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Generous Interfaces for Digital Cultural Collections

Mitchell Whitelaw <mitchell_dot_whitelaw_at_canberra_dot_edu_dot_au>, University of Canberra, Australia

Abstract

Decades of digitisation have made a wealth of digital cultural material available online. Yet search — the dominant interface to these collections — is incapable of representing this abundance. Search is ungenerous: it withholds information, and demands a query. This paper argues for a more generous alternative: rich, browsable interfaces that reveal the scale and complexity of digital heritage collections. Drawing on related work and precedents from information retrieval and visualisation, as well as critical humanistic approaches to the interface, this paper documents and analyses practical experiments in generous interfaces developed in collaboration with Australian cultural institutions.

Imagine yourself outside an art gallery in a far-off city, with a collection you don't know well. You enter the building to find a small, drab lobby with an attendant at a desk. The attendant asks you to enter your query on a small slip of paper. Not knowing the collection, and not seeking anything in particular, you write down something arbitrary, and pass it over. The attendant disappears for a moment before returning with a line of artworks sitting on trolleys. These are paraded, ten at a time, through the lobby. You can submit another query at any time, calling forth more trolleys, but there seems to be no way to explore the gallery beyond this small lobby.

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As absurd as it seems, this scenario is played out daily on the web sites of libraries, archives, galleries and museums around the world, where keyword search is the central — often the *only* — way to access the collection. The dichotomy embodied here can be framed through the notion of generosity. Decades of digitisation have made a wealth of digital cultural material available online. The Victoria and Albert Museum offers over a million items; Europeana's aggregated collection numbers some 31 million; the National Library of Australia's Trove hosts around 128 million digitised newspaper articles. A recent survey of some 1200 institutions in the UK and Europe found that 80% have digitised collections, and these are increasingly coming online [ENUMERATE 2014]. This is a truly generous mass: large, abundant, ample. Yet in response to this abundance, collection interfaces wheel out miserly lists, one page at a time. Generosity entails more than scale, too: another of its senses describes an ethos of giving or sharing freely. These values tally well with the aims of many collecting institutions — especially public institutions, mandated to provide broad and open access. But here too, search is ungenerous. It fails to be liberal in sharing: instead of throwing open the doors, its greeting is "Yes, what?"

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As an interface, search fails to match the ample abundance of our digital collections and the generous ethos of the institutions that hold them. A more generous interface would do more to represent the scale and richness of its collection. It would open the doors, tear down the drab lobby; instead of demanding a query it would offer multiple ways in, and support exploration as well as the focused enquiry where search excels. In revealing the complexity of digital collections, a generous interface would also enrich interpretation by revealing relationships and structures within a collection.

[3]

This is not to question the effectiveness of search or its value for many users. Empirical research shows that many visitors come to a museum website seeking specific information [Fantoni et al. 2012]. However, a significant number of visitors do not have a specific goal: in a survey of the motivations of some 34,000 visitors to Dutch museum websites, 29% report seeking specific information, but 21% visit to "engage in casual browsing" [INTK n.d.]. Another recent study finds that browse features are valued highly by non-expert visitors to online art collections [Lopatovska et al. 2013]. Thus from the user's perspective, search is an incomplete solution.

[4]

In this context, more generous interfaces are beginning to emerge. The sites of the Rijksmuseum> and the Walker Art Centre, for example, emphasise browsing and visual exploration. While the Victoria and Albert Museum's collections page privileges search, it also generously includes a random sampling of works. Experimental and overtly poetic approaches to

[5]

digital collections — such as Tim Sherratt's *The Real Face of White Australia* — are a promising and potentially radical new form. However, these examples are the exception, rather than the rule; and in some cases generosity is only superficial. The Met Museum's beautiful browse-centric interface leads abruptly to a standard search display, showing thirty records at a time. This ostensibly browsable interface (like the Rijksmuseum's) is in fact a highly curated set of predefined starting points, rather than a comprehensive representation of the collection.

The stakes here are high, because the interface plays an inescapable role in mediating digital heritage. Whether a command-line console or an immersive visualisation, these collections come to us in some specific, concrete form; and crucially, that form is constructed and contingent. It can always be otherwise. As our cultural heritage is increasingly networked and digital, the life and use of that heritage will increasingly be conditioned by the forms in which it reaches us, how it is made concrete and available both for scholars and the wider public. As argued above, search-centred conventions offer meagre representational tools; while there are promising signs of a new generosity emerging, much more is possible.

6

To demonstrate and interrogate that potential, this paper documents applied research into generous interfaces for cultural collections. In order to frame the problem more thoroughly, it first draws together a range of practical precedents and related theory from fields spanning information retrieval, human-computer interaction, information visualisation and digital humanities. This interdisciplinary terrain provides a useful framework, but also raises important tensions between the philosophical orientations of these fields; I argue finally for a humanistic model of interface and interaction that emphasises exploration and interpretation over task and information retrieval. Next, the paper presents a series of practical projects developed in partnership with Australian cultural institutions: *Manly Images* (supported by Manly Public Library and the State Library of New South Wales); *Australian Prints and Printmaking* (in partnership with the National Gallery of Australia); and *Discover the Queenslander* (with the State Library of Queensland). I reflect on these projects as a designer and developer, and analyse them against the conceptual framework outlined earlier, offering practical strategies and critical injunctions for the creation of generous interfaces.

7

Escaping the Search Box: Contexts and Precedents for Generous Interfaces

In the opening scenario search is cast as the villain; but it's also, more usefully, a puzzle. How did we come to be trapped in the search box; and do the limitations of search indicate richer alternatives? Search has a deep heritage in the history of computing, and especially the field of library and information science; it is deeply ingrained in the thinking and practices of digital collections, but equally its limitations have long been documented in the scholarship around information retrieval. As Belkin, Oddy and Brooks wrote in 1982, "One can identify two assumptions basic to the best-match [search] principle: that it is possible for the user to specify precisely the information that he/she requires; and, that information needs ... are functionally equivalent to document texts" [Belkin et al. 1982, 63]. Both of these questionable assumptions are directly relevant to digital cultural collections. As Taylor's foundational work on information needs explains, a search query is a compromised and imperfect expression of a feeling that arises as a "vague dissatistfaction" [Taylor 1962]. Rather than an information need, Belkin and collaborators propose an "anomalous state of knowledge", and observe that "in general, the user is unable to specify precisely what is needed to resolve that anomaly" [Belkin et al. 1982, 62]. Some twenty-five years later, little seems to have changed: writing on "grand challenges for information retrieval", Belkin states: "only considering specified search as the basis for IR models and techniques, is clearly inadequate, and inappropriate" [Belkin 2008, 50]. Yet despite its flaws, search has been so effective that other techniques have been largely neglected — at least in practice. Research suggests that for humanities scholars search is both ubiquitous and imperfect. Kemman and colleagues confirm the dominance of Google and keyword search for contemporary researchers [Kemman et al. 2013]. Rimmer and collaborators report that humanities researchers tend not to use advanced search techniques, but do use more exploratory strategies including "chaining" — following links through the literature via citations — and browsing, especially in physical libraries [Rimmer et al. 2008].

