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**REFERENTES E TENDÊNCIAS TEÓRICAS SOBRE ANÁLISE E
REPRESENTAÇÃO DE IMAGEM NA ISKO: UMA ANÁLISE DE DOMÍNIO**

**Marília
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Dissertação apresentada ao Programa de Pós - Graduação em Ciência da Informação da Faculdade de Filosofia e Ciências da Universidade Estadual Paulista – UNESP, como requisito final para obtenção do título de Mestre em Ciência da Informação.

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RESUMO

Considerando a crescente importância da imagem como elemento de informação, o que pressupõe o desenvolvimento de abordagens cada vez mais acuradas de organização e de representação, no presente trabalho busca-se identificar as formas pelas quais a organização e representação da informação imagética tem sido discutida no âmbito da *International Society for Knowledge Organization* (ISKO) com o objetivo de verificar quais são os referenciais e as tendências teóricas da análise e da representação da imagem no universo da organização do conhecimento em nível internacional. Para tanto, será analisada a literatura científica oficial da ISKO por meio dos anais dos congressos internacionais e da revista *Knowledge Organization*, entre os anos de 1990 a 2015. Nesse sentido, serão selecionados os artigos que apresentem o(s) termo(s) *image**, *picture**, *photo**, *film**, *movie** no título e/ou no resumo, a partir do que se procederá à análise de domínio, a partir das abordagens bibliométrica e epistemológica propostas por Hjørland (2002).

Palavras-Chave: Análise e representação de imagem. ISKO. Análise de domínio.

Estudos bibliométricos.

ABSTRACT

Considering the increasing importance of image as an element of information, which presupposes the development of increasingly accurate approaches to organization and representation, the present work aims to identify the ways in which the organization and representation of imagery information has been discussed in the International Society for Knowledge Organization (ISKO) with the objective of verifying the theoretical references and trends of image analysis and representation in the universe of knowledge organization at the international level. In order to achieve this, the official scientific literature of the ISKO is analyzed including the proceedings of the international conferences and the Knowledge Organization journal, from 1990 to 2015. In this sense, I analyzed the articles that present the term (s) image *, picture *, photo *, film *, movie * in the title and/or abstract using domain analysis in the bibliometric and epistemological approaches proposed by Hjørland (2002).

Keywords: Analysis and representation of images. ISKO. Domain analysis.

Bibliometrics

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1 INTRODUÇÃO

A Ciência da Informação é um campo voltado para questões ligadas à produção, organização, disseminação e uso da informação. Seu objeto de estudo é a informação em seus atributos; atributos esses que contemplam a natureza, a gênese e os efeitos informacionais (LE COADIC, 1996). Trata-se, em última análise, de uma ciência que estuda e aplica os processos de organização e representação da informação.

A organização do conhecimento e da informação, no âmbito dos fazeres da Ciência da Informação, tem como um de seus processos o Tratamento Temático da Informação (T.T.I.), cujos objetivos se constituem a organização, recuperação e disseminação para o uso da informação, gerando com isso, um novo conhecimento (GUIMARÃES, 2003; GUIMARÃES; SALES, 2010).

Os objetivos do T.T.I. são a organização, a representação, a disseminação e o uso da informação. De acordo com Fujita, Sousa e Gracioso (2014), o Tratamento Temático da Informação tem como processos a análise documental, a classificação, a catalogação de assuntos e a indexação. Sendo assim, a análise do documento é requisito básico para a organização, representação, disseminação e para atingir o efetivo uso da informação.

Hoje em dia, utilizam-se diversos tipos de imagens em todos os campos de conhecimento e esse uso é muito bem aceito pela sociedade, pois através da imagem é possível transmitir informações visuais do mundo, tornando estas um instrumento de pesquisa e conhecimento (AZEVEDO NETTO; FREIRE; PEREIRA, 2004). Dessa forma, a imagem é um documento, uma fonte e um veículo de informação que precisa de tratamento, organização e representação para que possa ser acessado e recuperado, gerando assim, novos conhecimentos (BOTÃO; SOUZA, 2013; MAIMONE, TÁLAMO, 2008; SMIT, 1996;).

As imagens são amplamente utilizadas em vários tipos de projetos, tais como publicidade, ilustração de livros e material de impressão, decoração, criação de uma estética adequada com uma variedade de imagens, por exemplo: slides, desenhos etc. (KONKOVA; MACFARLANE, GÖKER, 2016).

Com o crescimento da importância da imagem como fonte de informação, verificou-se um desenvolvimento teórico e metodológico relativo à análise documentária de imagens (MANINI, 2002).

Contudo, o tratamento temático da informação, especialmente a análise documentária, foi a princípio desenvolvido para documentos textuais. Porém, com o tempo, a análise do documento não se restringiu a documentos textuais, utilizou-se dela também para documentos sonoros, imagéticos etc. Contudo, é reconhecido que deve-se respeitar as características de cada tipologia documental (FUJITA, SOUZA, GRACIOSO, 2014).

