Analysing Creative Image Search Information Needs†

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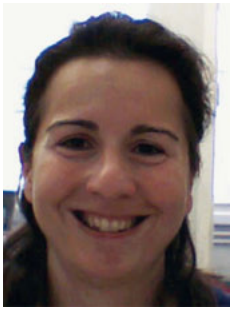

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Abstract: Creative professionals in advertising, marketing, design and journalism search for images to visually represent a concept for their project. The main purpose of this paper is to present search facets derived from an analysis of documents known as briefs, which are widely used in creative industries as requirement documents describing information needs. The briefs specify the type of image required, such as the content and context of use for the image and represent the topic from which the searcher builds an image query. We take three main sources—user image search behaviour, briefs, and image search engine search facets—to examine the search facets for image searching in order to examine the following research question—are search facet schemes for image search engines sufficient for user needs, or is revision needed? We found that there are three main classes of user search facet, which include business, contextual and image related information. The key argument in the paper is that the facet "keyword/tag" is ambiguous and does not support user needs for more generic descriptions to broaden search or specific descriptions to narrow their search—we suggest that a more detailed search facet scheme would be appropriate.

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1.0 Introduction

Images are widely used in various types of creative projects: advertising, illustration of books and print media, decoration, creation of a suitable aesthetic with a variety of image types e.g. slides, drawings, video, etc. In this study we focus on creative images and the use of photography in that domain. Professionals involved in the process of image selection include image consumers from advertising and editorial communities (advertising and marketing agencies, graphic designers and journalists) and image providers such as private photographers, image stock libraries and photography agencies. These professionals search and disseminate images through commercial libraries, social networks and indexed search engine results. Usually the search is based on a number of queries with an average length of about two words (Jorgensen and Jorgensen 2005), in an iterative process (Jansen et al 2009) where queries are reformed. Often these queries are derived from briefs, which are requirement documents for creative projects containing information about their background and objectives, target audience and the message carried, time and budget limits, contact information of stakeholders, etc. The briefs specify the type of image required, such as the content and context of use for the image, and represent the topic from which the searcher builds an image query. The aim of this paper is to investigate the semantics of creative image search through a detailed briefs' analysis and to structure and categorize search facets for image search. We contribute to the literature on information needs and their articulation in the image search community. The research question addressed in this paper is—are search facet schemes for image search engines sufficient for user needs, or is revision needed? We also analyse image needs as articulated in interviews with creative searchers and analyse the systems which they use in order to match the concepts identified in the briefs.

In the next section we describe the existing image retrieval approaches, as well as academic methods of image organisation. Section 3 describes data collection used in this study for the interviews, systems and image briefs. Analysis of the collected data is provided in Section 4, starting with the interviews analysis which provides the necessary understanding of information searching required for facet use, an analysis of common search engines used by participants, ending with a comprehensive facet analysis for briefs. A comparison of the facets to those of the briefs' analysis is presented in Section 5. Conclusion and future work are covered in Section 6.

2.0 Related work

2.1 Image needs and search

There are many studies that analyse image information needs of specific user groups. For example, Westman and Oittinen (2006), Markkula and Sormunen (2000), and Ornager (1995) specialised in image needs for newspapers. Chen (2001) studied users' needs in the context of art history by analysing queries of twenty-nine students of art history, whilst Jorgensen and Jorgensen (2005) analysed image searches and queries, user query modification strategies, and user browsing and downloading of results through search logs from a commercial image provider. However, to the best of our knowledge, there are no studies that have examined the whole creative project as a context for search, nor work that has analysed briefs other than Inskip et al. (2012) who addressed music needs rather than image needs. Image search is informed by a number of factors (Westman 2009; Hollink et al. 2004): image needs including specific and concrete/vague search for some abstract concept or mood/inspirational browsing; offered functionality of image search systems; given search strategies including verbal or written request to intermediates, textual query, content-based query, category search, browsing; search techniques including selected categories, single keywords, combined terms, Boolean modifiers, wild card, truncation, spelling/syntax alternatives, filters; the domain within which the user is searching, their level of expertise, and the task they perform. More details of search functionalities for image search engines can be found in Tjondronegoro and Spink (2008) and Menard and Smithglass (2013).