8

Browsing is the most prominent practical alternative to search, though in digital collections browse-based collection interfaces are typically impractical and uninspired: pages of alphabetised lists. By contrast, theorists in information retrieval argue that browsing is "a rich and fundamental human information behaviour" [Chang and Rice 1993]. The literature on browsing develops a portrait of a complex, open-ended, embodied human experience, rather than the input-output exchange that characterises traditional information retrieval [Rice et al. 2001, 2]. Researchers develop models of browsing with a number of relevant features. Browsing is an iterative process that entails scanning [Rice et al. 2001, 178] or glimpsing [Bates 2007] a field of potential resources, and selecting or sampling items for further investigation and evaluation. Browsing entails movement through a field of resources [Rice et al. 2001, 220]; Kwasnik stipulates "movement

9

in a connected space" [Kwasnik 1992, 2.4.4]. This movement depends in turn on orientation: a knowledge of the "structure and content" of the browsing field and an ability to navigate within it [Kwasnik 1992]. Where information retrieval is premised on a specific intention or question, browsing reflects broader and more complex motivations. Browsing may be instrumental and purposeful, or intrinsically pleasurable; it may be cognitively or affectively rewarding, or both [Rice et al. 2001, 221–22]. We may browse with or without a goal in mind, and goals may change as the process unfolds. The model of browsing that emerges here ultimately challenges the instrumentalist basis of disciplines such as information retrieval; as Toms suggests, successful browsing is not a "task" but a pleasure [Toms 2000, 447].

Models of browsing tend to emphasise physical spaces and resources; similarly for humanities researchers, physical libraries seem to be favoured as browsable, serendipitous and enjoyable information spaces [Rimmer et al. 2008, 14]. Theorists of browsing offer some clues as to how browsing can be supported in digital environments. Bates critiques the conventional forms — "a long list or a set of thumbnails" and calls instead for "rich scenes, full of potential objects of interest, that the eye can take in at once" — what she terms a "massively parallel glimpse" [Bates 2007]. Toms and Bates both emphasise stability and orientation; interface elements that establish and maintain continuity within a browsing space [Toms 2000, 426].   `10`

From the complementary fields of interface design and information visualisation, Shneiderman's "visual information seeking" approach is deservedly influential [Shneiderman 1996]. Shneiderman sets out a "mantra" for the visual exploration of digital collections: "overview first, zoom and filter, then details-on-demand". Overview is a *zoomed out* view of the whole collection; zoom and filter enable focus on a subset; detailed information on an item is displayed in its context (maintaining orientation). Shneiderman adds tasks for "relate" — to view relationships between items; "history" — preserving the user's path through the system; and "extract" — to save and share selected views or subsets. Shneiderman emphasises information visualisation here, and his approach has been most influential in that field; in later work with Greene et al. the implications of this approach for digital libraries are spelled out clearly.   `11`

In a paper that amounts to a how-to manual for generous interfaces, Greene and colleagues observe that designers "often fail to provide appropriate views...to give an overall sense of the structure and materials available" [Greene et al. 2000, 1]. Drawing on library and information studies, they emphasise the "information surrogate" in collection interfaces; surrogates (such as catalog records) are compact, browsable abstractions of primary content — rich scenes for Bates' "massively parallel glimpse". In this formulation a *preview* (for example a thumbnail image) provides a surrogate for a single item; an *overview* provides a surrogate for a collection of items. The authors show how previews and overviews can be nested and articulated in systems designed for interactive "information seeking" (as distinct from information retrieval). Given suitable data, we can break collections into intelligible aggregates or subsets, reveal relationships between these, and link these overviews to previews of collection items. Surrogates should be "salient" (to the "task" and "needs" of users), hierarchical (showing multiple levels while maintaining orientation) and leverage structures in the collection (using temporal ordering, for example) [Greene et al. 2000, 8–9]. The authors also indicate some of the design challenges involved: overviews should be "fairly exhaustive", but limits in the data might "limit the coverage of the overview"; a preview should faithfully represent its object, but nonetheless "has the potential to be misleading" [Greene et al. 2000, 7]. These points lead into important questions about the representation of digital cultural collections, to be taken up below.   `12`

While the examples in Greene's paper show their late-1990s age, for information density, browsability and generosity they trounce most contemporary interfaces to digital cultural collections. Whatever happened to Greene's previews and overviews, or Shneiderman's notion of exploratory "information seeking" in digital collections? Why are we still, it seems, stuck in the search box? Perhaps, as Kemman and colleagues suggest, Google's uncanny effectiveness reassures us that search is the only interface we need [Kemman et al. 2013]; or academic work in information retrieval and visualisation has simply failed to connect with the custodians of our increasingly digital cultural heritage. The reasons are beyond the scope of this paper, except to note that the practical work presented here is aimed squarely at this implementation gap — creating rich, browsable interfaces for large, real-world digital collections.   `13`

While this practical challenge is appealing, it also entails some theoretical issues. In applying techniques from information retrieval and visualisation to cultural material, this project must negotiate with a significant interdisciplinary boundary. Johanna Drucker poses the challenge clearly as she critiques the use of information visualisation within the digital humanities: bar charts and Google maps, she argues, constitute an epistemological Trojan horse [Drucker 2011]. These devices conceal realist models of knowledge — claims to transparently show "what is" that are at odds with the critical tradition of the humanities. Similarly in calling for a model of "humanistic interface design", Drucker critiques the orientation of mainstream HCI and information visualisation [Drucker 2013]. In the work of researchers such as Shneiderman, Drucker   `14`

says, we find a "pragmatic, but highly mechanistic" approach, based on functional models of task and goal that are inappropriate in the humanities, where "distraction, engagement, flow experience and pleasure-driven activity are not goal-oriented, but motivated by the process" [Drucker 2013, para 32]. Rather than borrowing from HCI, Drucker calls on the digital humanities to reinvent interface design in a form "suited to its critical principles".

