

Searching Wartime Photograph Archive for Serious Leisure Purposes

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Abstract

A survey of image information search goals, search tactics and what was looked at in the images was circulated among serious-leisure war historians. Also, we used the user engagement scale (UES), and a user success score were measured. Search goals included general and more specific goals. It is shown that despite the lack of full coverage of descriptions and metadata, users preferred mostly keyword searching. Surprisingly, general targets were popularly looked at the images, such as milieu or scenery. Participants gave high UES and varying success scores, but they were, in general, satisfied with their interactions. Serious leisure users are very engaged with their activities, which makes them tolerant to the possible system and indexing shortages. We discuss the findings and suggest research implications based on them.

Keywords: Image searching, Photograph archive, User studies.

1 Introduction

Historical photograph archives have been created to preserve the past. Digitalization has increased possibilities to access the contents. However, retrieving an image from a digital image archive may be difficult since it is relying on existing textual descriptions and metadata which may be impartial, or their usage may require special skills due to the historical context of the descriptions. We may learn from historical images something that applies also to the present. In newspaper context, the suitability of using image captions for searching have been questioned. Captions are of varying quality, often short and present only one interpretation of the image subject (e.g. [1]). Further, interpretations of images are

polysemic and the same image may have multiple interpretations at the same time and the interpretations vary between viewers, which makes indexing them challenging [16].

Context of activity affect the information needs that trigger search behaviours [4]. Further, serious leisure activities are based on information acquisition and shaped as information-rich social worlds [8]. Different browsing and interaction mechanisms of image search make the search process rather different from general Web search engines [25]. Specifically, information needs related to historical images are expected to be different from a typical web image search and this may affect the interactions. We present a survey study about the users of a wartime photographic archive, who present a specific user group with possibly specific information needs. Further, the contents of the photographic archive are accessed via textual representations of the contents and metadata, but these may be impartial and inconsistent.

To find out how the collection descriptions and search functionalities match with the users' search practices, we examined searching at different stages or activities [12]: (i) what were the information needs behind searching the images (search goals), (ii) how these needs are approached (search tactics) and (iii) what was looked at in the retrieved images when selecting suitable items for further use (target of looking). We surveyed the user engagement and search success associated with them. The study was conducted in the context of a historical digitized image collection, the Finnish Wartime Photograph Archive (FWPA). The collection is publicly available via Internet (<http://sa-kuva.fi/>) and it provides search interface in three languages, Finnish, Swedish and English.

Development of content-based image retrieval has been popular lately, but user needs and search practices are not widely examined. Further, there were not any research about serious leisure use of images. Therefore, we analysed the users' search goals, search tactics and what they look in the images. This knowledge may be used in designing better content-based methods and in informing algorithm development. Further, given that the descriptions are often the only way how to access the photographs, also the archival profession would benefit from user studies that explore interactions with visual materials.

1.1 Image Searching in the History Domain

Although much research has been done on contents of various collections, there has been little research into how people search and use historical images. Chassanoff [5] studied

historians' image selection in digital information environments in their research activities. In interview research of fifteen self-identified historians, the difficulty in describing visual materials is discussed. In the research, sixteen broad themes about experiences using digitized archival photographs were found. In locating potential material, broad visual browsing was used. Assessing the relevance of the images was a cycle of iterative events and selection included criteria such as "anything interesting and unusual". Images were also used to corroborate earlier findings and as verification [5].

In another research about querying American history images, subject contents of queries into a photo archive were analysed [6]. In the research wide range of aspects were studied, including search needs and subject contents of need statements. The search needs were categorized into four different types: specific, general/nameable, general/abstract, and subjective. Subject contents were also typified. The types included: names (person/animals/thing/; names of events/action; place names); temporal (linear/cyclical) kind of a person/thing/event/action/condition/place; emotions etc [6].

Outside the history domain in a related field of archaeology, the use of images and visual materials in work context are discussed in [9]. In examining the information resources of archaeologists with varying work roles (academic teaching, field archaeology, antiquarian, cultural heritage administration, public dissemination, academic research and infrastructural development), it was found that the archaeologists sought texts and various forms of imagery. The most extensive use of visual information, consisting of diagrams, videos, photographs and objects themselves, was involved in teaching [9].