2.2 Image attributes

Irrespective of the retrieval approach (concept-based or content-based), the indicator of a good image retrieval system is its "ability to respond to queries posed by searchers" (Hare et al. 2006). There are a number of established frameworks for organising image collections including Jaimes and Chang (2000), Eakins and Graham (1999), Armitage and Enser (1997), Westman (2009) and Hollink et al. (2004). Based on the detailed analysis of these frameworks, Westman grouped image attributes into three main levels. "Non-visual image information" is the information that is not presented in the image and taken from the image's metadata, i.e. biographical attributes (creator, title and date), physical attributes (type, location) and contextual attributes (reference). "Syntactic image information" refers to an image's visual characteristics, i.e. global distribution (colour, texture), local structure (shape) and image composition (spatial layout of the

components). "Semantic image information" is a conceptual image content. Its interpretation requires some "personal and cultural knowledge." Semantic attributes could be generic, specific and abstract. Generic attributes (Westman 2009, 67) show "types of objects or scenes," specific attributes describe "identified and named objects and scenes" and abstract attributes represent symbolic meanings and emotions, which are assigned by people and known to be subjective. These attributes can be used in different ways, e.g. in relevance feedback (Kovashka et al. 2012) or with the initial query (Siddiquie et al. 2011).

2.3 Faceted search

A key concept in search is that of "keyword," which is a search term representing some part of a user's information need (or on occasion the information need as a whole)—see section 2.1 above. Because of the semantic gap, "keywords" for searching are assigned to images (or "tagged") using the image attributes described in section 2.2, and these keywords will be assigned to facets—according to Russell-Rose and Tate (2013, 168) these are "essentially independent properties or dimensions by which we can classify an object." Image attributes will determine the type of facet used by an indexer. Once indexed the user can search using the keywords assigned to the object, using a subset of facets to filter the results to specific images of interest. Facets are of two types: "single-select" or "multi-select." "Single-select" facets have values that are mutually exclusive, e.g. an image can only have one size. "Multi-select" facets have more than one value, e.g. target market can be both the US and UK. In search, keywords within facets are applied disjunctively (e.g. using the Boolean OR operator), whilst keywords across facets are applied conjunctively (a Boolean AND). In this way the user can build up an appropriate query in a faceted search image retrieval system to meet their information needs. Faceted search has been applied in many image search services (Menard and Smithglass 2013). A specific example is Ye et al. (2003), who evaluated image search which used an art history facet scheme with students studying in that domain. In our research, we investigate the cited search categories and their use in a commercial product for the creative industries, and also to reveal what is missing and why it is important.

3.0 Data collection and methodology

The general approach taken is very similar to that of Inskip et al. (2012) who interviewed music creative professionals and examined the system they used to find music using briefs—with an analysis of the briefs and search engines to find facets. However, we used interview transcripts only and did not carry out observations of users working in real contexts due to time and resource constraints. The work took place in three distinct phases: 1) analysis of the contextual interviews; 2) analysis of the search engines: and, 3) analysis of image briefs. The results of the contextual interviews were used to inform the analysis of search engines, and search facets identified using search engines were used to analyse the briefs. The evidence from these three phases is then brought together to provide an overview of search facets for image search engines. In the subsections below, we elaborate on each of these phases describing both the methods for analysing the data as providing a description of the data collected for the analysis.

3.1 Contextual interviews

As an initial step of information needs and behaviour research within the creative industries, we undertook an analysis of 13 interview transcripts. The interviews were held with current users of image retrieval systems (ten image consumer and three image providers). The interviewees included media agencies and departments, designers, news agencies and bloggers, as well as individual photographers working in various areas like fashion photography, photojournalism, still life photography and artistic photography. The interviews were loosely structured into two main parts: the traditional interview and the contextual inquiry of image query tasks. The interviews provided an overview of the research context covering such areas as image usage and search process, image search systems and satisfaction of using them. Information on real work tasks was collected through the information rather than observation, which was sufficient for our needs. The interview transcripts were analysed by using a simplified grounded theory approach (Strauss et al. 1998), where the findings emerged from the data itself, i.e. moving from more specific experiences of interviewees to more general findings in image search and retrieval. This represents a theoretical contribution showing how a grounded theory approach can be used as basis for facet building. More details on the methodology can be found in Göker et al (2015).