As Drucker argues, the functional, task-based approach — and its inbuilt assumptions — is ubiquitous in HCI and IR. However those fields also suggest the seeds of alternative approaches, and these in turn, I suggest, offer ways forward for generous interfaces. The theorisations of browsing outlined above, for example, quickly exceed a narrow task focus; like Drucker, they recognise that browsing can be its own reward [Rice et al. 2001, 221–22] [Toms 2000, 447]. Information retrieval theorists recognise the paradoxical limits of explicit information; the inarticulate *feeling* of a query, an anomalous state of knowledge [Belkin et al. 1982]. In other formulations such as exploratory search, outlined by Marchionini, information-seeking emerges as a complex, open-ended process, rather than a goal-oriented transaction [Marchionini 2006]. **15**

More recent work develops this theme within IR and HCI into a more holistic and humanistic model of the information seeker. Marian Dörk and collaborators propose the "Information Flaneur": a contemporary information-seeker modeled on the urban flaneur of 1840s Paris: **16**

> Following the flaneur's attitude toward the city, the information flaneur sees beauty and meaning in growing information spaces. By envisioning the information flaneur as a curious, creative, and critical persona, we promote a shift from negative concepts such as needs and problems towards positive information experiences [Dörk et al. 2011, 1].

This proposal posits that information interfaces "are not inevitable technical solutions, but cultural artefacts" demanding "reflection, critique, and appropriation"; and that "information seeking is an inherently complex human experience" [Dörk et al. 2011, 2]. The information flaneur embodies this model, emphasising curiosity and pleasure while maintaining a critical and reflective stance. For the info-flaneur, immersion in complex information is an everyday experience; casual, ambient, and cultural, rather than need-driven and instrumental. The authors also offer practical suggestions for flaneur-friendly interfaces, emphasising a continuum between "horizontal exploration" — overview, orientation, and multi-dimensonal browsing — and "vertical immersion" — the pleasures of detailed investigation and sense-making [Dörk et al. 2011, 2]. **17**

These contexts and precedents support a proposal for generous interfaces, and outline both the gap in practice it addresses and the multidisciplinary field it draws on. Work in information retrieval validates the subjective assertion that search alone is "inadequate" [Belkin 2008, 50], while models of browsing offer richer, more complex models of experience, interaction and interpretation. Yet digital collections do not support browsing well: Bates observed in 2007 that browse interfaces consisted mainly of lists, and little has changed [Bates 2007]. Shneiderman, Greene and collaborators make essentially the same case for the value of visual exploration in digital collections, and offer concrete examples and techniques to that end [Greene et al. 2000]. In fact, across this literature — spanning information retrieval, information visualisation and HCI — a consistent set of principles emerges for browsable or exploratory interfaces: overview — Bates' "massively parallel glimpse"; detail or preview of individual items; movement and navigating relationships; and the articulation of these modes while preserving orientation. **18**

Drucker offers a salutary warning about importing the "realist" epistemologies of HCI into the humanities, along with its techniques. At the same time, humanistic models like the information flaneur suggest a productive interdisciplinary middle ground that builds on pragmatic approaches while also critically interrogating their performance. Reflective practice is a useful approach here because it occupies a similarly in-between site, shuttling between conceptualisation, practical production and analysis. In my experience the making of generous interfaces is not a neat implementation but a productive wrangling of digital materials, formal abstractions and conceptual concerns, as the following sections aim to show. **19**

Case Studies: Generous Interfaces in Practice

1. Manly Images

Manly Images is an experimental web interface for a collection of around 7000 historic images held by the Manly Public Library, in Sydney, Australia. The project was commissioned by the State Library of New South Wales to explore the potential for rich web interfaces for such collections, often held by local libraries. This collection documents the life of this **20**

local region through the 20th century: portraits of soldiers and council officials, street scenes and beach views, school sporting teams and real-estate advertising. Manly Library makes the images available through a third-party interface that does little to convey the scope and character of the collection. The collection metadata is limited, but informative; all items have descriptive titles, most have dates (often imprecise); many have subject metadata.

Given this collection, the central design challenge was overview: creating a rich but workably compact representation of the collection as a whole. "Show everything" — a provocative edict from visualisation studio Stamen Design [Jones 2009] — offers a simple and literal-minded starting point. We adopted this approach in previous Java-based projects [Whitelaw 2009] [Hinton and Whitelaw 2010]; but here it was not technically (let alone perceptually) feasible to render all 7000 items in the web browser. Creating a navigable overview thus requires some kind of intermediate representation, a set of proxies that aggregate all 7000 items into a smaller number of appropriate clusters. *Manly Images* clusters the collection in two different dimensions, providing twin but complementary representations. One set of clusters simply groups items by decade (including a group for undated items); the other uses a frequency analysis of terms in item titles, creating sets of items grouped around specific, characteristic terms. The title clusters were developed here in the absence of other metadata (such as tags) that might help group related items, and extensively "tuned" to the specific qualities of this collection. In my experience this experimental process of wrangling patchy and idiosyncratic metadata is characteristic in developing generous interfaces.