Nesse sentido, Guimarães (2003, p. 102) destaca que “análise documentária tem como objetivos estabelecer uma ponte entre o usuário e o documento, fornecer subsídios aos processos de disseminação da informação e gerar produtos documentários (resumos e índices)”.

Cunha (1989), Maimone e Tálamo (2008) por sua vez, defendem que a análise documentária envolve vários procedimentos para representar o conteúdo do documento, para melhorar e facilitar a recuperação da informação, sempre recorrendo às necessidades dos usuários que geralmente se compõem por uma diversidade de públicos.

As atuais técnicas de tratamento de documentos escritos não são apropriadas para analisar imagens (MENARD, 2006), levando em conta também que o comportamento do usuário que busca imagem é totalmente diferente daquele que busca livro ou qualquer outro suporte de documentos escritos (SMIT, 1989).

O processo da análise documental no T.T.I. visa a identificação e a descrição do documento (PINTO; GALVEZ, 1996). A descrição do documento é frequentemente assistida e realizada por meio de linguagens documentais, não acrescenta nada ao original ou não altera, essencialmente, o teor do original e sempre estabelece uma relação entre a linguagem do sistema e a linguagem do usuário (MAIMONE; TÁLAMO, 2008).

Sendo assim, torna-se comum que os profissionais da informação (bibliotecários, arquivistas, etc.) ainda possuam muitas dúvidas sobre o tratamento de imagens, tendo em vista que em sua formação há uma prioridade para os documentos textuais (SMIT, 2011). No entanto, a análise da imagem tem um conjunto de características que transita entre o discurso visual e verbal, assim é preciso que o profissional da informação tenha competência entre as duas esferas discursivas, nas quais ele tem a função de representar os documentos, facilitando a organização, recuperação, disseminação e o uso da imagem (MAIMONE; TÁLAMO, 2008).

Dessa forma, como o tratamento temático da informação documental bibliográfica necessita da análise documental para o tratamento da informação imagética, a fase analítica é essencial. A análise de imagens consiste em passar as linguagens imagéticas para a linguagem verbal.

As imagens “transmitem significados, sejam eles explícitos ou não” (MAIMONE; GRACIOSO, 2007, p. 3). Desse modo, são necessários estudos da linguagem documental também para a representação de imagens, no qual o profissional da informação deve ter habilidade e competência para fazer descrição (MAIMONE; GRACIOSO, 2007).

O profissional da informação necessita buscar conhecimento para melhorar a análise e a representação da informação imagética. Assim, torna-se importante a criação e uso de metodologias e técnicas específicas de acordo com cada tipologia documental, pois diferentes materiais precisam receber distintos tratamentos. Neste cenário, destaca-se que na representação da informação documental, o referencial teórico está bem consolidado em comparação com a representação de imagens que está defasada devido ao fato de ser um tema com exploração incipiente e restrita (MAIMONE; GRACIOSO, 2007; MAIMONE; TÁLAMO, 2008, 2009).

A partir das considerações apresentadas, tem-se como definição do problema a seguinte questão: quais os principais referentes teóricos e tendências consolidadas na análise e representação da imagem no âmbito internacional da organização do conhecimento na ISKO (International Society for Knowledge Organization)? Uma vez que a ISKO é a sociedade científica que constitui o fórum que agrega o que existe de mais significativo em termos de produção de conhecimento nesse vasto campo relativo ao tratamento do conteúdo informacional e organizacional do conhecimento.

1.1 OBJETIVOS

A pesquisa tem como objetivo geral identificar o diálogo da questão da organização e representação da informação imagética no universo da ISKO a partir da produção científica oficial, em âmbito internacional, por meio dos congressos internacionais da ISKO e da revista *Knowledge Organization* (KO) dos anos 1990 a 2016. Em termos específicos, objetiva-se: a) Identificar os fundamentos e os métodos presentes na literatura internacional da ISKO para análise e representação de imagem; b) Identificar aos referentes teóricos de análise e representação da

imagem; c) Estabelecer os diálogos e fluxos existentes dessa produção científica em termos de autoria, instituição e contexto geográfico; d) Identificar e analisar os autores mais citados; e) Relacionar tematicamente como se apresenta essa produção.

1.2 JUSTIFICATIVA

A presente pesquisa se justifica por fornecer elementos para a consolidação teórica na temática de Análise e Representação da imagem e Sistematização, que se adapta às tendências para o contexto brasileiro.

Ressalta-se que esta pesquisa se insere na linha de pesquisa Produção e Organização da Informação do Programa de Pós-graduação em Ciência da Informação da UNESP, pois busca também contribuir para o desenvolvimento de referenciais teóricos e aplicados em organização da informação e do conhecimento, em especial, no que se refere à análise e representação da imagem.