3.2 Commercial search systems

Based on the interviews, we revealed three main types of commercial image search systems that are widely used in creative industries: "image search engines" (Google, Yahoo!), "microstock and stock image libraries" (Getty, Corbis, Alamy, iStockphoto, Fotolia, Dreamstime, Associated Press, etc.) and "photo-sharing web services" (Flickr, WikiMedia Commons, Panoramio, Stock.XCHNG)—see Table 1. We selected five most used systems identified by interview participants for further detailed analysis (one im-

Image Search System	Type
ISS1	Image search engine
ISS2	Stock image library
ISS3	Stock image library
ISS4	Photo-sharing social network
ISS5	Photo-sharing social network

Table 1. Analysed image search systems

age search engine, two photo-sharing web services and two microstock/stock image libraries). The search systems are anonymised as the functionality analysis is commercially sensitive, as the aim of the research is to compare the facets with the briefs rather than address the differences between them. The search facets of these search engines was collected from each service, compared and analysed—which was a simple process of listing, merging and eliminating facets to provide the final set. This information was used in part to analyse the briefs (section 3.3).

3.3 Briefs

There is a vast range of creative projects that include imagery: advertising, publishing, design, editorial illustrations, marketing and promotional materials for private and corporate use. The need for images is communicated through "briefs." These briefs are the requirements document describing needs of image consumers and can take the form of an email chain or a widely circulated MSWord™ or PDF document. Briefs were regularly referred to in the interviews as a starting point for formulating an image query. The importance of briefs in creative environments has been demonstrated in the music domain by Inskip et al. (2012). As a query comprises only a limited amount of needed image features, the analysis of briefs as whole was considered necessary. For this purpose, a set of 85 real image briefs have been collected to analyse their structure, description facets and vocabulary used in them. These briefs vary in form and structure. The briefs were chosen on the basis that they were publically available and open access, and that the different forms of brief from three different sources represented a more realistic sample than relying on one source. The majority of briefs come from a photography crowdsourcing platform called ImageBrief. This platform allows image consumers to create a natural language description of their image need via a brief publishing interface with a number of predefined fields including wanted and unwanted image features, reference images, budget and time limits and usage details. The second largest source of briefs was a MeetUp group called *Photographic Assignment*, which contains a selection of real life photographic assignments used for educational purposes. These briefs contain a detailed description of an actual task; however, the business side of assignments was usually omitted. A small percentage of the examined briefs was found through Google Search and contained photographic assignments of universities, governmental organization and various companies populating their corporate image bases. The analysed briefs were created using various publishing interfaces and approaches, however, the impact on brief structure and expressed need is considered to be minimal, as users were able to express their image needs in a form of free text. Over half the briefs were for promotional and advertising use, about 25% for editorial use, with the rest being searches of images for books and CD/ DVD covers, items for personal or corporate use and items for resale. Briefs were usually of up to one page in length and contained description of the project's background, terms and conditions of acquiring the image and the actual description of the image and its purpose. There is a need to analyse consumers' image search facets not expressed in a free text form to evaluate whether they match the structure of existing image retrieval systems. A range of facets utilized within the existing commercial image search engines (section 3.2), as well as image attributes classification schemes (section 2.2) were used as a basis for coding the briefs and to eliminate bias in the coding (codes were constrained to those two sources). Coding was an iterative process during which a number of codes were eliminated and added leading to a comprehensive set of facet codes. After all iterations, 1508 phrases were split into 21 facets, which were then grouped into three main higher level classification categories—Business, Image and Context (see section 4.3 for more detail).

4.0 Analysis

Based on the specified image requirements (expressed in a brief) an image consumer either iteratively formulates search queries to search existing (stock) image collections or provides a modified and tailored project brief to a photographer for a commission (assignment) photo. In existing image collections search is iterative with query clarification along the search session with the help of textual and content-based refiners. In this section, we examine the user's image search behaviour (section 4.1), identify the facets in key search engines named by users (section 4.2) and identify facets in briefs (section 4.3)

4.1 Contextual interviews

At the beginning of an image search process, searchers usually come up with a mental image of what they want to find—a targeted search. This leads to a search using specific search terms, which yields low recall results. The searcher may therefore use more generic search terms in

Facet			#Systems	Examples
Image	Bibliographic	Media/File type	5	JPEG, TIFF
		Size	2	59mb, 29.5kb
		Format	4	17in x 13in @ 300ppi
		Timestamp	5	Uploaded 1,2 days, 1 week
		Geolocation	3	Lat/Long, France
		Source [image provider name, domain address]	5	Photographer name, collection
		ID, title, description	4	'Cute baby eating biscuit'
	Descriptive	Category	5	News, Sport, Documentary
		Keyword/Tag	4	Agility, risk
		Colour*	2	Colour, B&W
		Composition (copyspace)*	1	Position of objects
		Presence of people*	3	1, 2 or more people
		Reference (Query-by-example)*	1	Uploaded image
		Adult material filtering*	3	Exclude nudity
Business		Price range	2	Per image, range slide bar
		Rights	5	Royalty free, rights managed
		Usage (use, circulation, size of placement)	1	Presentation, website, business package
		Target market	1	Creative, editorial
		Territory of use	1	Worldwide…
		Duration of use	1	…for 5 years