1.2 Search Goals and Image Searching

Search behaviours vary with search goals, which vary with search tasks that are driven by task-specific needs [4]. Due to the visual nature of images, aspects surrounding use are markedly different than those of purely textual materials. The subject of a representational picture is simultaneously generic and specific, it may be of objects, but it may also be about intangibles [23]. The images may be reached out for different purposes and for various informational needs.

Image searching may include different types of search goals, i.e., the informational aspects that are expected to be obtained from the images, such as image content,

identification/attribution/provenance checking, accessibility of image [1]. Image needs have been studied in the context of web search engine logs [e.g., [11, 25] and these include needs such as Explore/Learn, Entertain, and Locate/Acquire [25]. However, image needs on the general web search are substantially different from domain-specific collections and image use varies by profession [2, 3]. In the context of history research, the searchers of the historical contents have been interested in various classes of named entities, such as organizations and locations [8] and they search for combinations of locations, period of times and person names. However, this study did not study image needs *per se*, but focused on textual materials.

Image need context has shown impact the attributes used in image seeking [7]. However, the image needs in [7] were on high conceptual level and are close to “purpose of use”, or underlying task than actual “information need” (c.f. [4]). The image needs included illustration, generation of ideas, aesthetic value, and learning, among others. Image use in work tasks of historians and journalists has been studied by McCay-Peet and Toms [18]. Their findings suggest that the stage of the work task process has a significant impact on how the image is used.

Research topics about searching include query formulation and modification, search strategies (e.g., keyword searching and browsing), evaluation of search results, query language and contextual factors [3, 17]. Markkula and Sormunen [16] found that journalists converted general information needs into tangible queries, e.g., searching with proper names. They considered that key word selection was difficult in general topics. Further, browsing was an essential strategy used by journalists and was found as an effortless activity. The journalists searched for named entities and concrete objects, events, but also conducted thematic searches [16].

Search success in querying was measured by downloading or browsing the thumbnails in a web search log analysis study [13]. They found also, in web searching thematic and descriptive queries are used more frequently than in expert searching [13].

Search tactics are behaviours aiming at accessing the image contents. The targets people look at may be different from the searching. The image may include some informational contents that are not searchable by the system. One approach to capture images’ information contents

is Shatford's [23] faceted classification of image attributes. According to Shatford, an image can be viewed within four facets, namely, Objects (Who), Activities and Events (What), Place (Where) and Time and Space (When). Images may be interpreted to represent both concrete and objective entities called "ofness" (e.g., objects, places, actions) and abstract and subjective entities called "aboutness" (e.g., feelings, concepts manifested or symbolised by objects). Images are rich in elements and that fundamentally there are many possible attributes and levels of meanings to index, and capturing all possible user goals is difficult.

1.3 User Engagement

User engagement has been a subject of growing interest in human-computer interaction [20]. According to O'Brien [19], user engagement (UE) is a quality of user experience. It is about the depth of the user's investment when interacting with a digital system and it is more than just user satisfaction. The User Engagement Scale (UES), which has been used for various purposes in research, consisted of 31-items and was constructed to measure six dimensions of engagement: focused attention, perceived usability, aesthetic appeal, durability, novelty and felt involvement. Further development of the scale appeared in a form of a four-factor scale referred to as the UES Short Form (SF) [20]. The factors of the SF scale are focused attention (FA), perceived usability (PU), aesthetic appeal (AE) and a reward factor (RW). UES SF has been found applicable to several domains, including digital cultural heritage [24] and search behaviour [21]. In the present study we utilize the UES to measure engagement with a historical photograph collection.

2 Research Setting

This research is descriptive in nature. Descriptive research is an appropriate choice when the research aim is to identify characteristics, frequencies, trends, and categories. It is useful when not much is known yet about the topic or problem [22]. We conducted questionnaire research, which was aimed at the users of the historical photographic archive. Questionnaires are well suited for collecting opinions in descriptive research settings [15], and selecting it we were able to handle the restrictions caused by the COVID-19 situation that took place during the research. Further, UES measure was selected due its popularity in user engagement studies to ensure robustness and comparability of findings across different digital applications. The questionnaire results would later serve as basis for interviews to gather more detailed data. We first describe the photograph archive, then data collection procedure and the questionnaire that was used.