1.3. METODOLOGIA

O universo desta pesquisa é a *International Society of Knowledge Organization* – ISKO, sociedade científica que tem como objetivo o desenvolvimento de pesquisas teóricas e conceituais na organização do conhecimento, com a missão de gerar avanço na pesquisa em organização do conhecimento, considerada no âmbito mundial. Portanto, é o âmbito mais significativo para intercâmbio de produção científica em organização do conhecimento. A sociedade foi estabelecida em 1989 por Ingetraut Dahlberg e Daobert Soegel na cidade de Frankfur, Alemanht.

A ISKO é uma organização interdisciplinar constituída por pesquisadores da Ciência da Informação, Ciência da Computação, Filosofia, Linguística e outras áreas do conhecimento.

Nos congressos da ISKO, os pesquisadores se reúnem para discutir e apresentar as pesquisas que estão realizando ou que realizaram, podendo exercer o intercâmbio de conhecimento.

Os congressos da ISKO são divididos em dois: Congresso Internacional e Congressos Regionais. O Congresso Internacional é realizado a cada dois anos, nos anos pares, em países diferentes. Desde a criação, em 1989, até 2016, já foram realizados 14 encontros. Conforme quadro abaixo:

Quadro 1 - Congressos internacionais na ISKO.

Ano	Local	Tema
1990	Darmstadt, Alemanha	Ferramentas para a organização do conhecimento e a interface humana
1992	Madras, Índia	Paradigmas cognitivos na organização do conhecimento
1994	Copenhague, Dinamarca	Organização do conhecimento e gestão da qualidade
1996	Washington, EUA	Organização e mudança de conhecimento
1998	Lille, França	Estruturas e relações na organização do conhecimento
2000	Toronto, Canadá	Dinamismo e estabilidade na organização do conhecimento
2002	Granada, Espanha	Desafios na representação e organização do conhecimento para o século XXI: integração do conhecimento através das fronteiras
2004	Londres, Inglaterra	Organização do conhecimento e sociedade global da informação
2006	Viena, Áustria	Organização do conhecimento para uma sociedade de aprendizagem global
2008	Montréal, Canadá	Cultura e identidade na organização do conhecimento
2010	Roma, Itália	Paradigmas e sistemas conceituais na organização do conhecimento

2012	Mysore, India.	Categories, contexts and relations in knowledge organization
2014	Krakow, Poland	Organização do conhecimento no século 21: entre padrões históricos e perspectivas futuras Organização do Conhecimento para um mundo sustentável: desafios e perspectivas para o compartilhamento cultural, científico e tecnológico em uma sociedade conectada
2016	Rio de Janeiro, Brasil	

Fonte: <http://www.isko.org/events.html> acesso em 24/10/2017

Os Congressos Regionais são eventos nacionais de cada país integrante da ISKO. Atualmente, são 12 ISKO Regionais. Os congressos são realizados a cada dois anos, nos anos ímpares, em seus países de origem.

Os países que fazem parte da ISKO são: Brasil, Estados Unidos, Canadá, China, França, Índia, Itália, Espanha, Portugal, Reino Unido, Polônia, Alemanha, Áustria, Suíça, Turquia com Algeria e Marrocos. Estes países entraram na ISKO em anos diferentes.

Os trabalhos que são apresentados nos congressos internacionais são publicados nos anais da própria ISKO Internacional. Os anais internacionais têm 13 publicações dos seus respectivos 14 eventos realizados, como apresentados anteriormente. Justifica-se ter uma publicação a menos se compararmos com o número de eventos, pela fato de o volume 1 e 2 estarem em conjunto. Os anais internacionais possuem como título: *Advances in knowledge Organization. A Internacional Society of Knowledge Organization* disponibiliza esses anais nos suportes físicos ou digitais.

Além dos anais da ISKO, a organização tem sua própria revista *Knowledge Organization*. O periódico *Knowledge Organization* possui suporte físico e digital. Até no momento da coleta dos dados no ano 2016, foram publicados 43 volumes. Fundada em 1973, pela mesma criadora da ISKO, Ingetraut Dahlberg, a revista iniciou sua publicação em 1974 com o título *International Classification*. Somente em

1989, foi agregada como revista oficial da ISKO. Em 1993 foi alterado o título para *Knowledge Organization*, no qual permanece até os dias atuais.

O tema da revista segue os objetivos da ISKO e somente são publicados nesse periódico artigos originais no tema da organização do conhecimento.

