

# **Managing Digital Cultural Objects**

Analysis, discovery and retrieval

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# **Managing Digital Cultural Objects**

Analysis, discovery and retrieval

Edited by  
Allen Foster and Pauline Rafferty

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Pauline Rafferty 2016  
The chapters: the contributors 2016

Published by Facet Publishing,  
7 Ridgmount Street, London WC1E 7AE  
www.facetpublishing.co.uk

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*British Library Cataloguing in Publication  
Data*

A catalogue record for this book is  
available from the British Library.

ISBN 978-1-85604-941-2 (paperback)  
ISBN 978-1-78330-102-7 (hardback)  
ISBN 978-1-78330-153-9 (e-book)

First published 2016

Text printed on FSC accredited material.



Typeset from editors' files by Flagholme  
Publishing Services in 10/14 pt Palatino  
Linotype and Myriad Pro.

Printed and made in Great Britain by CPI  
Group (UK) Ltd, Croydon, CR0 4YY.

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### **Allen Foster**

Allen Foster has a BA in Social History, a Master's in Information Management and a PhD in Information Science. As Reader in Information Science, he has held various roles, including Head of Department for Information Studies, at Aberystwyth University. His research interest areas span the research process of Master's and PhD students, the development of models for information behaviour and

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Sarah Higgins lectures in the Department of Information Studies at Aberystwyth University, where she teaches across all programmes and leads the Master's degree in Digital Curation. Her research focuses on the lifecycle management of digital materials by archives services, libraries and other information professionals. She was formerly an advisor with the Digital Curation Centre where she led the DCC Curation Lifecycle Model Project and the standards advisory function. She moved to the DCC from the University of Edinburgh where, as a qualified archivist, she undertook various metadata development and co-ordination roles across their cultural collections. A trained cartographer, her first archival role was curating the British Antarctic Survey's Geographical Information Collection and acting as Secretary to the UK Government's Advisory Committee on Antarctic Place-names.

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### **Corinne Jörgensen**

Dr Corinne Jörgensen is the author or co-author of numerous publications in the areas of organization and representation of information, with a focus on cognitive, perceptual, and social influences on these activities and on indexing and retrieval of visual materials. She has won a number of national awards for her research and publications. Her interdisciplinary book *Image Retrieval: theory and research* (2003) is considered the authoritative resource in the area, and she is well known in the USA and internationally for her work in these areas. She participated in the international development of the MPEG 7 standard for multimedia materials. Her research currently focuses on the role of social networking technologies in the organization of information and the convergences among libraries, archives, and museums (both physical and digital), and their roles in preserving and providing access to the cultural, social, historical, and natural heritages of communities. Her research aims to inform design of computer systems enabling access to a wide range of artefacts. She has also held a number of administrative positions in the School of Information Studies at Florida State University, serving variously as Associate Dean for Academics and Research and Director. As Emerita Professor she continues to mentor graduate students in areas such as fine arts, music information retrieval and image retrieval.

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Kathryn La Barre is an Associate Professor at the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign where she is an expert in contemporary and historical knowledge organization and access systems. At GSLIS, she teaches courses in information organization and access. Her areas of focus include task analysis, facet analysis, faceted classification, and concept theory. Her current project 'Decolonizing Identity in LIS' interrogates the axis of naming and power in the field of library and information science. During 2011 to 2012 she was named the GSLIS Centennial Scholar in recognition of her outstanding accomplishments in the field of library and information science. She currently serves as Director-at-Large on the ASIS&T Board of Directors. Her research has been

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### **Nicola Orio**

Nicola Orio is Associate Professor in computer engineering at the Department of Cultural Heritage of the University of Padua. His research interests include the application of novel methodologies and development of original technologies to the access and retrieval of cultural heritage. The approach has its main application to multimedia digital libraries and archives, and has always been carried out in collaboration with scholars of different disciplines: musicology, history of art and film studies.

His principal domain is in music information retrieval, where he has addressed a number of issues, from scalable music identification techniques, to automatic music alignment, and to merging content and context information for music retrieval and automatic music tagging. He also worked in the field of digital archives of illuminated manuscripts, focusing his research on the user requirements of scholars and researchers, and collaborating on the development of a computer system for supporting scientific research on manuscripts and promoting their access to a wider audience. Another area of research is the development of tools for film-induced tourism, developing a system for the geo-localization of movie locations. He participated in international research projects on music retrieval in peer-to-peer networks, in the EU project SAPIR, and on the development of personalized systems for accessing cultural heritage, in the EU project CULTURA.