21

This clustered data provides the basis for the visual interface design. Groups of items become tiles in a browsable mosaic; each tile represents a cluster, and offers clues to — and previews of — the items it contains (see Figure 1). Each tile is a visual composite; an overlay of synoptic features and specific contents. The size of each tile is related to the number of items in that cluster — a summative, quantitative representation. Tiles also show the key facet of that cluster; either most frequent title term, or decade. Hovering over a larger tile also reveals a deeper list of title terms (synoptic qualitative features). Finally each tile shows the actual images within its cluster, and these preview images gradually change so that each tile progressively reveals its contents. Thus the interface as a whole forms a slowly shifting mosaic, as if rotating a complex, multi-faceted object. In the terms of Greene et al, this is a heirarchical interleaving of preview and overview: at any moment each tile offers both a preview of a specific item, and an overview of the other items it contains. The mosaic as a whole forms a composite, higher-order overview, encoding collection structure and distribution while also revealing its visual character and texture. Selecting a tile opens a horizontal slider display for browsing items in that cluster, while maintaining the context of the mosaic interface and the sense of global orientation that it provides. Selecting an item displays a large image in a lightbox, along with links to the item's permanent URLs on the Manly Library site and Trove, where they can be bookmarked, shared or cited.
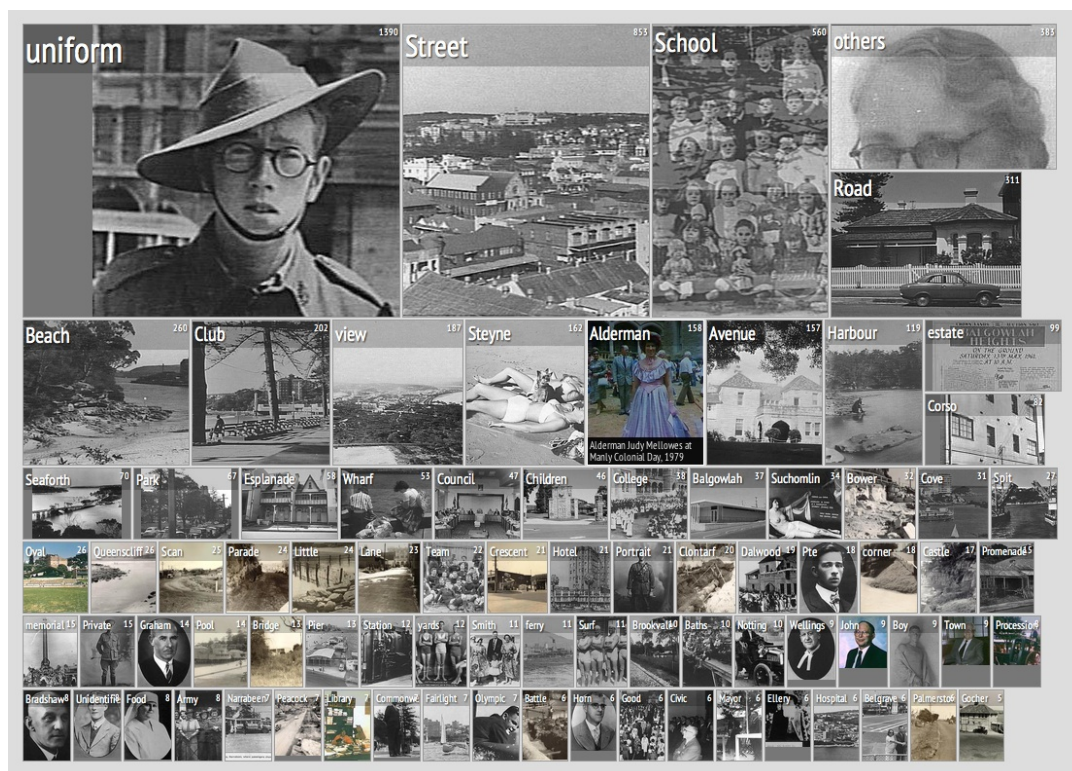
22

Figure 1. *Manly Images* title interface.

2. Australian Prints and Printmaking

The Prints and Printmaking Collection of the National Gallery of Australia contains records of some 40,000 works by more than 4,000 artists. In a project commissioned by the Gallery, I worked with Ben Ennis Butler to develop three separate "generous" interfaces offering multiple, complementary views. Launched in March 2013, these interfaces appear on the main collection site as a prominent alternative to search. In this case the metadata is comprehensive, with highly structured relationships including detailed information on works and artists. Digitised images are available for around half of the works in the collection.

<div style="float:right">23</div>

The structured data here enables two separate overview interfaces, each focusing on a different aspect of the collection. In the *All Artists* interface all 4000 of the collection's creators, printers, publishers, workshops and artists appear as a sortable array of tiles. Each one includes the artist's name, birth and activity dates, gender, and number of works in the collection. Some data points are visually encoded: gender (including companies) is represented in a colour-coded left-hand border, while number of works is reflected in the width of the tile. Scanning a page of these tiles the distribution of males, females, and companies is immediately apparent. Similarly the "long tail" distribution of works within the collection is clear; most artists contribute a small number of works, while a few contribute many works. A panel of facets filters the display according to role, work count, and gender; so for example we may focus on female artists, or female printers, or only female printers with more than ten works in the collection. While such facets are a familiar feature in many collection search interfaces, there are two key differences here. These facets are also visual variables — bar-chart elements that show patterns of distribution at a glance. Second, these facets don't require a preceding search, but enable refinement (Shneiderman's "zoom and filter") of the initial overview as well as comparison of different subsets — showing, for example, the relative distributions of male and female artists for different roles.
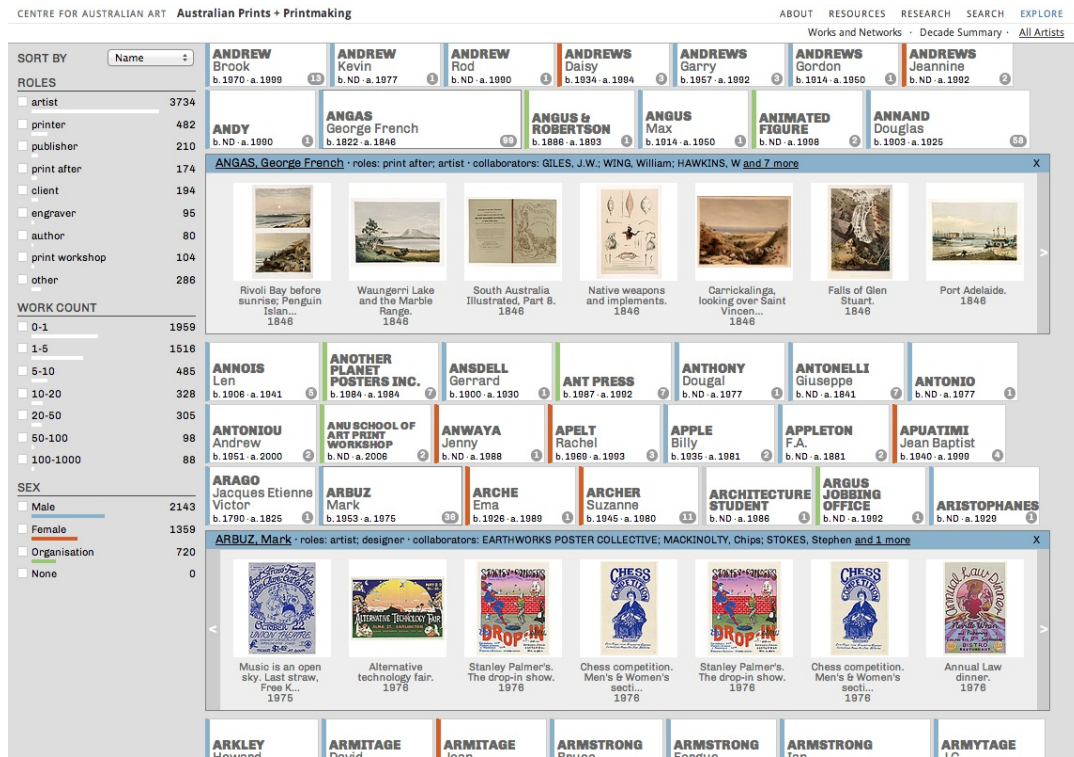
<div style="float:right">24</div>