A partir da delimitação do corpo de pesquisa, foram recuperados e analisados os artigos com os termos *image**, *Picture**, *photo**, *film**, *movie** no título e no resumo dos papers de AKO e do periódico *Knowledge Organization* dos anos de 1994 a 2016, para identificar a temática que pesquisam sobre imagem dentro do universo da organização da informação, mais especificamente, análise e representação de imagem. Uma vez identificados os artigos, estes foram objetos de análise de domínio no que se refere à abordagem bibliométrica e epistemológica.

Na segunda fase da pesquisa, foi realizada a leitura de todos os artigos identificados com os termos e foram selecionados os artigos que, no conteúdo, abordam a análise e representação de imagem. Assim, foram agrupados os conteúdos em comum sobre análise de imagem, para identificar os assuntos mais abordados dentro dessa temática. Em seguida, na etapa de que concerne à caracterização do domínio, realizou-se uma análise bibliométrica, mais especificamente, no que se refere à análise das citações a partir dos artigos que abordam, no conteúdo, a análise e representação de imagem, de modo a identificar diálogos, correntes teóricas, entre outros.

Para melhor visualização das redes das análises de citações, utilizou-se o *software* PAJEK, que permite visualizar e discutir os referentes teóricos identificados.

2 Referente Teóricos e Conceituais

2.1 Análise e Representação da Imagem

As imagens têm uma grande importância na humanidade. Começou na pré-história com desenhos feitos nas paredes, evoluindo até chegar as imagens de 4 dimensões. Hoje, a imagem é utilizada por todos e em todos campos, tais como áreas de história, medicina, pesquisa, jornalismo entre outras ou somente para registro de memória. “É banal falar de civilização da imagem, mas essa expressão revela bem o sentimento generalizado de se viver em um mundo onde as imagens são cada vez mais numerosas, mas também cada vez mais diversificadas e mais intercambiáveis” (AUMONT, 2002, p.13).

A imagem é um instrumento de expressão e comunicação. É considerada como uma linguagem, por ela traz uma mensagem para outro, esse outro pode ser até o próprio autor (JOLY, 2007). A linguagem da imagem é visual, por meios de signos.

Joly (2007) afirma que a imagem representa algo, que não seja sempre o visível, tornando visível algumas características ao visual, mas tudo depende da produção de um sujeito: imaginária ou concreta, a imagem passa por alguém, que a produz ou a reconhece.

Já a imagem materializada é vista como representações visuais planas que envolvem desde pintura, fotografia, cinema, desenho, gravuras televisões entre outras que surgiram com o avanço da tecnologia, todavia para estudar a temática imagem não se pode deixar de considerar a essência da imagem (AUMONT, 2002). Aumont (2002) afirma que:

A imagem tem inúmeras atualizações potenciais, algumas se dirigem aos sentidos, outras unicamente ao intelecto, como quando se fala do poder que certas palavras têm de “produzir imagem”, por uso metafórico, por exemplo (p.13).

A imagem gera uma informação visual que pode ser interpretada e gerar outras informações. Sendo assim, para que Ciência da Informação possa realizar seu papel de organização, recuperação e disseminação para o uso da informação, gerando um novo conhecimento, é necessário realizar o tratamento temático da imagem, que utiliza outras metodologias diferentes daquela para o objeto bibliográfico.

A representação da imagem tem como objetivo promover a organização, recuperação e disseminação, assim como qualquer outro documento. Sua representação é realizada por meio de análise documental para a identificação e seleção de termos que descrevam o conteúdo informacional.

A análise documental é dividida em três etapas: a primeira é a compreensão do conteúdo do documento, a segunda identificação dos conceitos que representam o conteúdo informacional do documento e por último a seleção de palavras de conceitos (FUJITA, 2003).

Para realizar a primeira etapa da análise documental é necessário realizar uma leitura, a partir da qual se compreende o conteúdo e identifica os conceitos que irá melhor representá-la. Porém, a leitura documental de uma imagem não é a mesma que se realiza em um documento em suporte livro, pois na imagem a informação está intrínseca. Sendo assim, Shatford (1986) propõe que a imagem seja analisada através das perguntas: “de que trata a imagem” e “sobre o que trata a imagem?” Por meios dessas perguntas metodológicas é possível extrair o conteúdo da imagem. De acordo com Smit (1996), a pergunta que tem que ser feita “sobre o que é?” é mais ampla, subjetiva e cultural. Já a pergunta de “que é?” é mais pragmática, objetiva. Dentro dessa categoria existem duas subdivisões a específica e a genérica.

Smit (1996) detalha as categorias desenvolvidas por Ginette Blery. As categorias são Quem?, Onde?, Quando? e Como?. Essas categorias são formadas por meios de perguntas e as informações extraídas para respondê-las ajudarão na formação de palavras-chave para a recuperação da imagem.

A categoria “Quem?” destina-se a identificar coisas animadas, seres vivos e substantivos concretos e abstratos. A categoria “onde” busca extrair informações de lugares onde a imagem está representada. A categoria “quando?” tem a finalidade de indicar o período, tempo e datas.