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Will Prentice is Head of Technical Services, Sound and Vision at the British Library, where he has worked since 1999. He is a member of the Technical Committee of the International Association of Sound and Audiovisual Archives (IASA), Vice-Chair of the IASA Training and Education Committee, and was the founding Convenor of the British and Irish Sound Archives (BISA). He holds a Master's degree in Ethnomusicology from Goldsmiths, University of London.

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Pauline has an MA (Hons) in English Language and Literature, an MSc in Information and Library Studies, and a PhD in Critical Theory. She is currently a senior lecturer and Director of Research in the Department of Information Studies, Aberystwyth University. Pauline's research and scholarly interests are in the areas of multimedia information retrieval and critical communication and information studies, particularly subject analysis, interpretation and visual semiotics, and representations of knowledge and classification theory. She co-authored *Indexing Multimedia and Creative Works: the problems of meaning and interpretation* (Ashgate, 2005) with Rob Hidderley and co-edited *Innovations in Information Retrieval: perspectives for theory and practice* (Facet Publishing, 2011) with Allen Foster.

**Lloyd Roderick**

Lloyd Roderick is the Subject Librarian for Art, History, Welsh & Celtic Studies and Law at Aberystwyth University. He previously worked at the National Library of Wales on the digital presentation of Kyffin Williams collections at that institution. His PhD research focused on the effect of the digital reproduction of art works, and the application of distant reading approaches to the study of the history of Welsh art. He has presented his research at the Yale Center for British art, the Computers and History of Art conference and the Art Libraries Society annual conference.

**Katrin Weller**

Katrin Weller is an information scientist and senior researcher at GESIS Leibniz Institute for the Social Sciences in Cologne. Her research focuses on new approaches to using social media in social science research, e.g. for studying elections or scholarly communication. At GESIS she is responsible for developing new services for social scientists that are based on computational social science research, including approaches for documenting and archiving social media datasets. In 2015, she was awarded one of two inaugural Digital Studies fellowships at the Library of Congress' John W. Kluge Center and spent several months at the Library of Congress to start a new project on the use of social media data as novel resources for future historians. She is @kwelle on Twitter; more details can be found at [www.katrinweller.net](http://www.katrinweller.net).

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## Introduction

This book explores the analysis and interpretation, discovery and retrieval of a variety of non-textual objects, including image, music and moving image. Its purpose is to inspire prospective students to develop creative and innovative research projects at Master's and PhD levels. This is an edited book that brings together chapters written by experts in the field. It provides an overview of the theoretical and academic aspects of digital cultural documentation and also includes contributions from practitioners within libraries and information organizations. Some of these contributions consider both technical and more strategic issues relating to cultural heritage projects, digital asset management and sustainability. The book covers a broad range of topics and draws from a number of disciplines, including information retrieval, library and information science, digital preservation and digital humanities, and even cultural theory, digital media studies and art history. We believe that this multidisciplinary and interdisciplinary approach is both necessary and useful in the age of the ubiquitous and mobile web.

The book is structured into three parts. Part 1 provides an introductory overview of general theoretical issues relating to the analysis of images, music and film, and the subsequent information retrieval design challenges. These chapters attempt to set the scene, introduce some innovative and novel approaches to digital indexing

and search, explore metadata issues and consider social media as historical source. Alongside questions relating to subject access to information, semantic web and metadata in digital cultural documentation, this section also considers relatively new approaches to retrieval including federated search and emotional indexing. There is still a gap in the field of information studies for theoretical scholarship that focuses on the challenges and problems of interpretation of non-textual information. Derek Langridge's *Subject Analysis* (1989) remains the classic in LIS, and Rafferty and Hilderley's *Indexing Multimedia and Creative Works* (2005) includes some discussion of such issues, but we believe that it is timely to update that discussion within the theoretical section of the current book.

The second part of the book includes contributions from practitioners in the field. Within this section we have contributions from the National Library of Wales which focuses on the digitization of artworks, and two chapters from the British Library, one of which offers an overview of their digital projects, while the other chapter focuses on issues relating to the digital preservation of digital audio material. Within the final section, we have included chapters which consider digital cultural documentation discovery and retrieval within the context of Web 2.0. In this section there is some discussion about the challenges of distributed, networked non-textual documentation, user tagging, intellectual property concerns and sustainability issues. These chapters explore image retrieval, music retrieval and film retrieval.

In addition to the rich and varied content within this book, we also asked every author to include a broad-ranging bibliography for their chapter. We hope that the content in the book is stimulating and rewarding in and of itself, and that the bibliographies will enable both students and practitioners to follow up on a topic if they so choose. We hope that these bibliographies will act as an education in themselves.