2.1 The Photograph Archive

This research surveyed the user practices and experiences with FWPA. The collection was published on the Internet in 2013 and is open to public (<http://sa-kuva.fi/>). The photograph archive studied is a unique digital collection of Finnish wartime photographs containing around 160,000 pictures from the Second World War during 1939–1945.

The images portray life on the home front, events and operations at the front, the war industry, leisure time at the front (see Fig. 1), damages in bombings and the evacuation of Finnish Carelia. The pictures were mainly taken by wartime Information Company photographers. Most of the photographs are in black and white, and a small number in colour or video material.



Fig. 1. “The Punt ‘swims’ first time on lake Kananainen”, 25.7.1941. Photographer Vilho Uomala. SA-kuva.

Typically, the images appear with some metadata attached (e.g., the location, date, photographer, some information on what’s in the picture) and these metadata are visible to the users. However, part of the collection lacks all descriptive texts and metadata. The photographers were instructed to write annotations describing the name of the photographer, the subject or event in the picture, and the location. Nevertheless, the annotations were not always this precise during the chaotic times.

Further, in the existing metadata there are some obscurities of describing the locations and dates, spelling mistakes, and possibly wrong information. In some cases, this means that the search, based on temporal period, single date, or any textual content, may not be reliable. The caption texts and metadata are typically in Finnish, some in Swedish. The language and terms of the caption texts present wartime Finnish language containing military abbreviations. The caption texts have not been edited nor proofread at any time.

The interface includes a word search and an advanced search with Boolean operators. The search indices are based on the textual descriptions and metadata. Users can choose a pull-down menu to browse images by predefined stages of the war (Winter War, Continuation War, Lapland War). Temporal searches can be done based on date information. The searchers can select to search only videos, or pictures in color. It is also possible to combine these search elements in the search.

The result page provides a set of browsable 15 thumbnail pictures. The user can click on a thumbnail to open a larger image and to read its captions and metadata in case there are some. The larger image can be downloaded. Help is provided in the search page and all the functionalities are described in it.

2.2 The Questionnaire and Data Collection

The data were collected between June and August in 2021 through an anonymous on-line questionnaire. The participants were recruited by inviting members of several Facebook groups. Most of the respondents were members of an active group concentrating on the photographs in FWPA. The link to the questionnaire was shared with three other Facebook groups concerning genealogy, old photographs, and wartime experiences. After piloting the survey, the questionnaire was revised accordingly.

The questionnaire started with general information about the research setting. The respondents were informed that filling in the form would take approximately 10 min and that responses were collected anonymously. The questionnaire was built on five factors: 1) Background information and previous experience, 2) Search tactics, 3) Search goals, 4) Target of looking, and 5) User engagement and success. We also provided an opportunity to report any perceived difficulties and desired improvements. Factor 1) included asking the respondents' year of birth, municipality of residence, profession, education, how often they

usually use search services, whether they have used other historical web image archives, and if so, which, how often they use FWPA and with which device, and for which purposes (multiple selection options: research, other work activities, studying, genealogy, hobby, other). Factors 2–4) were about what they were primarily aiming for when searching the FWPA (information or pictures on wartime or of their own relatives, pictures by a certain photographer, a certain organization, certain military rank or unit, on events, on leisure time, on equipment, other), what they were looking at in the pictures (milieu or scenery, details, atmosphere, expressions, composition), and how they did the search (keyword search, browsing, filtering with different options, combination).

Questions about search tactics were based on the functionalities of the FWPA. These included querying and browsing options, temporal search, and specific filtering option for stages of the war. The service also provided filtering for colour photographs and videos, and Boolean operators for combining search keys and the available search functions. Options provided for search goals were applied from [14]. Target of gaze were based on interviews with subject experts and with the research group.

Factor 5) was about user experience and engagement. We utilized the UES short form (UES-SF) to measure the user engagement [20] and translated the UES-SF into Finnish. In this section of the questionnaire the respondents agreed or disagreed with 15 sentences of UES-SF, such as “I lost myself in this experience.”, “I was absorbed in this experience.”, “I found this application confusing to use”, “This application appealed to my senses.”, “Using this application was taxing.”, and “I consider my experience a success.” We used a Likert scale (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree) to measure user engagement. Some of the questions were negative and some positive. Therefore, the scores were reversed if needed so that the higher scores indicated higher value on agreement. The scores ranged from 1–5. The perceived difficulties and desired improvements were collected with open questions.