Essas categorias formadas por perguntas devem atingir o objetivo da análise documental, que é representar o documento para que possa ser recuperada pelos usuários, sem ter a necessidade de o usuário ter o documento na mão para tomar uma decisão sobre ele. Sendo assim, a análise documental deve ser realizada por meio de métodos de estudos na Ciência da Informação e por meio de análise documental de documentos bibliográficos que já está bem consolidada, comparando-o com a representação de imagens que está defasada devido ao fato

de ser um tema com exploração incipiente e restrita (MAIMONE; TÁLAMO, 2008, 2009), como anteriormente mencionado.

Destaca-se, todavia, que Jorgensen (1996) considera que à indexação de imagem é inferior a indexação de material bibliográfico, pois com a imagem é possível realizar várias interpretações, não existindo, assim, uma interpretação correta da imagem. Desse modo, indexá-las baseando-se em suporte de material bibliográfico é algo muito difícil e insuperável. Arastoopoor (2012) afirma que, realmente, é difícil indexar adequadamente uma imagem por meios de termos.

2.2 Análise de domínio

A análise de domínio proporciona a caracterização e avaliação da ciência, pois permite encontrar as condições pelas quais o conhecimento científico se constrói e socializa. Entre autores que trabalham com análise de domínio, destacam-se são Hjørland & Albrachtsen (1995), Hjørland (2002, 2004, 2017), Moya Anegón & Herrero Solana (2002), Tennis (2003), Smiraglia (2011, 2012, 2015).

Birger Hjørland junto com Hanne Albrechtsen foram os primeiros pesquisadores a utilizar a Análise de Domínio na área da Ciência da Informação em 1995, no artigo *Toward a new horizon in Information Science: domain-analysis*, no periódico *Journal of the American Society for Information Science*.

Segundo Smiraglia (2011), a análise de domínio é um estudo da evolução dos discursos apresentados em um período por uma comunidade que partilha a divisão do trabalho. Com a análise de domínio, é possível ver como determinado domínio do conhecimento vem evoluindo nos aspectos teóricos e como interagem em diferentes comunidades discursivas em diferentes lugares gerando novos conhecimentos. Danuello afirma que essa análise é “a melhor maneira de se entender a informação na Ciência da Informação. [...]” (DANUELLO, 2007, p.50).

Avaliar a evolução nos aspectos teóricos e como interagem em diferentes comunidades discursivas é importante, pois a produção científica traz a confirmação de teorias que já estão consolidadas ou problemas de outros pesquisadores que, ao discordam ou concordam um com outro, geram novas teorias e nova visão, proporcionando uma nova abordagem (SANTAREM, 2010).

Desse modo, consideram que a análise de domínio revela a interação das comunidades discursivas por meio das observações pragmáticas de seus membros e a interação social entre eles, bem como a interpretação do contexto que estão inseridos e seu uso. Com isso, a análise de domínio identifica as categorias fundamentais do domínio e, também, aspectos relevantes para a área, pois é fundamental para construir um sistema de organização do conhecimento (GUIMARÃES; TOGNOLI, 2015)

Guimarães e Tognoli (2015) mostram a importância do estudo realizado com a metodologia que da análise de domínio:

Análise de domínio é especialmente importante para pesquisas sobre organização do conhecimento, particularmente no que diz respeito a estudos sobre a configuração epistemológica da área, o social processos que permeiam a construção da área (por exemplo,

produção e comunicação científica) e também ao desenvolvimento de sistemas de organização do conhecimento (como linguagens de indexação, por exemplo) porque este aspecto proporcionará uma abordagem cada vez mais contextual, de acordo com os valores inerentes à sua produção e uso sem desconsiderar os elementos idiossincráticos que permeiam todo o processo de organização propriamente dito (GUIMARÃES; TOGNOLI, 2015, p. 563).

Para melhor entender um determinado domínio, é necessário compreender o seu funcionamento, como que ele interage no universo científico, sua epistemologia, avaliar o seu meio de produção, organização e o uso do conhecimento. É necessário analisar todo o contexto que está inserido, pois cada área do conhecimento se desenvolve diferentemente e não tem como ignorar esses aspectos para que seja estudado e compreendido.

Danuello (2007; 2014) destaca que a análise de domínio permite identificar o grau da importância e significância em um campo do conhecimento humano, revelando elementos que analisam um contexto científico, assim como “tendências, padrões, objetos (pessoas), processos e relacionamentos existentes” (DANUELLO, 2007, p. 50).

O mapeamento da evolução e transformação da ciência ao longo do tempo é realizado por meio da análise de domínio, que é um método eficiente para visualizar a grande quantidade de temas e subtemas de pesquisa e auxiliar na identificação das tendências e as direções na pesquisa (RAGHAVAN; APOORVA; JIVRAJANI, 2015).