We are very grateful to all our contributors for their hard work and their enthusiasm for this project. When we invited authors to contribute chapters on their specialist subject, we explained that we hoped that this book would help students and information professionals to create and develop innovative, creative and exciting research projects in the future, and all our contributors were keen to take part in a project which is underpinned by such an aim. Now that

the book is being published, we look forward to the research projects and innovative solutions that it inspires!

**Pauline Rafferty and Allen Foster**

## **References**

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Rafferty, P. and Hilderley, R. (2005) *Indexing Multimedia and Creative Works: the problems of meaning and interpretation*, Ashgate.

PART 1

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## **Analysis and retrieval of digital cultural objects**

# **Managing, searching and finding digital cultural objects: putting it in context**

*Pauline Rafferty*

### **Introduction**

The challenges of managing digital cultural objects have been considered by many academics in the fields of information sciences, archives, media and communications and computer sciences, to name but a few stakeholder disciplines (see for example Besser, 1997; Minzter, 1999; Gilliland-Swetland, 2000; Srinivasan et al., 2009; Beaudoin, 2012; Christodoulakis, 2014). Challenges are not only technical but often related to the semantic and communicative aspects of cultural objects. This introductory chapter seeks to contextualize the major themes relating to managing, searching, and finding digital cultural objects which are explored in this book by considering some of the broader issues relating to communication and practice. It explores the retrieval of digital cultural documentation with reference to communication and cultural theory, specifically social semiotics, and it will also explore semantic approaches to indexing and approaches which go beyond the conventional, such as emotional indexing and storytelling as indexing, before moving on to consider aspects of digital cultural collections, particularly crowdsourcing in conventional cultural memory institutions and amateur collections. That cultural documentation brings with it certain semantic and interpretative challenges has long been recognized in the literature (see for example, Langridge's 1989 book on subject analysis, which examines questions relating to interpretation and

meaning and remains a classic in the field, and Rafferty and Hilderley's 2005 *Indexing Multimedia and Creative Works*, which includes some theoretical discussion relating to the problems of interpretation of non-textual information). Kim Veltman (2006) outlines the challenges of developing an information retrieval and knowledge organization framework for representing and facilitating access to digital cultural documentation in the context of the semantic web. Veltman was writing at a time when the development of the putative semantic web was beginning to be discussed, and the scholarly literature surrounding the semantic web suggested that knowledge organization systems such as ontologies and taxonomies would be crucial to facilitating the development of the semantic web (see, for example, Weller, 2010 and Morville, 2005). Many of the issues that Veltman raised in that paper are still useful in forming a framework through which to examine digital cultural information retrieval systems.

### **Kim Veltman, cultural documentation and the web**

In his discussion of the semantic web and cultural documentation, Veltman points to the work of John Sowa (e.g. Sowa, 1999) and Tim Berners-Lee as underpinning much of the discussion of the semantic web. For Veltman, one of the concerns with their work and their world view is that they understand semantics and linguistic meaning as being relatively unproblematic. Veltman (2006) argues that developers of the semantic web and the world wide web community as a whole are limiting their debate about knowledge organization and meaning by accepting the view of knowledge organization developed by Sowa. His critique of Sowa's *Knowledge Representation* acknowledges Sowa's 'excellent survey of classical contributions to logic by Aristotle, the role of Porphyry's tree of being, which he calls the first semantic network, contributions of Leibniz, Kant, Peirce and Whitehead' but he then asserts that '[i]nterestingly enough, Sowa ends with Whitehead as if effectively nothing has happened since about 1925' (Veltman, 2006, 6).

Veltman lists and describes five basic issues relating to the history of knowledge organization, knowledge representation and meaning, which are missing from the conceptual framework within which Sowa and 'pioneers of today's semantic web' work. This framework

sometimes fails to register that all knowledge organization systems are always ideologically bounded, and are strong loci of power through their everyday ubiquity. Knowledge organization systems necessarily discipline epistemology in the sense of imposing structures on knowledge in an effort to simplify access to information for users, and while these practices are empowering in that they make search possible, they are also ideological and dominating in their epistemological disciplining.