Table 2. Image search systems' predefined search/refining features.

subsequent iterations. However, some users may start with generic terms in order to "examine" the collection first and narrow down the query after viewing interesting images using specific terms. Only if the topic is new or unfamiliar will the user start by browsing the collection. Most of the interviewees employed Google Images as a brainstorming tool to find what is "out there" and to generate ideas. This is described by Datta et al. (2008) as search by association in the image. Examples of users' search preferences from transcripts are: (Advertiser) "There are some times that I purposely keep the word quite generic, because it helps kind of get a bigger perspective on the subject matter;" (Graphic designer) "So it's trying to be as specific as I can … I find it's easier to be quite narrow and go I want the watch, the brand than to come up with something quite broad."

Most of the searches employ general objects and conceptual events for their searches, using affective abstract terms (e.g. happy kids), location (e.g. UK fashion) and colors (e.g. red scarf) as refinements for search. As the images were searched to accompany some text, some searchers took search terms directly from the brief text and used them as queries. Some searchers formulated ideas based on perceptual features of the image in order to "draw" a query. These searchers may derive the end image by creating a composite image drawn from retrieved images. Users may benefit from systems supporting sketch-queries and other content-based image search mechanisms.

4.2 Commercial search systems

Given the various types of commercial image retrieval systems used by creative professionals (see section 3.2), we focus here on an analysis of search facets used by the systems and functionality given to the user to formulate a query (see section 4.1). All five image search systems to some extent allow users to search images by bibliographic, descriptive and business facets (see Table 2). Bibliographic facets are usually immutable over time and are set when the image is created/uploaded. Descriptive facets are more variable in nature and may be subjective. Business facets are specific for each buying scenario and depend on a specified business model. There are also a number of image content features that might be either assigned in the form of a keyword by a human or a content based information retrieval (CBIR) algorithm, where the last way of assignment is less subjective. Those marked with (*) have corresponding CBIR algorithms along with descriptive approaches.

Search engines (ISS1) and photo-sharing (ISS4, ISS5) websites are more bibliographic and description based (keywords, timestamp, geolocation, etc.), while commer-

cial stock libraries (ISS2, ISS3) pay great attention to a business side of image search (i.e. budget limits, future image usage, etc.). Commercial stock libraries take a domain analytic approach to image description as they are targeted at specific users such as creative searchers, while search engines and photo-sharing websites are focused on the average user. Stock libraries put a lot of effort into tagging, and provide a variety of different guidelines for photographers.

4.3 Brief facets

The analysis of search engine facets (section 4.2) gave us a starting point with which to analyse briefs, and together with standard image attribute schemes (see section 2.2) allowed us to identify facets based on the brief collection described in section 3.3. A total of 21 facets were identified in the analysis (see table 4), which were then grouped into three main higher-level classification categories—'business," "image" and "context" —as follows. "Business category 'B'" refers to business decisions about time and budget frames, rights needed including model releases required, and quantity of images asked for. "Image category 'I'" refers to image description including description of specific, general and conceptual image features, syntactic features like colours and textures, lighting, style, composition, format and size, required post-processing, as well as links to similar images or suggestions about image content. It corresponds to Westman's (2009) categorization of image attributes. "Context category 'C'" gives background information on the context of use (client, contextual post-processing, purpose), as well as includes additional relevant material (book reviews, articles to illustrate, place description, etc.). We describe each of these facets below and give specific examples for use for each facet.

4.3.1 Business facets 'B'

The Business class facets include budget, deadline, rights, territory of use, duration of use, model release and image quantity (see Table 3). "Budget" is the project budget available per image ("Project Budget (USD) $250-$750"). "Deadline" is a time limit for photo offers ("3 days left"). "Rights" include creative commons, rights-managed, royalty-free rights schemes needed by the client, as well as exclusivity of use ("do not submit any royalty free images;" "Exclusive use in specified regions"). "Territory of use" is usually relevant for rights-managed rights scheme and refers to the territory the image will be used on, where "worldwide" usually refers to the use of the image on the Web ("Use: UK and Europe, Where? Worldwide"). This facet represents the space concept in context of professional user needs. "Duration of use" is also usually relevant