Já vimos as características e os conceitos de análise de domínio, mas afinal o que é um domínio?

Para Oliveira (2013, p.26) “um domínio pode ser uma disciplina científica, uma área do conhecimento científico ou uma comunidade discursiva que pode estar relacionada a um partido político, a uma religião ou a um grupo qualquer”. Em um trabalho mais recente, Lima (2015) define domínio como uma característica dada a uma comunidade de discurso vinculada a um âmbito qualquer em que se desenvolve uma atividade. Um domínio é um conjunto de atores que compartilham a a divisão do trabalho, comum. No ramo da ciência, desde uma disciplina ou especialidade científica corresponde um domínio temático.

O domínio é um conjunto de discursos, pressupostos teóricos, consenso epistemológicos em comum que conversam entre si sobre abordagens metodológicas e semânticas sociais (SMIRAGLIA, 2012; SMIRAGLIA; LÓPES-

HUERTAS, 2015). Hjørland e Hartel (2003) afirmam que os domínios são constituídos por dimensões ontológicas e conceitos epistemológicos e sociológicos.

Em 2018, Oliveira define o domínio como:

uma área de conhecimento, atividade, interesse, em que se demarca algum conhecimento com limites definidos, com profissionais ou grupos articulados em pensamento e em linguagem. Dentro da Análise de Domínio, procura-se uma integração do indivíduo, extrapolando as abordagens cognitivistas para o contexto social das comunidades nas quais aquele indivíduo se insere. Assim, os conceitos de informação passam a ter sentido dentro no compartilhamento das diversas comunidades e seus membros (OLIVEIRA, 2018, p.49)

Vários pesquisadores definiram o conceito de domínio, podemos afirmar que um domínio dentro da ciência da informação é um conjunto de atividades em comum que relacionam, tais como uma disciplina de uma área, um discurso de um tema, que os pesquisadores que têm os mesmos objetivos e compartilham algo em comum. Existem vários domínios e dentro de um domínio pode existir outros domínios menores no qual vai se ramificando.

Sendo assim tem a possibilidade de existirem vários domínios. Em Tennis (2003) no seu artigo *Two axes of Domains for Domain Analysis*, propôs a utilização de dois eixos para definir o domínio. O motivo para o domínio ser bem definido é pelo fato que ele pode ser usado por mais de um pesquisador, sendo assim, tem a necessidade de deixar bem claro a compreensão do objeto de análise de domínio.

Os dois eixos são Área de modulação e Grau de Especialidade. Área de modulação define a extensão da abrangência do domínio, é o alcance do domínio, é neste eixo que é determinado o início e o fim do domínio analisado, é determinado o que estão excluídos e define o nome do domínio.

Já o eixo de Grau de Especialidade define a intenção de um domínio, é a profundidade do campo do domínio, isto é, o grau de especificação, quanto mais profundo mais específico é o domínio. Esse eixo de Grau de Especialidade determina o foco e posicionamento entre outros domínios. Por meio da interseção é gerado um novo domínio (TENNIS, 2003).

Tennis (2003) propôs uma maneira de delinear e definir um domínio usando dois eixos e um total de quatro parâmetros: extensão, nomeação, foco e interseção.

Podemos perceber a importância dos eixos para definir o domínio, pois com eles será bem determinado o escopo total, a amplitude, o nome, a qualificação e a

especificidade através do foco; para assim, quando outro pesquisador for analisar o mesmo domínio, estará bem específico e claro qual foi o domínio analisado.

Porém Hjørland (2017, p. 446) considera que a divisão de em dois eixos em Tennis (2003), “sugere uma determinação a priori de um domínio que é simplesmente impossível do ponto de vista hermenêutico”, embora seja necessário determinar com clareza o objetivo da análise, que é importante. Ainda Hjørland (2017) afirma seleção do domínio deve ser justificada, mesmo que a maioria é implícita, inconsciente e influenciada pelas fontes ou também pela cultura do pesquisador que irá fazer a análise de domínio, ele deixa claro também que a justificativa não é uma teoria da análise.

Para realizar a análise de domínio, é necessário que o pesquisador tenha conhecimento profundo e amplo sobre o domínio que irá analisar, isso implica que não existe neutralidade na análise de domínio, pois suportará algumas visões à custa de outras. É por esta razão que se faz necessário tomar a visão dominante para o ponto de partida e examinar suas implicações e suposições filosóficas (Hjørland, 2017).

Para realizar a análise de Domínio, Hjørland (2002) apresentou 11 abordagens:

1) Produção de guias de literatura;

Os guias de literatura são documentos que descrevem e listam de forma organizada as fontes de informações de acordo com os tipos e funções de cada área. A função da guia de literatura é orientar o usuário e até o próprio bibliotecário na busca de informações por meio das entradas bibliográficas, pois ele fornece os pontos fortes e fracos das bibliografias, assim como as descrições dos trabalhos. Fornecer entradas bibliográficas, recuperar e selecionar os melhores trabalhos de um determinado domínio que cumpre sua necessidade informacional.