The five issues that Veltman focuses on are: world views and changing paradigms, types of definitions, natural language versus terminology, new classes of relations, and dynamic meaning. The following subsections will explore each issue in a little more detail:

- *World views and changing paradigms*: Veltman argues that web developers: ‘in the best traditions of the Artificial Intelligence (AI) community, focus on the existence of things in terms of their substance, much the way Aristotle did. The result of this is that the existence of things is defined as ontologically static rather than historically dynamic’. This approach leads to a framework within which things are presented as if ‘this is the way it is ontologically, rather than providing frameworks whereby what a thing is, what it means, and how it relates to other things, change as the framework changes’ (Veltman, 2006, 6).
- *Types of definitions*: Sowa’s view, according to Veltman, assumes that definition is only about existence, about what a thing is and ignores rich semiotic traditions. For the Saussurean linguists, meaning in language is constructed through difference, so that signs only have meaning relative to other signs, present or absent. The construction of meaning for Saussurean semiotics is governed by operations on two planes. Contemporary semioticians call these planes paradigmatic (Saussure<sup>1</sup>) and syntagmatic (Jakobson). Peirce’s semiotic was principally a communicative process and he was interested in the ways in which the process of semiosis could endlessly generate meanings from signs. For Peirce, meaning is not fixed and authoritatively determined but creative, fluid and dynamic. He mapped out a large range of signs that humans use in the process of semiosis, but in most contemporary general

introductions to semiotic theory, only three of Peirce's signs are usually discussed. These are:

- Index: is a sign, which is not arbitrary, but in some way is connected with the signified/object, for example thunder or medical symptoms.
- Icon: where the sign is seen as resembling the signified/object, for example a portrait, a scale-model.
- Symbol: where the sign is arbitrary or conventional so that the meaning of the sign must be learned, for example language, traffic lights (Chandler, 2007). A particular sign can operate as all or any of these functions at any given moment, depending on the readings brought by specific human readers or viewers, and the functions are historically contingent.

Veltman argues that the semantic web approach to terminology and definition overlooks the distinctions between ostensive, nominal and real definitions which have been made by knowledge organization scholars over the last century. As an example of such scholarship, he discusses in some depth the work undertaken by Dahlberg (e.g. Dahlberg, 1978a and 1978b):

- *Natural language versus terminology*: Sowa's approach assumes that the relationships between words and concepts is straightforward and ignores distinctions between everyday usage of language and terminology. The view is that if we collect together all the words used, then we will understand what is happening linguistically. However, Veltman argues that this approach ignores the differences between everyday natural language and professional and scientific language.
- *New classes of relations*: new knowledge organization systems should distinguish between different kinds of relations, for example: substance (is a); accidents (has a); subsumptive relations (e.g. is a species, etc., is a part of); opposition (is not); and functional (especially determinative and ordinal) relations (is about). We need to combine universal, subsumptive relations (type/kind, whole/part) with particular, subsumptive relations (subject/property, substance/accidents) (Veltman, 2006, 11).

Veltman argues that even within computer science, developers have focused on simpler models of semantic relations than those which have been developed through the work of linguists and information scientists such as Dahlberg.

- *Dynamic meaning*: Veltman returns to the problems of ontological definitions and argues that semantic web developers focus on finding the one logical, static, unequivocal definition of a term (the ontology fallacy) but in so doing fail to recognize that terms can be transformed through time, culture and geography. We need databases that reflect temporal, cultural and spatial semantic transformations.

Where there was a 19th-century, positivist, optimistic belief that there could be a 'single, comprehensive, omni-valent dictionary that provided universal definition and encompassed all words in a language' (Veltman, 2006, 23), linguists, semioticians, philosophers of language and information scientists in the 20th century moved towards a view that there was a need for specialist dictionaries (slang, etymological, terminological, etc.), and that the challenge is creating bridges and 'walkways' between these knowledge representation systems. Apart from any other concerns, Veltman argues that this is the only way to preserve the riches of culture and history.

It becomes clear in reading Veltman that the issues related to definition and indeed those related to semantic interoperability are not straightforward, and this may well be particularly true in relation to cultural documentation. Alemu, Stevens and Ross (2011, 2012), writing about semantic metadata interoperability, noted that semantic interoperability encompasses concepts that extend beyond the mere exchange of information, focusing on how the exchanged information can be meaningfully and semantically interpreted. This makes semantic interoperability an important issue for cultural institutions, involving as it does language, culture, values and policies, and even politics. Alemu, Stevens and Ross (2011) argue that the issues underlying semantic interoperability need to be addressed at different levels, at the philosophical, theoretical and methodological levels, as well as technological levels.

The significance of the underpinning philosophical framework can

be seen in the development of library and information standards; for instance, the creation and practice of implementing a library standard such as MARC would seem to imply an objectivist philosophical perspective, whereas in reality, 'libraries and the interpretation of their information objects (metadata) tend[s] to be disparate, perhaps suggesting the need for an interpretive perspective' (Alemu, Stevens and Ross, 2011, 4). Again, the design of online public access catalogues (OPAC) would seem to favour an objectivist perspective; however, in recent times we have seen the development of Web 2.0 applications, such as social tagging (collaborative metadata), and these knowledge organization tools would seem to follow a social constructivist philosophical perspective.

