. Applied to the new media context, process can be interpreted as having technological, procedural or semantic facets. As well as software, documentation remains an integral dimension irrespective of whether one is describing the required steps for collecting and arranging wooden sticks to reproduce a physical art installation² or encoding appropriate representation information to reveal the meaning of coded column headings in an Excel dataset.

¹ see <http://www.planets-project.eu/>

² see Meg Webster's "Stick Spiral" (1986)

3 Expressive Documentation for New Media Art

Our vocabulary is positioned firmly within the domain of new media art preservation. Instead of focusing on the description of materials in and of themselves we look to conceive a description of the *Preserved New Media Work*. This implies that some elements of preservation infrastructure become implicit within the work itself. While perhaps not part of the piece envisaged by the creator these become nevertheless integral to its ongoing survival, like a pacemaker inserted into a human heart. Naturally, as the artist's view takes on such critical importance within this domain, only those additions that have been satisfactorily sanctioned can occupy such a role.

The *Vocabulary for Preserved New Media Works* (VPNMW) collates a complex set of information that may relate to multiple individual instantiations of a work across space and time. Likewise it is sufficiently loosely defined to support additional variability within the process of preservation. We assume a number of relationships between its principle dimensions; *Work*, *Version*, *Functional* and *Material Component*, *Dependency*, *Context*, *Property* and *Stakeholder*.

- Our parent element is the **Preserved New Media Work**, encapsulating every intellectual and material facet of the preserved work. This includes both elements of the artistic work and constituents of the preservation process. **Stakeholders** are associated with the work and have a range of priority levels for legislating on the work's value components, and determining acceptable limits for the preservation and management process.
- Works have multiple **Functional Components**, consistent within a single work, and contributing largely to its definition. This does not imply that they are completely static, as through their relationship with variable **Properties** a range of acceptability is established.
- **Functional Components** can exist hierarchically, and therefore single functional behaviours' may be grouped into wider functions. Multiple **Versions** may exist within a single preserved new media work, a consequence of variability within the creative space, and also of preserved outputs, which may differ from the original. Different versions share function, but may exhibit material differences. Within the context of each version there must be an explicit mapping between **Material** and **Functional** elements. There must be assurances of sufficient materiality to satisfy functional and property requirements. Specific versions may benefit from input of alternative or additional **Stakeholders** to the work itself; therefore, versions can be related directly to individual stakeholders.
- **Material Components** are the tangible building blocks of the preserved work, considered distinct from function, but directly contributing to its realisation. The relationship between material and function can be 1:1, but likewise in any single version there may be several material assets associable with a single function, and by extension significant properties. Any additional documentation assumes the character of material component, and becomes part of the PNMW.

- **Dependencies** are any process elements that must be associated with material elements to realise functional or property requirements of a work. These may be procedural, or infrastructural, or based on particular contextual qualities. At times it may be necessary to absorb **Contextual** elements into a work as an integrated dependency in order to resolve contextual omissions that occur over time (e.g. to provide an audience with the understanding that a worldwide recession took place at the end of the first decade of the 21st century). Dependencies are representation information; they may be structural or semantic, but are integral to establishing functional sense from material components.
- **Context** describes factors that exist outwith the control of the preservation environment, but that contribute to either its function (and associated properties) or are required as dependencies to realise material component's performance. Context is a critical dimension for documentation, since it cannot be manipulated directly by the preservation professionals. There is scope to absorb evidence of contextual elements into the *PNMW* as documentation, and these are encapsulated as material components.
- **Stakeholders** are the individuals that perform the preservation activity. Among their primary goals are to determine functional components (and by association properties) and their acceptable variability; evaluate material version-specific components to ensure their capacity to satisfy functional component requirements; monitor dependencies and contextual circumstances to ensure their ongoing adequacy; evaluate preservation risks and conceive, exercise and validate appropriate preservation responses.
- **Properties** are those measurable facets of function that collectively express the value of a *PNMW*, and that must persist for preservation to succeed. Properties are related to a stakeholder who explicates their identity and value, as well as (crucially) an acceptable tolerance for variability. Properties are frequently associated with function, but can also relate to dependencies and context as a means of expressing acceptable variability that can be tolerated before a preservation interaction is required.

3.1 Preserved New Media Work

At the top-most level of our information infrastructure we have the concept of a *Preserved New Media Work*. This has a number of sub-dimensions, which must be related and rationalised in order to determine preservation challenges and equip ourselves to satisfy them appropriately. It is at this top level that we associate descriptive metadata information, and other registration details that describe the work as a whole. There is value in presenting this information at the level of work, although further granularisation at the level of individual components and contextual elements enables more sophisticated and finely tuned recording, and associated preservation planning.

3.2 Functional and Material Components

A critical foundation for supporting works' recreation are means to describe both the intellectual object of preservation, and those physical material manifestation of that information. Content within a new media art piece may be as potentially diverse as one could possibly envisage, including real world objects, digital media, and combinations of both. More critical than considering objects in tangible terms is their expression as measurable (and functional) properties, ideally in a manner that is agnostic to any transitory, non-specific implementation. MANS elects to approach preservation as an activity that practically focuses on tangible system components (Resources), with an expectation that their preservation will safeguard the more intellectually (or functionally) specific Parts. This seems short-sighted we need not retain physical equivalence to ensure the sustainability of logical meaning. For example, it may be possible to replace multiple discrete media assets (e.g. still images, sound materials, interview transcripts) with a single subtitled video and retain every aspect of original information value. The message is the critical point at which persistence must be sought the physical building blocks are merely means to that end. This is why documentation can occupy a partial-surrogacy role, and be capable of expressing aspects of original meaning.