A abordagem produção de Guias de Literatura deve trabalhar em conjunto com outras abordagens para realizar a análise de domínio; tais como: Construção e elaboração de classificações especiais e tesouros, Estudo epistemológico e crítico e Estrutura e instituições em comunicação científica.

2) Elaboração de classificação especial e tesouro;

Com a classificação e tesouro é possível identificar categorias e conceitos de uma forma organizada em estrutura lógica de um determinado domínio, assim como as relações semânticas entre os conceitos, relações genéricas e as sinônimas.

Os tesouros são instrumentos de vocabulários controlados e específicos de domínio. A estrutura e a organização do tesouro podem ser consideradas como uma forma de análise de domínio.

A abordagem Construção e elaboração de classificação e tesouro trabalham em conjunto com outras abordagens tais como: Indexação e recuperação da informação, Estudos bibliométricos, Estudos históricos, Estudos epistemológicos e críticos e Estudos terminológicos, línguas para fins especiais.

3) Indexação e recuperação da informação;

Pesquisas sobre indexação, representação de documentos e a recuperação, são capaz de avaliar práticas e melhorá-las. Se isso não for feito, torna-se difícil argumentar para pesquisas futuras nesta área. Muitas vezes, especialistas em bibliotecas sentem falta de assunto adequado para uma área. Para reivindicar a existência do campo como um campo de estudo sério, no entanto, é necessário desenvolver conhecimento de assunto suficiente.

4) Estudo empírico dos usuários;

Como estudos empíricos de usuários é possível extrair informações importantes sobre o comportamento informacional de diferentes grupos, facilitando a análise de domínio. Assim como outras abordagens anteriores que trabalham em conjunto com outras, o Estudo empírico dos usuários também pode trabalhar com outras abordagens como Estudo bibliométrico; Estudo epistemológico e crítico; e Estudo de estrutura e instituições em comunicação científica.

5) Estudo bibliométrico;

O estudo bibliométrico permite mapear a ciência e identificar pesquisadores, instituições, correntes teóricas de diferentes áreas por meio das análises de citação e colaboração científica. Possibilita também identificar os anos que mais produziram ciência, indicadores.

O estudo bibliométrico pode ser combinado com outras abordagens como Estudo histórico e Estudo epistemológico e crítico.

Por ser a abordagem utilizada nesta pesquisa, o próximo capítulo traz mais características e detalhes dessa abordagem do Estudo Bibliométrico.

6) Estudo histórico;

Com o estudo histórico, busca-se mostrar o desenvolvimento das terminologias, categorias, literaturas, gênero do documento, estrutura dos diversos

tipos de documentos de um determinado domínio estudado. Esse estudo pode ser realizado juntamente com o Estudo de documentos e gêneros.

7) Estudo de documentos e gêneros;

Existem vários tipos de documentos para diferentes informações tais como na música utilizam-se folhas de músicas, na geografia, os mapas e atlas, no direito, os códigos, doutrina, legislação, na astronomia utilizam-se os almanaques e na psicologia os testes, assim por diante. Por isso, a importância de estudar os diferentes tipos de documentos e estilos, pois a forma dos documentos reflete a especificidade dos diferentes domínios. Como uma abordagem para análise de domínio, ela deve ser combinada com outras abordagens, por exemplo: Pesquisa sobre indexação e recuperação de especialidades; Estudos históricos; e Estudos epistemológicos e críticos.

8) Estudo epistemológico e crítico;

Com o estudo epistemológico e crítico, tem-se a finalidade de organizar as abordagens do conhecimento e teorias. A epistemologia é uma disciplina da filosofia, porém, não só se limita à filosofia. Na ciência da informação, a epistemologia é vista como geração e interpretação da experiência científica e seus pressupostos.

Estudos epistemológicos analisam os pressupostos explícitos ou implícitos das tradições de pesquisa, classificados em cinco categorias, segundo Hjørland (2002):

- (1) empirismo / positivismo;
- (2) racionalismo;
- (3) historiologia / hermenêutica / fenomenologia;
- (4) pragmatismo / funcionalismo / marxismo / feminismo;
- (5) eclecticismo, pós-modernismo e ceticismo.

Essas categorias fornecem conhecimentos para orientação, seleção, organização e recuperação da informação. Estudos Epistemológicos e críticos geralmente são combinados com estudo histórico.