No	**CLASS**	**FACET**	**FACET CODE**
1	B	Deadline	DL
2	B	Budget	B
3	B	Rights	R
4	B	Territory of Use	TU
5	B	Duration of Use	DU
6	B	Model Release	Rel
7	B	Quantity	Q
8	I	Colours &Textures	C&T
9	I	Composition	Comp
10	I	Light	L
11	I	Post-processing	PP
12	I	Size	Size
13	I	Generic Semantics	G
14	I	Specific Semantics	S
15	I	Conceptual	C
16	I	Ref Similarity	RS
17	C	Usage	U
18	C	Target Market	TM
19	C	Purpose	Pur
20	C	Additional Info	AI
21	I	Subjective Evaluation	SE

Table 3. Categories and facets arising from the brief analysis.

for RM rights scheme and refers to the time during which the image will be used by the buyer ("One time use," "12months," "starting from April 24, 2012"). This facet represents the time concept in context of professional user needs. Buyers may also need a "Model release," which is a legal release typically signed by the subject of a photograph granting permission to publish the photograph in one form or another ("must be model-released," "no models under 18 years"). Buyers may ask for an image that contains (recognisable) people. The last feature in this category is "Quantity," which specifies number of photos needed as total or as a choice range ("a range of images," "3 shots," "up to 20 images") by the client.

4.3.2 Image facets 'I'

The Image category classes include non-visual, syntactic and semantic information. Non-visual image features are: file size, file type and format. Media type (photo, video, drawing, etc.) was omitted from this analysis, as initially we searched for briefs that contained photo assignments. The "size" feature is closely connected with a notion of quality and media for image use context (lower quality for web, higher resolution for printing). The size either is known

("the image size is 637 pxl x 226 pxl," "72 dpi," "a couple of inches high") or the image needs to be of high quality/resolution ("large resolution files," "vast shot"). Syntactic features include: "colours & textures," composition, lighting, applied post-processing and style. "Colours & Textures" refer to the overall colour scheme of an image, as well as background and isolated objects colours and textures ("only b&w," "must contain a prominent red object"). "Composition" is a collective term including such features as format of an image ("landscape," "portrait," "square," "panoramic"), shooting distance ("close-up," "face portrait," "an overall view"). The facet also includes angles ("camera angle directly front on," "looking into the camera"), mutual location of objects ("no cars directly in front of the theatre," "isolated"), focus ("shots with nice background blur") and copyspace ("will carry words 'Real life. Real taste'," "space for type over bottom half of image"). "Light" describes various lighting schemes ("natural lighting," "some orange subtle lighting 'orange pings'," "long shadows"). "Light" can be influenced by time of a day ("feel like it was taken at about 4 pm in the afternoon," "daytime images") and location of a shot ("indoor/outdoor/studio settings"). "Post-processing" refers to additional editing and retouching of an image content required ("can be treated," "have to be cropped or manipulated"). Image style reflects a "subjective evaluation" of glamour, natural, stocky concepts ("not touristy shots," "a classy image," "not cheesy stock shots"). The semantic subclasses describe general, specific and conceptual features of an image. "Generic Semantics" are general (not opinionated) descriptions of what should or should not be on an image ("beach with great surf waves," "young adult woman"). It should be noted that in the examined briefs some of the semantic descriptions are just thoughts on what is required to provide context for the reader. "Specific Semantics" is specific entities/places/people that should be represented in the image ("portrait of new astronomer at Greenwich observatory," "a hand holding an iphone4," "view along the Southbank towards Tower Bridge and The City Hall"). "Conceptual" features are descriptions of ideas, concepts, events ("positive busy images of every day street life," "innocence," "freedom," "beauty"). Sometimes for users it is easier to show what is wanted than try to describe it. In such cases they attach a "reference" (image, link to an image or any other visual aid) that supports description of an image need by showing wanted and unwanted features. It may refer both to content similarity ("as close to the apple ones as possible," "reference is attached"), as well as style similarity ("similar in style to National Geographic," "were looking for a similar style to the reference images attached," "like 50s documentary").