3 Results

3.1 Respondents

The total number of respondents in the survey was 114. After removing partial answers, we selected for further analysis 53 full answers in which the reported purpose of use was related to serious leisure activities. These included genealogy research, interest in war history (e.g.,

as authors in books for general audience/public) and for other leisure related purposes, such as being active in sharing historical information in social media (e.g., Facebook interest groups). Number of partial answers were 55 which is typical for surveys shared in social media. People tend to click links but not continue filling in. Overall, all the respondents had interest particularly for historical issues and none of the participants reported any other use.

The participants' age ranged from 25 to 88 years. The mean age was 60.2 years, median age was 61 years. The background of the respondents was divided between retired and those still being in the work life: 41.2% were retired, rest were working either as entrepreneurs or as employees. Seven reported being managers or executives.

They mostly accessed the collection by using personal computers (67.9%), the rest used mobile devices or both mobile and personal computers. 64.2% used daily some search engines and 28.3% weekly. 26.4 did not use any other historic photographic collection, but most of them reported using several other image collections.

The respondents were very frequent users of the FWPA; 54.7% used it weekly or more often, only 3.8% reported using it infrequently. All the respondents used the FWPA in Finnish.

3.2 Search Goals

We examined what were the search goals of the respondents when they last time interacted with the collection (Table 1). Respondents were able to select and report several options. The most popular search goal was to find images about wartime (60.4%). These were prompted by, e.g., in overall interest in wartime, or in general understanding about the times. Some classes of named entities were searched. These included events, military units, people, and organizations. Wartime equipment was searched by 41.5%.

Searching with leisure time goals got the highest UES score, 4.15 and events second highest, 4.13. These are surprising since these types of photos are not necessarily easy to search with the current description in the photographs. The highest success score was in searching for photographers. This information, however, is missing in a relatively large portion of the collection. Searching for people or military unit search goals were associated with poor success rate. Searchers may assume that these are searchable, e.g., querying by names, but this information may be missing from the descriptions.

Table 1. Search goals and user engagement (n = 53).

Search goals	Percentage	UES	Success
War time	60.4	3.92	3.48
Events	49.1	4.13	3.79
Military unit or organization	49.1	4.03	3.46
Objects or equipment	41.5	4.03	3.73
People	35.8	4.09	3.39
Activities	32.1	3.95	3.62
Leisure time	15.1	4.15	3.56
Photographers	11.3	4.05	4.33
Other	5.7	3.64	4.00

3.3 Search Tactics

There were several search functionalities that allowed accessing the contents. Search tactics and associated UES and success scores are shown in Table 2. The most popular tactic was to use keyword search, which matched the query with the textual descriptions (if available), and the metadata fields. Stages of war was made searchable as a drop-down menu. It enables browsing through photographs from the Winter War, Continuation War and Lapland War in their entirety as separate categories. Searchers can also limit their search to a particular period of their choice. Of these types of temporal search functionalities, the possibility to select the stages war more popular (41.5% and 26.6%). Slightly over a third reported using browsing and only 24.5% used combinations the provided functionalities. Videos or colour images were searched only by 11.5%. This in line with the content types of the collection, since most of the material is black and white.

Used search tactics were all associated with high UES scores, ranging from 3.87 to 4.09. The highest UES score was associated with stage of war. This is an inbuild functionality that supported facet searching and therefore it worked very well. Surprisingly, stage of war was not associated with high success score. Highest success scores were associated with combining several search tactics. Browsing was associated with low success score, indicating that the layout of images as thumbnails or their ordering in the result display did not support

searching. The lowest success score was related with videos or colour photographs. This can be explained by the small number of them in the collection.

Table 2. Search tactics (n = 53).

Search tactic	Percentage	UES	Success
Keyword search	69.8	4.04	3.68
Stage of war	41.5	4.09	3.57
Browsing	34.0	3.87	3.28
Temporal search	26.4	3.99	3.96
Combination	24.5	3.91	4.08
Videos or colour	11.5	4.00	3.17

3.4 Looking at the Photographs

We asked the participant to report what did they look at in the photographs to find out what was used as a cue to informational contents. The distributions are reported in Table 3.