Recently we have seen the development of novel approaches to the management and retrieval of digital cultural objects that have attempted to mirror or to represent the many-faceted semantic and communicative practices facilitated in and through digital cultural objects. The development of digital publishing media, which enable mass publishing through informal processes, has allowed for many voices and many viewpoints to be seen, read and heard through the web. Social tagging complements and critiques conventional indexing in many websites (for discussions of social tagging as critique see for example, Speller, 2007; Bates and Rowley, 2011). These developments recognize and accept the existence of many points of view and this acceptance at the level of publishing suggests that semantic interoperability solutions and thus retrieval and access frameworks are moving towards solutions that accommodate, indeed embrace, this social constructivist (Alemu, Stevens and Ross, 2011) approach to semantics and communicative practices.

### **Social tagging**

Social tagging has now become established as a communicative practice operating in and through the web. There are a number of websites that use social tagging, and these include text-based websites, such as CiteULike, music-based websites such as Last.FM, and image-based websites, such as Flickr. By social tagging, we generally mean the practice whereby internet users generate keywords to describe, categorize or

comment on digital content. Clusters of user-generated subject tags are sometimes referred to as folksonomies (Vander Wal, 2005). Folksonomies do not have hierarchies, but they might include automatically generated related tags. A folksonomy is the set of terms with which users tag content rather than a pre-determined set of classification terms or labels from which specific terms are chosen (Vander Wal, 2005), and they might be of the broad or narrow variety. Vander Wal explains that within a broad folksonomy many people can tag the same object using their own tags and their own vocabularies. A power law distribution tends to operate over time so that a small subset of tags become the preferred tagging terms. At the other end of the distribution curve, there will be some terms that are used by only a few taggers and these are known as the long tail. The narrow folksonomy is created by one or a few taggers (e.g. Flickr). The narrow folksonomy loses the richness of the broad folksonomy but it can allow digital objects which are sometimes not easily retrievable with traditional knowledge organization tools to be accessed (Quintarelli, 2005).

A number of studies over the last decade or so have investigated various advantages and disadvantages of tagging as retrieval tools (see, for example, Golder and Huberman, 2006; Mathes, 2004; Matusiak, 2006; Munk and Mork, 2007; Peters and Stock, 2007; Trant, 2009; Gupta et al., 2010; Atkekar and Zaveri, 2014). Advantages include the fact that tagging is cheaper and more economical in terms of time and effort than traditional indexing practice, and that the instant feedback that can be derived from user-generated tagging can facilitate a high level of community interaction which would probably not be possible if decisions had first to be made about the codes, conventions and rules governing a tightly controlled taxonomy. Limitations of these systems include their ambiguity, the use of multiple words, and the lack of synonym control, whilst their strengths are that they facilitate serendipity and browsing.

The cultural heritage sector has been very open to incorporating crowdsourcing initiatives into its practices, partly as outreach practice to encourage engagement with digital cultural objects and partly as a way to create or enhance data in a cost-effective way. Recent studies which have looked at crowdsourcing and tagging within the galleries, libraries, archives and museums (GLAM) sector have explored the ways

in which the turn to digital has changed the nature of the objects they house by creating new communities, opening access and encouraging knowledge exchange (see for example, Eccles and Greg, 2014; Oomen and Aroyo, 2011). We will return to this issue later in the chapter, but for now we will briefly examine two other novel and interesting approaches to retrieval, specifically related to digital cultural objects and facilitated by digital publishing: these are emotional indexing and storytelling as retrieval.

### **Emotional indexing**

The move towards digitizing, collecting, accessing and producing cultural documents in and through the web has led to increased interest in developing approaches to indexing or tagging and searching by emotion. We can see a move towards using emotion in tagging in websites such as Flickr and Last.fm, and there are already a number of projects that have examined whether and how emotional indexing or affect indexing might be used in the management of images (e.g. Dunker et al., 2008; Schmidt and Stock, 2009; Machajdik and Hanbury, 2010), music (Tzanetakis and Cook, 2002; Lu, Liu and Zhang, 2006; Yang, Liu and Chen, 2006; Bischoff et al., 2009; Schuller et al., 2010), film (e.g. Soleymani et al., 2009; Knautz and Stock, 2011) and multimedia cultural objects in general (e.g. Yazdani, Lee and Ebrahimi, 2013).