Figure 2. *All Artists* interface, Australian Prints and Printmaking.

This display also enables investigation of individual artists in depth. Selecting an artist opens an inset display showing their works, as well as additional data such as collaborators. We can "open" multiple artists, and compare their works; when the display is sorted chronologically, this enables us to explore the work of contemporaries or observe stylistic changes and distinctive period aesthetics. The detail appears in place within the global context of the page, maintaining orientation while also providing visual samples of the collection content.

25

The *Decade Summary* interface presents a complementary overview focusing on works, rather than artists. The central device here is a chronological bar graph: each horizontal bar shows number of works per decade, and is segmented in turn into different work types such as intaglio, monoprint, and relief. We also include a section for undated works — essential to ensure that inevitably patchy metadata does not compromise the representation of works in the collection. The resulting graph is informative in itself, showing the chronological shape of the collection and the relative distribution of different print types. The boom in stencil printing in the 1970s and 80s, for example, is clear. The graph also acts as an interface; selecting a segment loads the corresponding set of works into the right hand pane. These cropped thumbnails provide a rich and immediate visual sample of the character of each group of works, and an exploratory interface in themselves. Hovering reveals full work images, titles and artists; clicking loads a larger image in the central pane. By showing three levels of scale concurrently — from whole collection, to focused subset, to individual work — the *Decade Summary* provides a single-screen interface to the entire 40,000-work collection. The hierarchy of scales provides a sort of visual compression of the collection, but also supports juxtapositions and lateral readings, encouraging context-rich exploration.
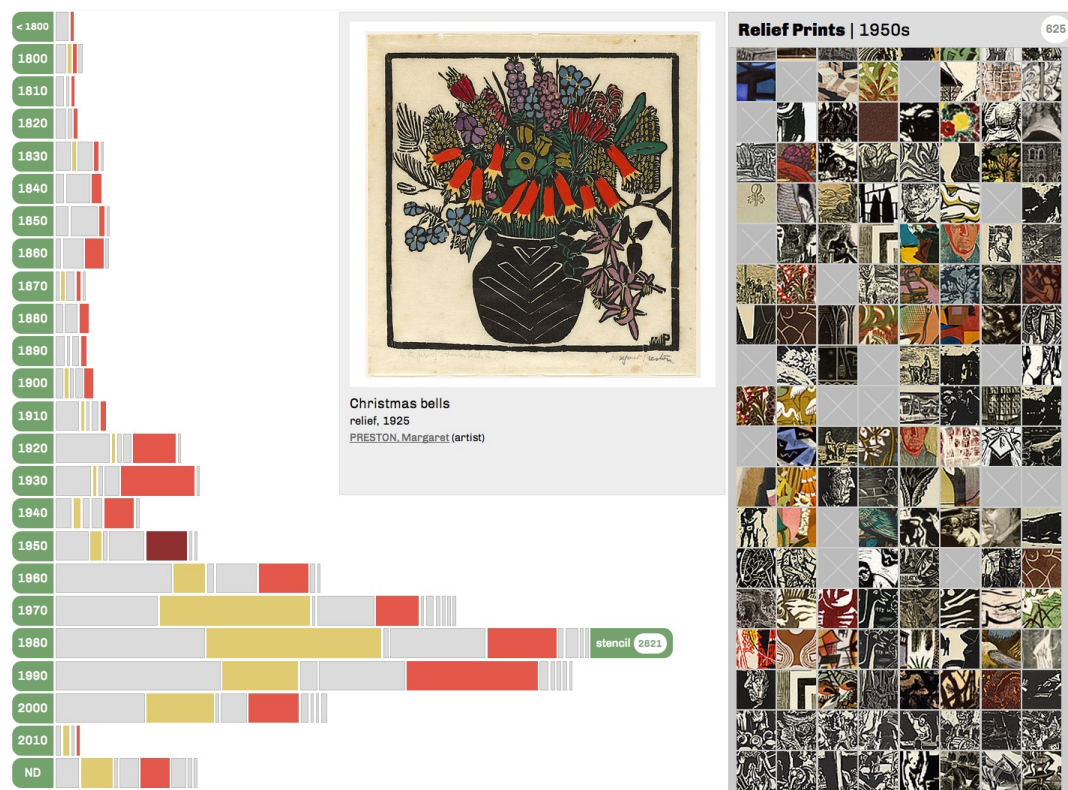
26

Figure 3. *Decade Summary* interface, Australian Prints and Printmaking.