4.3.3 Context facets 'C'

Context class includes such facets as usage, client's industry, target audience, purpose of use, additional information relevant for the project. "Usage" is a description of where the image is going to be used (for printing, to reproduce, will be used for a new website, book jacket, half or quarter page). "Target market" specifies target audience/industry for the image, which is either said explicitly ("IT service provider specialising in 'cloud services,'" "readers are aged 14 to 22") or is given in a form of a hint ("client:" "Coca-Cola," "for Timotei," "this target audience is very practical and down to earth"). This category could potentially be split into client industry and product target audience ("consider:" "client is an insurance company," "target audience could be housewives," "active tourists," "businessmen," etc.). "Purpose" is an objective for image use ("the development of the project home in Australia," "for a road trip story," "Job title: Real Life. Real Taste"). By "additional info," we mean a range of information, including description of additional relevant material ("book reviews," "links to music or other external materials"). Description of colour and texture features that refers to the image context can also expressed ("front page contains variations of green," "Carbon Fiber can be very reflective"), together with contextual post-processing, i.e. use of the image within a predefined template, GUI, text ("put type around"). "Subjective evaluation" is an opinionated description of affect the images should have on a viewer ("no stages," "posed," "cheesy shots," "dark and moody," "evokes fun," "warmth and positivity").

5.0 Comparison of search engine and brief facets

A brief, being a requirements document, usually contains a quite detailed description of an image that is in some way "drawn" with words. Searchers usually provide generic descriptions of what should and should not be on a search image, using conceptual descriptions mostly when they are seeking for inspirational ideas or for illustration of a topic that is not familiar to them. Table 4 shows the matches between the facets identified in briefs and those used in image search systems.

Overall, there is a very close correspondence between the facets and the majority of the brief facets are supported in one way or another. In the case of "Keyword/Tag" in which a number of brief facets are represented. There is a clear case for a more detailed facet scheme in search engines, as users need to be able to refine their searches by narrowing or broadening their query (see section 4.1). Users may start with generic terms (in a Generic object facet) and then refine their query by identifying specific terms (through a Specific Object) facet to nar-

Match Type	List of facet matches: Brief=Image search engine [facet class]
Full Match [Total=17]	Budget=Price Range [B]. Rights=Rights [B]. Territory of use=Territory of use [B]. Duration of use= Duration of use [B]. Colour/Texture= Colour [I]. Composition=Composition [I]. Size=Size/Format [I]. Generic Object; Specific Object; Concept; Subjective Evaluation; Light; Purpose, Additional Information=Keyword/Tag [I,C]. Ref Similarity=Reference [I]. Usage=Usage [C]. Target Market=Target Market [C].
Partial Match [Total=1]	Model Release=Presence of people [B,I].
Brief Only [Total=3]	Assignment Photography: Deadline, Quantity. Non-Search criteria: Post-Processing.

Table 4. Matches on brief facets with those on image search systems

row down their search. However, users may also start a search from Specific Object terms and find generic terms from the image description to broaden their query. A more detailed facet scheme would give the user this flexibility, which a "Keyword/Tag" facet cannot—it is harder for users to pick out specific or generic terms from a facet that is too ambiguous. A key recommendation of this work is that image retrieval systems avoid "Keyword/Tag" facets and provide more helpful ones for the users.

6.0 Conclusion and future work

The research aim was to look more closely at the image information needs of creative professionals and analyse the semantics and structure of documents known as briefs. These documents are commonly used in creative fields and incorporate a range of descriptive and bibliographic image facets, as well as additional contextual details and business related information of a creative project. We saw that in some areas facets used in briefs were consistent with literature describing image search processes, but still had its own peculiarities and commercial constraints. We also compared our findings with information coming from contextual interviews and functional analysis of commercial image retrieval systems. Most of the issues highlighted in the interviews were confirmed by examples in briefs. Search facets identified in briefs were also compared with functionalities offered by top commercial systems and some gaps were highlighted. In particular, it is clear that a more fine grained system of facets is required to support creative user needs (e.g. "Keyword/Tag" is too ambiguous) and any image search system needs to reflect these needs through an appropriate faceted search scheme—this addresses our central research question. The outcome of this study is a set of search facets for an image search system for creative professionals. These search facets might not only be used for a conventional search engine based on keyword queries with further refiners but also as part of a brief creation tool that will collect information needs of a user with more detailed and contextually rich description of images. A theoretical contribution of the work is to demonstrate the usefulness of a grounded theory approach at the beginning of the process of facet building.

Two main directions of further research are study of a composition facet from CBIR and semiotics perspectives and a linkage between project's contextual information and image recommendations potentially based on social proofing (e.g. there has been a substantial growth in social curation of photo and image collections). These recommendations are tailored for creative image search in advertising, marketing, design, etc. Further research of peculiarities of editorial images is still required. When designing a new or improving an existing image search facet set, we should keep in mind richness of contextual and business information that the searcher has in mind while searching.

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