Underpinning any attempt to create emotional indexing lies the need to first define what is meant by emotion, and many of the researchers in the field agree that this is disputed territory (e.g. Schmidt and Stock, 2009; Knautz, 2012). Knautz (2012) points to the existence of models of emotion in the field of psychology from which we might draw. Amongst the models discussed is the Mehrabian-Russell P-A-D model, where:

- P stands for the Pleasure–Displeasure continuum
- A represents Arousal–Non-Arousal, and
- D represents Dominance–Submissiveness.

Another approach used by psychologists, and perhaps by its nature of interest to information scientists and librarians, is to organize emotions into a small fixed number of categories, although as Knautz notes, there

is no consensus regarding these categories and increasingly there is some questioning of the existence of base and secondary emotions at all (Knautz, 2012, 348). The thorny old issue of where meaning lies is also of some concern to scholars working in this field; for example Schmidt and Stock (2009) distinguish between the emotions which are represented in the cultural object and the emotions which are aroused in the viewer in the design of their image retrieval experiment.

Despite the slight scepticism that psychologists might have regarding the categorization of emotions, this approach can be useful in developing affective dimension-based knowledge organization systems. Lee and Neal (2007) and Schmidt and Stock (2009) used five basic emotion categories in their music retrieval studies: sadness, happiness, anger, fear and disgust. Knautz and Stock (2011) extended these categories to include surprise, desire and love. In addition, they also included 'fun' in their categories, as, although it is not a basic emotion in the Shaver et al. (1987) taxonomy, there are many web queries that were concerned with 'fun'. Knautz, Siebenlist and Stock (2010, 366–7) describe a project which adds the concept 'shame' to the categories. This project, which focused on picture retrieval, presented the participants with a number of emotional terms which they could use to tag pictures using the prototype search engine MEMOSE. In this system a user can index existing multimedia documents, or can index media they upload themselves, from Flickr, YouTube, Last.fm or from MEMOSE's own uploads. The indexing tool allows for general indexing of one or more emotions from a fixed set; these are then rated against a 0–10 sliding scale. In this project, one group were asked to index the emotion depicted in the picture while the other group were asked to index the emotions felt by the viewer when looking at the picture.

Emotional indexing has been the focus of a considerable amount of research in music information retrieval and there is some interest in developing systems that can automatically detect the mood of the music; for example, Soleymani et al. (2013) focus on the problem of collecting training data to develop operational music emotion recognition (MER). One of the problems is that the interpretation of emotion varies between listeners which means that each clip would have to be 'annotated by a distribution of subjects'. This in turn would be time consuming and costly, and in addition, there are difficulties arising from the need to

identify poor annotations 'due to inattentive labeling, listener fatigue and so on'. Soleymani et al. report a project that has a publicly available dataset (MediaEval) which has been annotated by crowdsourcing using the Amazon Mechanical Turk. The final data set consisted of 1000 40-second clips, each of which was annotated by at least ten workers. Songs covered a broad range of genres: Blues, Country, Electronic, Rock, Classical, Folk, Jazz, Country, Pop.

The specific focus of interest in this project was the *valence* and *arousal* representation of emotions, where valence refers to positive versus negative emotions, and arousal refers to emotional intensity (Russell, 1980). Data was also collected on other aspects that affect a subject's connotations. The analysis of the annotations showed that there is a higher agreement on arousal ratings compared to valence ratings. Time of day and workers' mood had a small but significant effect on the ratings. These results, and indeed the publicly available dataset, offer the opportunity for other scholars to study music affect and the possibilities of developing music emotion content based information retrieval systems.

### **Storytelling as indexing**

Current tagging practice tends to be in the form of inputting individual terms or short phrases; in other words, it operates mainly on the paradigmatic plane. It may be that operating at the syntagmatic plane – through sentences and stories – would allow us to capture a broader range of interpretations. Some commentators acknowledge that rich descriptions of images might enhance indexing exhaustivity and indeed inform indexers' understanding of users' seeking behaviour (see for example, O'Connor, O'Connor & Abbas, 1999, 682; Greisdorf and O'Connor, 2002). Connor, O'Connor and Abbas noted that users employ stories to describe the content of images (1999, 684) and tend to use a narrative style for their descriptions as they become accustomed to the viewing experience offered by an image (687–8), but the possibility of using these stories in image indexing is only just starting to be considered by scholars because of the 'lack of a widely accepted conceptual framework within which to make indexing decisions' (Jørgensen, 2003, 252) among experts. Annotation-based information

retrieval, of some interest in the area of image retrieval, tends towards using the practice of storytelling to encourage users to produce digital metadata, and despite some of the perceived pitfalls, for example noise and subjectivity (Inoue, 2004), it is being explored as one possible approach to retrieval.