Respondents were able to select several options and provide their own targets that were not included in the predefined list. The most popular target of looking was Milieu or scenery in the photos. This was reported by 73.6% of the respondents. Over a half of them looked at details. Atmosphere was looked at by 41.4%. This target is a very abstract concept, subjectively inferred and not necessarily described in detail in the descriptions that were available. Accordingly, the success rate associated with the atmosphere is the lowest (3.25). The most successful in the listed were details (3.78) and other (9.91). The latter included, e.g., buildings, distance between the objects and postures of people. Facial expression was looked by 30.2 and compositions by 11.3%.

The UES Scores indicated strong engagement ranging from 3.94 to 4.08. They seemed to be engaged with all the targets they were looking at. However, success rates were lower ranging from 3.25 to 3.91. This may indicate that if they succeeded accessing the contents they were expecting to see in the photos, they were engaged with them. At the same time, finding the desired contents may have been difficult.

Table 3. Target of looking (n = 53).

Looking at	Percentage	UES	Success
Milieu or scenery	73.6	4.07	3.64
Details	51.9	3.94	3.78
Atmosphere	41.5	4.15	3.25
Expressions	30.2	4.08	3.44
Composition	11.3	3.98	3.50
Other	11.3	3.96	3.91

4 Discussion

This research analysed a survey from users of a war time image collection. Users' image searching tactics and experiences has not been widely studied even though images are increasingly important in sharing and searching information. We studied historic photograph collection users' search goals, used search tactics and the desired image contents.

Firstly, users were mainly interested in general search goals (wartime and leisure time), but the most used tactic was keyword searching. This indicates that the general topics are searched with tangible queries, which is in line with the findings of [16]. Secondly, searching with predefined stages was also a popular search tactic. More faceted search functionalities, that present search goals that are meaningful to the users, could be built-in to better support the users' goals. Thirdly, the users were interested in general topics presented in the photographs, such as milieu or scenery and atmosphere. These are difficult to predefine since they are open to different interpretations derived from the users' context and activity [4]. However, their search goals included also informational nuggets about people, events, organizations etc., which are typical classes for named entities. Identifying these from the image contents would make them more easily searchable. Named entity recognition has been tried for the textual descriptions included in the collection [10]. This, however, does not solve the problem that a large proportion of the collection has no description texts at all. Therefore, image content-based recognition methods would be more suitable in solving the findability problem to cover all the photographic contents.

The popularity of keyword searching also suggest that searchers prefer searching to browsing. This was also supported by the UES and success scores. However, typically, image collections are browsed to get large overviews [4]. The large proportion of keyword searching may be due the fact that the users in our survey were serious leisure users, meaning they were very frequent users, and they already knew what to expect from the collection. It would be interesting also to include more first-timers or more casual users to compare their search tactics to the expert users. Further, this is only one information source available, and several information sources are used in conjunction to fulfil needs. However, FWPA is a unique historical collection that has been preserved from past and digitized for future uses. All participants were members of an active Facebook group that focused solely on the collection and its photos. They follow actively the group and its discussions and share the information to others they have acquired by searching and investigating the collection [c.f., 10]. This emphasizes the meaning of this collection to its users.

There were some limitations. The method used was a survey with only a small sample invited from a social media enthusiast group. Also, the UES has been developed and tested with Western adult populations in studies that evaluate digital technologies [20] which was expected to fit our purposes. However, some of our participants reported being uncomfortable with some of the “overly emotional” questions in the scale. The reception of the UES scale by using user groups of varying cultural background or varying domains of image collections would be useful.

Few efforts have been made towards understanding the intents of image searchers. In image search, the information items are images instead of texts or textual documents. Nevertheless, the contents are accessed via textual representations of the contents, and metadata. The searchability of the photographs according to the users’ needs could be improved by using automatic means. In the next steps of our research project, we will aim at testing recognizing objects and people from the photographs.

5 Conclusion

We studied the users’ search goals, search tactics and what they were looking at in historical photographs. The current state of the examined digital photograph library shows that the image contents are not fully searchable. Although the participants were quite engaged with the photograph archive, supporting searching by exploring the contents in more detail would

yield to improved search experiences. Content-based image search supported with modern techniques should be incorporated into photograph archives as the users prefer keyword searching in reaching their search goals. Also, browsing could be supported by faceted search beyond the period-of-time approach presented here. Researching how and why people use images will help developing photograph archives that properly support their larger activities that require visual information.

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