The third interface in this set takes a different approach, offering not so much an overview as a local or "inner" view. The *Works and Networks* display focuses on a single artist, showing their works as a navigable grid; networks here refers to relationships between artists and other makers — a signficant factor in the collaborative artform of printmaking. The display lists each artist's collaborators by role (printers, publishers, studios etc); selecting one re-focuses the display on that individual. Browsing collaborators and their works leads to new discoveries, and still more collaborations. Rather than a synoptic overview of the collection, this display encourages a piecing together of local views through the same "chaining" process Rimmer and colleagues identify in humanities information seeking [Rimmer et al. 2008]. This display also works in conjunction with the two overviews: focusing on an artist in the *All Artists* and *Decade Browser* views loads the corresponding artist in *Works and Networks*. Thus the three interfaces work together to provide a three-way parallax (triangulation?) while the more immersive "innerview" of *Works and Networks* complements the top-down overview of the other displays. This echoes the articulation of horizontal exploration and vertical immersion that Dörk and collaborators identify in the exploratory behaviour of the information flaneur [Dörk et al. 2011, 7].

27

Figure 4. *Works and Networks* interface, Australian Prints and Printmaking

3. Discover the Queenslander

Discover the Queenslander is a generous interface to a collection of some 1000 digitised pages and covers from *The Queenslander.* This newspaper, published 1866-1939, was the illustrated weekend supplement to the *Brisbane Courier Mail*; its covers and illustrations offer a delightful core-sample of Australian visual culture before World War II. Collection holders the State Library of Queensland commissioned this project to create a rich, exploratory, visual interface for a wide audience, improving on some of the shortfalls of the Library's vendor-provided digital collection infrastructure. Launched in June 2014, this project was designed and developed in collaboration with my University of Canberra colleague Geoff Hinchcliffe.

28

With fairly complete, well-structured metadata and high-quality images, this collection provides rich opportunities for a generous interface. Once again we construct two complementary views of the collection. The Mosaic view reuses the mosaic-tile approach from *Manly Images*, segmenting the collection by year (Figure 5). Tile sizes show the distribution of the collection by date, and again the tiles progressively reveal their contents; in this case each tile's slide show is also directly navigable. As in *Manly Images*, the mosaic provides a glanceable overview that shows both the shape of the collection and a changing chronological sampling of its contents; here the mosaic also provides a self-sufficient interface to navigate the entire collection.

29

> **Figure 5.** Mosaic interface, *Discover the Queenslander*.

Where the Mosaic emphasises visual overview, the Grid focuses on exploring the contents of the collection through item- 30
level metadata (Figure 6). The layout is conventional: a panel of facets, term-clouds and filters provides a navigable
overview, mediating the display of individual items in an orderly grid below. Filters are cross-linked and update dynamically:
selecting a specific year will refine the term clouds for that subset, while focusing on a specific subject or creator will show
the temporal distribution of those items. Grid items reflect the current filters, but can also be used to modify those filters
through their own item-level attributes, within the context of the grid. Where the main filter panel emphasises global
overview, and the exploration of collection-wide features and correlations, the item-level controls enable navigation through
local affinity or relationship.

Figure 6. Grid interface, *Discover the Queenslander*.

In working with the collection material the graphic character of the items — in particular colour — emerged as a focal point. Drawing on some recent work at the Cooper Hewitt Museum [Cope 2013], we pre-generated a simple colour palette for each item — a form of automatic content-based metadata. The filter panel includes a colour "overview", an aggregated 64-colour palette based on items in the current selection. Colours also act as filters, selecting items whose palettes contain similar shades, while also cross-linking with date, creator and subject. Colour becomes a visually engaging tool for browsing the collection, but also reveals the structures and patterns within it; the favoured palettes of specific artists, or the rapid turn away from colour illustration towards monochrome photography in the final years of the newspaper.

31

In Shneiderman's schema, the Mosaic and Grid views fill the roles of overview, zoom and filter; detail here is an item page that privileges the high-resolution image but also links the item to both internal and external contexts. Item metadata facets lead back to the Grid view, while a link out to Trove reunites each item — a single page or cover from a specific issue of *The Queenslander* — with its full digitised edition as held by the National Library of Australia. While it's a long way from the expansive scope of linked data approaches, this small effort shows how structured data (and services such as the Trove API) enable easy, ad-hoc bridges between disparate collections.

32

Unpacking Overview: Contingency, Parallax and Interpretation

Overview plays a founding role in these generous interfaces, and creating overviews poses significant challenges. While these interfaces propose a range of practical approaches they do not seek to "solve" overview; they do raise important questions around its contingencies and potentials. In proposing to more generously show digital cultural collections, we should also take note of exactly what is shown, and how.

33

As introduced in the work of Shneiderman, Greene and their colleagues, overview has a neutral, unproblematic character; yet of course an overview is a constructed representation. Specific features of a collection are selected and aggregated; other features are elided or ignored. *Manly Images* shows this clearly. The title view selects and priveleges title terms, and

34

runs them through a computational process that strongly shapes the final interface. A recursive process groups items around the most frequently occurring terms, creating ever-smaller clusters down to a lower threshhold (here five items). But these clusters don't account for the whole collection: some 380 items remain unclustered in a "long tail" with relatively infrequent title terms. They appear in the "others" tile — a false unity that marks the point where this aggregation process is finally defeated by the diversity of the collection. So to one of the central representational questions of overview — the cost, as it were, of compression: *what misses out?* In this case it is the heterogenity of the long tail — the outliers or oddities in the collection. Where overviews emphasise quantitative features — the distribution of items within a collection — they will often privelege the common, and hide (or minimise) the rare. Metadata and collection structure matters; tightly-structured metadata (such as dates) makes for easier aggregations, as shown in *Manly Images* and *Discover the Queenslander.* We can account for items with missing metadata relatively easily (*Decade Browser, Manly Images*); but complex, unstructured, diverse metadata (terms, tags, subjects) resists the compression that overview demands.

This resistance is more (and more important) than a technical inconvenience: the complexity and diversity of digital cultural collections is central, I assert, to their character and their value. This complexity is exactly what a generous interface should aspire to reveal, so this is a significant challenge, especially when it can be difficult to distinguish between the signal of long-tail diversity and the noise of poor metadata. In response this work presents some specific strategies for overviews that honor complexity and represent diversity. Multiple overviews can form complementary composites, revealing different aspects of a collection — what Drucker terms "parallax" [Drucker 2013, para 39]. The *All Artists* and *Decade Browser* interfaces to the Prints and Printmaking collection demonstrate this, as do the Mosaic and Grid views in the *Queenslander* project. Links between different views encourage a shuttling or alternation, emphasising the parallax effect — as in the *Queenslander*, where Mosaic tiles link to the Grid view for the corresponding year. Multiple views also make an important metatextual point: that any interface is intrinsically contingent, rather than necessary. If we can create two or three different overviews, why not four or five? A "parallax" interface suggests an open-ended proliferation of partial views; rather than a single total or definitive representation, it emphasises a human interpretive process.