There has been some research in this area in the field of consumer information retrieval, for example Lieberman, Rosenzweig and Singh (2001), working in the area of photograph information management. They recognized that most image retrieval systems are designed within a framework that separates annotation from retrieval. Their work focuses on image retrieval for the general public rather than for cultural institutions and they acknowledged that one of the problems that people have in managing their digital photo collections is that assigning keywords is tedious. Their project developed a prototype user interface agent, ARIA (Annotation and Retrieval Integration Agent), which can sit in the user's e-mail editor and sift 'descriptions of images entered for the purposes of storytelling in e-mail' for annotations and indexing terms. The storytelling that might be done through e-mail communicative practices becomes the raw material for image annotation.

More recently, a small pilot study (Rafferty and Albinfalah, 2014) investigated storytelling in users' descriptions of images using two 'writerly', high-modality images. Examining a small number of responses in some detail, the investigation established that storytelling plays an important role in how people interpret images, and suggested that incorporating elements of storytelling into the indexing process might be valuable in relation to indexing exhaustivity. One of the challenges in tagging is to encourage creativity while at the same time disciplining input. If storytelling were to be developed as a method of indexing, it might be that analytical algorithms based on the conventions of the story could be used to identify and process story elements as individual terms. Storytelling might improve exhaustivity of indexing and might help with information-seeking activities which are more serendipitous and possibly creative in nature. Informal studies undertaken in the classroom with popular music suggest that storytelling approaches might also work with music. In short, as the web has allowed a greater number of people to search for more information,

more easily and for more reasons than pre-web, it also makes available more creative and innovative approaches to information access.

### **About interpretation and collections**

Underpinning these approaches has been a recognition, whether explicitly stated or not, of the broad range of communicative practices facilitated in and through digital cultural objects. In semiotic terms, digital publishing of cultural objects in and through the web potentially allows for a considerable range of connotative interpretations, where connotation refers to personal and subjective interpretation and denotation refers to more objective interpretation. Interpretation comes through the reading process, and as a result of this, meaning, or perhaps more specifically, interpretation, is created or constructed with every reading, even by the same reader at different times.

Digital methods have made production ubiquitous. Where once upon a time resource-heavy production processes demanded a publishing model that was built to gate-keep and control at many levels, at the level of initial choice, of editing, of aesthetic production, of distribution, now everyone (with access to the right network, connections, the right software and the desire) can be their own producer. This inevitably means that there is the strain of deciding what is worth preserving for future generations. Collections management and canon formation is not a novel problem. There is a considerable literature that explores the challenges of building collections and that explores fundamental questions such as what cultural objects to choose, whose history and what version of history will these objects represent, whose views of excellence do these cultural objects represent? Choices have consequences and none of these issues is trivial. There is a growing interest in open access and in institutional repositories and open GLAM projects are often sponsored by and encouraged by national grant-awarding bodies.

The web has democratized information production and dissemination and also information collection and preservation. Conventionally, when we have referred to collections, we have probably meant institutional collections, but in the age of the web, collection initiatives often emerge beyond the institution, both professional and commercial. The tendency

for Web 2.0 participation and productivity in relation to cultural heritage collection development can be seen in the ways in which GLAM institutions have harnessed the power of crowdsourcing to enhance and complement conventional activities. In addition, Web 2.0 publishing platforms have enabled people to develop their own collections on wikis, on blogging platforms, and on social media sites such as Flickr, singly or in groups, and even on Facebook, for example the Lost Glasgow site ([www.facebook.com/lostglasgowofficial?fref=ts](http://www.facebook.com/lostglasgowofficial?fref=ts)).

### **Crowdsourcing GLAMs**

GLAM institutions are now beginning to explore the potential of crowdsourcing but as yet the number of projects and the scope of those projects are relatively limited. Digitization offers the chance to preserve fragile documents and to make them accessible but beyond this, crowdsourcing offers the chance to use the knowledge, enthusiasm and energy of the crowd to enhance, comment, explain, interpret, remix, mashup, and create from digital cultural artefacts which in some ways can be reborn in and through digitization. Collection and preservation in a digital context can fairly easily lead to production, reproduction and re-creation.

Oomen and Aroyo (2011) developed a taxonomy of crowdsourcing projects that identified six different categories of crowdsourcing activities undertaken by GLAM institutions (see Table 1.1 on the next page). They mapped these categories against the National Library of New Zealand Digital Content Life Cycle and were able to identify which crowdsourcing activities predominate at which stage of the model. Crowdsourcing can play a role in all stages of the model underlining the importance and potential of such activity.