Even where artists stipulate conditions that appear to concern only matters of physicality, we must interpret that in intellectual terms. If a particular model of display device must be used for example we must consider that in its functional terms (i.e., its creative significance), rather than interpreting it as a material requirement. We should not assume a 1:1 correspondence between material and intellectual components.

The functional component is best expressed in terms of properties; this affords a level of measurability that is required to validate preservation efforts, and to make explicit acceptable boundaries for variability which are an intrinsic part of especially these kinds of materials.

New media works are dynamic and therefore may have multiple manifestations available simultaneously or along a time line. The version element provides a means to accommodate this dynamic quality, with the potential for multiple instances of a work which while tangibly variable nevertheless represent the same conceptual piece. Although material aspects of the work may vary across versions the functional components (expressed primarily in terms of associated, and a bounded range of property values) will remain consistent.

A complication facing the preservation community is that factors threatening our information often do not do so directly. Although the preservation goal is targeted on the sustainability of more intellectual or functional facets, it is often tangible and physical characteristics that are threatened by specific preservation risks (for example, the risk of file format obsolescence). This is not uniformly true we also face challenges such as insufficiency of semantic representation information for example, but the disconnect demands an understanding of the interrelationships between each dimension. We distinguish a work's functional and material character to support better preservation decision making. Material

components are intended to encapsulate a physical, and, one would anticipate, transitory dimension of a work. Their availability is threatened by preservation risk, which demands our awareness of the relationship between risk and materiality. Having established such links, of greatest importance is their relationship with intellectual properties, and by extension function.

3.3 Component Dependency

Both material and functional components exhibit dependencies, and again we must make this relationship explicit within our vocabulary. Dependencies describe those facets of process that must exist to support the realisation, from a content source, of an information performance. These may assume myriad forms, including technical or other infrastructural (most obviously software), procedural or contextual dependencies. Once more, these dependencies are expressed at the level of a preserved work, meaning that there are a number of examples included primarily due to the role they perform within the preservation process.

3.4 Work Context

The primary purpose of recording contextual dimensions is to make explicit those external or situational influences that must persist or be recreatable to realise or perform a work and preserve original artistic intention. Context is distinct from implicit components, dependencies and stakeholder relationships, in that they may surround, influence and reflect either the global work (or in even wider terms whole collections) or just individual information facets. Many contextual facets are represented as points on a continuum of variability and evolution of a work implies movement along this continuum, and reflects the different contextual properties that may still surround and legitimise a work.

Context is distinct from content in terms of the extent to which it can be realistically preserved. We cannot hope to maintain every aspect of context. In some respects objects and their associated representation mechanisms may exhibit change over time (for example, in the case of bit-rot), but the greatest challenge for preservation professionals is keeping up with change that is wholly contextual, whether realised in financial, technological or cultural terms, almost always a reactive process.

Preservation requires the establishment (probably with the input of artists) of acceptable spectrums for contextual deviation. For example, what spatial restrictions are tolerable on a particular installed piece? What opportunities are there to transfer content to new media devices? What wider contextual factors (for example a financial recession) must be documented and integrated within a work to maintain its essence when those factors have since changed and been forgotten? In these respects the line between context and content (particularly objects' associated dependencies or process elements) may appear blurred; the preservation process demands the explication of that which is content, and that

which is a relevant, but not integral contextual factor. Likewise, for each contributing factor, tolerable parameters and descriptions of associated documentation requirements should be made explicit.

3.5 Stakeholder

The diversity of roles and priorities that contribute to the creation, documentation, preservation and consumption of art hints at the complexity of the characterisation process. Artists are most naturally assumed to be the most appropriate arbiter of a work's significance. Likewise, they are often relied upon to sanction preservation interventions that may otherwise prejudice its value. Example accounts exist of useful artist intervention [10], but this probably cannot be expected to be typical. Nevertheless, engagement with creators is a critical part of understanding the work, and the breadth of opportunities for its preservation.

The other broad dimension of stakeholder intervention is identification of preservation risk and challenge. For bespoke highly complex technical materials this may presuppose the input of wider constituencies than simply curators. Technological contributors for example are very well placed to comment on information dependencies implicit within any code they have implemented for a specific work. Curators must assume primary responsibility for preservation risk awareness, although as described above this assumes a close understanding of the relationships between a work's tangible assets and softer facets of message and value, expressed as properties.

3.6 Information Property

Preservation planning must be moored to both the tangible realities of a piece and their cumulatively realised expressive force. This softer, but most critical dimension is best expressed in terms of properties. Information properties are the focus of the preservation effort, and are potentially limitlessly diverse. Each specific property has a number of individual facets. They are relatable to both functional and material components, and to stakeholders, who are at least partially responsible for their definition, and for establishing bounds of acceptability for variation of those properties over time.

A well defined information property is one that is discrete, measurable and explicit. There are few if any information domains where such attributes are universally feasible. There are always likely to be peripheral, but nevertheless potentially integral properties that are inarticulately defined, or insufficiently tangible to express in empirically evaluable terms. A pragmatic approach may be to ignore these in favour of those properties that can be definitively validated (ideally using automated tools) but this remains unsatisfactory, particularly for qualities (frequently associated with new media art) that are ephemeral or philosophical. The primary role of new media art preservation and documentation is to distil even loosely expressed properties into tangible factors that can be exposed to validation. The characterisation process must seek to granularise works

into discrete component parts, each composed of some kind of content, associated dependencies, implicit variability, and stakeholder relationships. These are then further subdivided into associated properties, and aligned with a characterisation of causally or effectually linked context.

4 Conclusion and Further Work

This short paper introduces a possible vocabulary for supporting new media art preservation, building on foundations established in preservation research in both creative and more mainstream information domains. Future work will seek to implement the vocabulary as an ontology and validate its effectiveness in real-world new media conservation and curation environments.

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