35

Another strategy used here is the layering and juxtaposition of different representational forms within a single overview, creating a form of internalised parallax that provokes rather than determines interpretation. In *Manly Images* and *The Queenslander* overviews are also multi-faceted previews; aggregations are shown as tiles that juxtapose generalising aggregate features (term or year, item count) with the specific texture of individual items. Previews act as rich exemplars that support interpretive inferences about the collection — a stitching together of inevitably partial proxies and clues supplied by the interface. The tiles in *Manly Images* combine (specific) image with (aggregate) text in this way. The use of animation in both interfaces adds a layer of temporal parallax, a gradual unfurling that reveals the diversity within each aggregate.

36

For Greene and collaborators both previews and overviews are information surrogates; one of their key guidlines is to "use salient surrogates" [Greene et al. 2000, 8]. "Salience" here requires "a solid understanding of data and users"; the interface designer should identify the most important or prominent features for a given task, with a given collection. Of course this rests on a stack of questionable assumptions, including the very existence of a "task" and a knowable and generalised "user"; any pre-baked salience immediately closes down alternative readings of the collection. By using multiple and multi-level surrogates (also among Greene's recommendations) we hope to support open-ended exploration and interpretation, presenting a rich set of partial information — fragments and clues that invite further investigation. Drucker's call for "fragmented and correlated points of view that resist self-evident reification" resonates here [Drucker 2013, para 39].

37

In the tradition of information retrieval, access to collection content remains the overarching goal in creating browsable interfaces. On the other hand these experiments suggest that content discovery is only part of the story. Cross-linked and hierarchical displays emphasise context — complex, multi-dimensional relationships between items — as well as macro-scale patterns and structures within collections. As with overview however, we regard these features as contingent and generative, prompting further investigation, rather than claiming to show *what is*. For example the Australian Prints *Decade Summary* shows a noticeable "bump" in relief printing in the 1920s and 30s; investigation reveals the work of noted Australian artist Margaret Preston and her Japanese-influenced wood-cut techniques, as well as a strong graphic turn among her contemporaries. These discoveries both reinforce and complicate a familiar art-historical narrative of Australian Modernism, hinting at the milieu around a prominent individual such as Preston. While the overview's dimensions — decade and print type — enable this discovery, those dimensions are not necessarily "salient" (prominent or significant) in themselves. Rather they form a scaffold or framework against which more complex features can be investigated. Similarly in *The Queenslander*, the year-based histogram acts as an interpretive lens as well as a navigable overview. It reveals,

38

among other things, the changing prevalence of photography over the paper's run; and the prolific but interrupted output of its most distinctive illustrator, Garnet Agnew (Figure 7). Again, these observations are not self-evident answers but questions prompting further investigation — both within and beyond these interfaces. These interfaces are not scholarly analyses, but they may prompt such analyses both by scholars and (importantly) wider communities of interest.
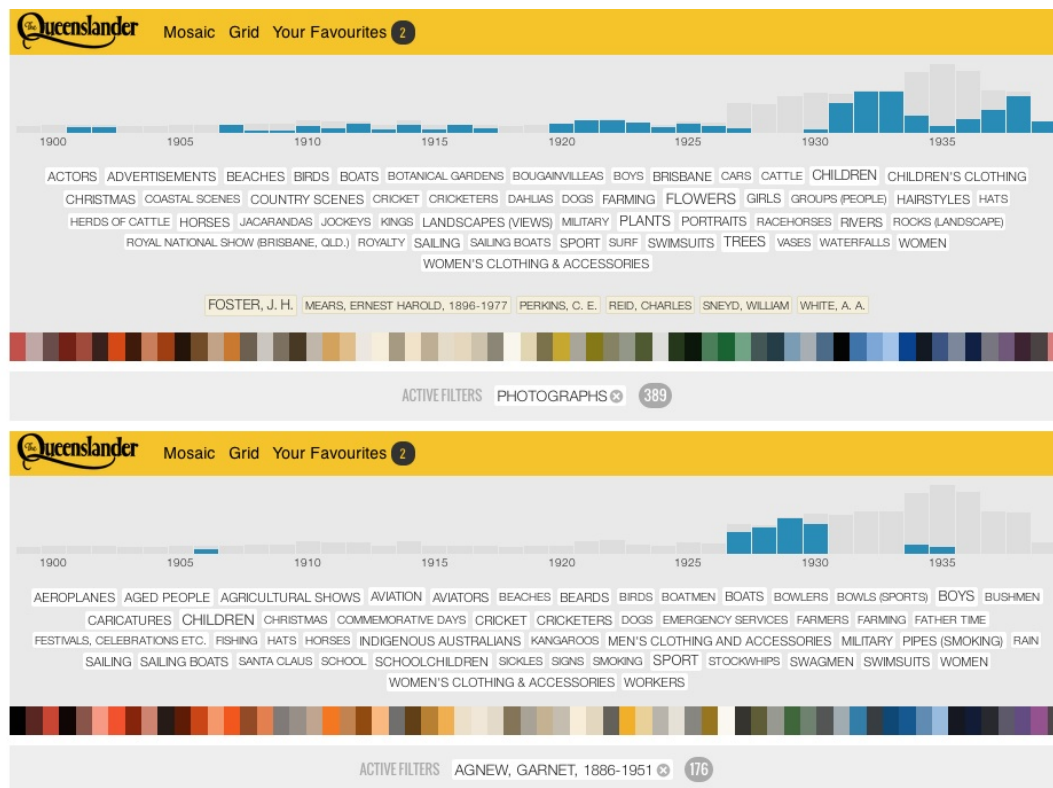

Figure 7. Grid interface, *Discover the Queenslander*; details showing distribution of photographs (above) and works by Garnet Agnew (below).