While Oomen and Aroyo identified a number of challenges that face the developers of crowdsourcing projects, including semantic web challenges and linguistic challenges – some of which, such as the recognition of the difficulty of providing explanations to users when dealing with complex underlying knowledge, overlap with Veltman's concerns – they focus on two challenges in particular, which are: ensuring sufficient knowledgeable and loyal-over-time users and maintaining reasonable levels of quality.

Correction and transcription tasks	Inviting users to correct and/or transcribe outputs of digitization process.
Contextualization	Adding contextual knowledge to objects, e.g. by telling stories or writing articles/wiki pages with contextual data.
Complementing Collection	Active pursuit of additional objects to be included in a (web) exhibit or collection.
Classification	Gathering descriptive metadata related to objects in a collection. Social tagging is a well known example.
Co-curation	Using inspiration/expertise of non-professional curators to create (web) exhibits.
Crowdfunding	Collective co-operation of people who pool their money and other resources together to support efforts initiated by others.

In relation to the first issue, Clay Shirky notes that the motivation of the amateur is the love of doing it: '[t]he essence of amateurism is intrinsic motivation: to be an amateur is to do something for the love of it' (Shirky, 2010, 82). Shirky refers to two of Benkler and Nissenbaum's (2006) broad types of social motivation: Cluster 3, Benevolence, charity, generosity, altruism and Cluster 4, Sociability, camaraderie, friendship, co-operation, civic virtue, as being important in commons based peer production, and adds to this the motivation that stems from fun and competition. We can perhaps see this in the growth of serious games approaches to encouraging, developing and harnessing the power of the crowds.

In relation to quality, monitoring the quality of commons-produced annotations and metadata remains an issue for crowdsourcing GLAMs. Current approaches to solving the issues of monitoring quality seem to rely on the moral, ethical aspects of the altruistic community. GLAMs might seek through conversation with their participants to establish behaviour norms, to build an image of the desired content, and to filter erroneous content (Oomen and Aroyo, 2011, 147). There is always a balance to maintain between the richness of crowdsourced metadata and the problems of inaccuracy, falsehood, malicious spam and malware. One of the interesting challenges for GLAM institutions engaging with crowdsourcing metadata is ensuring that expert knowledge is not lost. Rafferty's small-scale research into the tagging of

images suggests that leaving annotating and tagging solely to users could lead to the loss of historically contingent information over time unless conscious efforts are made to preserve it (Rafferty, 2011, 296). But it seems that for those institutions engaging in crowdsourcing projects, the benefits are seen to outweigh the risks.

### **The amateur collector**

Melissa Terras, in particular, has focused on the interesting development of the amateur digital collector outwith the GLAM sector. The development of Web 2.0 technologies makes the creation of amateur digitization projects easier than they used to be, and in addition, conventional memory and cultural institutions actively encourage the participation of users through tagging feedback, and this might well be encouraging amateur enthusiasts to take their involvement in digital collections a little further (Terras, 2010, 426). Terras (2010, 432) reports that many of the museum sites surveyed in her project now use blogging software as their base, and that many host their image content on Flickr and stream it to their blogs. Creators surveyed by Terras were not aware of procedures in creating traditional archival metadata but rather an 'intuitive metadata' seems to have emerged, and with Flickr in particular, it would seem that its inbuilt 'collection management' tools are beneficial in nudging the creator towards the creation of useful metadata. On the downside, Terras observes that the lack of formal knowledge about technical and management standards will preclude these amateur projects from being eligible for development and research funding; moreover, there is often a question about who owns the images digitized by the amateur sites (2010, 433). Terras ends by suggesting that there might be ways in which conventional memory institutions can work with the amateur creators to 'reinvigorate their online presence' (2010, 437).

### **Concluding remarks**

This chapter has sought to identify and review some of the issues underpinning the content of this book. It has considered the possibilities opened up by digitization and in particular by the web, and it has considered some of the challenges. Many of the themes that have been

outlined in the introductory chapter will be returned to again throughout the course of the book, in more detail and in more depth, but it is hoped that this chapter has provided some small foundation, some elements of interest and some references to the scholarly literature that might inspire further research and the development of interesting future projects.

## Note

- 1 More information on Saussure, Peirce, Jakobson and semiotics is included in Daniel Chandler's excellent website 'Semiotics for Beginners', which can be found at: <http://visual-memory.co.uk/daniel/Documents/S4B/>.

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