Local, browsable "innerviews" offer a further layer of parallax, and a useful counterpoint to the top-down perspective (and potential dominance) of overview; they are well suited to a model of exploration that emphasises process and interpretation, as in Kwasnik's theory of browsing [Kwasnik 1992]. In the *Works and Networks* interface to *Australian Prints and Printmaking*, each view is strictly local — showing a single artist's works and collaborators — yet in wandering the local connections we can develop a complex appreciation of intra-collection structures that is not available via an overview such as the *Decade Browser*. Similarly in *The Queenslander*, the grid view encourages traversing the collection through related slices or subsets; local, partial views that build up a more fine-grained familiarity. Linking innerviews with overviews promotes the alternation between modes that Dörk and colleagues see as characteristic of exploration in complex information spaces [Dörk et al. 2011, 7]. 39

Slipping the functional modality of information retrieval also opens the way for a wider range of experiences, potentially exceeding the frame of the interface as such. For the contemporary information-flaneur digital collections are sites for leisure and pleasure as much as focused investigation; so why not drift idly, rather than clicking and scrolling? The animated tiles in *Manly Images* and *The Queenslander* allow such a passive, contemplative mode of engagement as well as active navigation. Passive or ambient collection displays would be well suited to contexts beyond the web browser — from on-site institutional displays to domestic media environments. The proposal for generous interfaces thus extends beyond the web, to consider a generous (and various) range of technical platforms and cultural modes of encounter. 40

Technical Considerations and Design Process

In general this work demonstrates, as Dörk and colleagues argue, that the contemporary web is well placed to support media- and data-rich visual interfaces [Dörk et al. 2011, 2]. These projects are built in HTML and Javascript, and run in modern, standards-compliant browsers on a wide range of devices and platforms. *Manly Images* and the Prints and Printmaking interfaces use jQuery; *The Queenslander* uses Angular.js; in either case, the data parsing and processing, and 41

construction of the interface is handled in the browser. This approach is effective and light-weight; it simplifies design and development, but does introduce some interesting challenges, especially with larger collections.

A search-based collection interface uses a traditional client/server architecture. The server hosts the source data (in the form of a database); clients send requests for data, and the server replies with a small set of results. This model mirrors the search paradigm; in general the server's only mode of response is to reply to a query. By contrast, constructing an overview requires some level of data for the entire collection. In the work presented here we use two complementary approaches. For smaller collections (in *Manly Images* and *The Queenslander*) we package the whole collection's metadata into a single static (JSON) file; the *Manly Images* metadata for 7000 images packs down to around 700kb. This client-side approach has a number of advantages. Because the browser retains a complete representation of the collection, it can build and rebuild the display without reloading the metadata. The collection can be clustered, filtered and traversed without the performance penalty of a server / database request; the result is a more responsive interface and faster, easier exploration.

Client-side item metadata is practical for a collection of 5000, but not for 5,000,000 items. Overviews of larger collections depend on some form of aggregate or summary data. In the case of the *Decade Summary* overview, a custom API generates an aggregated table of item counts per decade and print type. Selecting a facet or segment of the collection triggers a second API call delivering item-level metadata for the relevant works. In this case the overview data is a single additional layer on top of the item data; for larger collections a deeper tree of overviews would be necessary. While there are no significant technical obstacles to providing such overviews, off-the-shelf frameworks and infrastructures (which underpin most digital cultural collections) are not designed to provide this sort of synoptic data. So far our own work has emphasised "front end" or client-side development; generous interfaces for large collections will require more back-end development to provide the data that rich overviews demand.

Designing and developing generous interfaces involves some interesting challenges. The projects presented here reflect an ongoing process of practical experimentation and the development of an ad-hoc repertoire of strategies and techniques. The underlying design process here is one of hands-on investigation and iterative exploration, as well as an attentiveness to the digital materials involved (as described by [Armitage 2009]). Notably in order to understand the features of a collection that might be represented, we must first represent the collection: the riches and voids in each collection are only evident through a process of exploratory visualisation. Synoptic devices such as histograms and tag clouds offer starting points for sketches, which can in turn develop into fully-fledged interfaces. For a designer this process presents a challenge in that preconceived visual or information structures rarely survive contact with the collection data. At the same time, exploratory visualisations can lead to further work with the metadata, which in turn transforms the potential representations. Given the wide range of potential interfaces and the potentially endless circularity of exploration and revisualization, our approach in these projects is pragmatic. We adapt familiar visualisation and interface conventions such as column graphs and timelines, facets and tags. While these may not be the optimal representational forms for generous interfaces, they offer practical starting points.

The tight coupling of collection data and dynamic representation that these interfaces require also raises some interesting challenges to conventional roles and capacities. Traditional collection interfaces reflect a clear delineation of "back end" (collection management and metadata) and "front end" (web design) as distinct functions and roles. Generous interfaces require a combination of approaches and skills spanning visualization, information design, data analysis, manipulation and processing. My collaborators and I draw on backgrounds in digital art and design and specifically creative code, where hybrid skill-sets and a playful, pragmatic experimentalism are central features of practice.

Conclusion

Cultural heritage collections are increasingly digitised and networked: they come to us largely through the web browser, and thus they are shaped and conditioned by practices (and philosophies) of interface design and information retrieval, as well as by "back end" processes of collection, curation and digitisation. In this paper I argue that search, as the dominant interface to our cultural collections, is inadequate. Keyword search is ungenerous: it demands a query, discourages exploration, and withholds more than it provides. This paper argues instead for *generous interfaces* that better match both the ethos of collecting institutions, and the opportunities of the contemporary web. Generous interfaces provide rich, navigable representations of large digital collections; they invite exploration and support browsing, using overviews to establish context and maintain orientation while revealing detail at multiple scales. Generous interfaces use multiple, fragmentary representations to reveal the complexity and diversity of cultural collections, and to privilege the process of interpretation. While they draw on techniques and models established in information retrieval and visualisation, generous

42

43

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interfaces emphasise process, pleasure and thoughtful engagement rather than the functional satisfaction of an information need. Like any interface or visualisation, these interfaces are inescapably contingent and constructed; as the representational scope of the interface multiplies so do the cultural stakes, and the need for critical attention and reflective practice. Yet if there are risks in doing too much, they are outweighed by the opportunities of doing more with the immense riches of our digital cultural collections. As the experiments presented here show, much more is possible.

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