9) Estudo terminológico, linguagem para propósitos específicos (LSP), semântica de bases de dados e estudos de discursos;

Terminologia e linguagem são elementos importantes dentro da Ciência da Informação para desenvolver instrumentos e processos de organização e recuperação da informação. O estudo terminológico e de linguagem para propósitos

específicos fornece conhecimento da linguagem e da terminologia de um determinado domínio. Esses estudos podem ser realizados com estudo bibliométrico, estudo histórico e estudo epistemológico e crítico.

10) Estruturas e instituições da comunicação científica;

Com o estudo das estruturas e instituições da comunicação científica é organizado os atores e instituições, conforme a divisão do trabalho no domínio e realizado o compartilhamento de informações importantes para a compreensão das funções dos tipos de documentos, ajudando assim na construção de guias de literatura. É um estudo que pode enriquecido quando associado com o estudo bibliométrico.

11) Cognição científica, conhecimento especializado e inteligência artificial.

O estudo da Cognição científica, conhecimento especializado e inteligência artificial teve origem na ciência da computação. Porém, também pode se aplicar na ciência da informação, pois esse estudo estabelece modelos mentais de um domínio ou métodos para obter conhecimento para a produção de sistemas especializados.

Em 2017, Hjørland (2017) concorda com Smiraglia (2015) que acrescenta mais duas abordagens semânticas de banco de dados e abordagem análise de discurso, Concorda também com Guimarães e Tognoli (2015) que sugere a abordagem princípio da proveniência. A abordagem da proveniência assegura que o contexto de criação dos documentos seja mantido na ordem que foi criado pela instituição, analisando os documentos pela ordem original e no conjunto e não somente individualizado (GUIMARÃES; TOGNOLI, 2015).

Hjørland (2002) destaca que as 11 abordagens podem ser combinadas a fim de fortalecer entre a pesquisa e a prática e identificar conhecimento mais aprofundado e mais satisfatório.

Dentre as abordagens apresentadas, esta pesquisa utiliza o aporte dos estudos bibliométricos, tema da pesquisa ora apresentada e, que muitas vezes, confunde-se com a análise de domínio que, como pudemos verificar, é um estudo mais amplo e complexo.

2.3 Análise bibliométrica

Estudo Bibliométrico é uma abordagem com grande importância para a análise de domínio, pois possui a competência de organizar padrões sociológicos de reconhecimento explícito em documentos individuais (DANUELLO, 2007; HJØRLAND; ALBRECHTESSEN, 1995; GUIMARÃES; PINHO; FERREIRA, 2012). É por meio do estudo métrico que se permite evidenciar o comportamento científico seja nacional ou internacional (NORANH; MARICATO, 2008).

Esse estudo é fundamentado na sociologia da ciência, ciência da informação, matemática, estatística e computação, com os métodos de análises e fundamentados em recusos quantitativos (GRÁCIO; OLIVEIRA, 2017).

De acordo com Araújo (2006), os estudos bibliométricos só se difundiram na década de 70 no Brasil. O Instituto Brasileiro de Informação Científica e Tecnológica – IBCIT foi o principal instituto que realizou estudos bibliométricos que, naquela época, tinha nome de Instituto Brasileiro de Bibliografia e Documentação – IBBD.

Com o estudo bibliométrico é possível definir os maiores produtores da informação, identificando os países, instituições e pesquisadores (OLIVEIRA, 1996).

Com esse estudo, identificam-se os temas mais pesquisados em determinada época em determinadas comunidades científicas, verificam-se os anos mais produtivos, o comportamento e também analisa-se a qualidade das publicações (FERREIRA, 2010).

Para melhor consolidar as considerações anteriores, Oliveira e Grácio afirmam que:

as análises bibliométricas têm se mostrado procedimentos tangíveis e confiáveis, que utilizam indicadores de produções, ligação e citação, explicando, além da produtividade, a relevância e impacto de autores, periódicos, instituições, grupos ou países nas diferentes áreas do conhecimento. (OLIVEIRA; GRÁCIO, 2011, p. 18)

O termo Bibliometria surgiu em 1934 no tratado da Documentação pelo Paul Otlet (FERREIRA, 2010). O estudo bibliométrico nem sempre foi voltado para o universo de pesquisa acadêmica. Surgiu com o objetivo voltado para a medida de livros, quantificar as edições e exemplares, a quantidade de palavras, espaços tomados pelos livros nas bibliotecas. Porém, foi passando para o rumo da produção bibliográfica, como artigos de periódicos, entre outras produções bibliográficas. Por fim, a atenção do estudo bibliométrico foi para produtividade de autores e de estudos de citação (ARAÚJO, 2006).

Freitas (2017) afirma que entender o comportamento da literatura científica, em relação a temáticas, autores, instituições, colaborações têm sido relevante para o entendimento do domínio e construção de políticas de informações.

Ainda sobre o conceito de bibliometria, Spinak (1998, p.143) afirma que “a bibliometria estuda a organização dos setores científico e tecnológico a partir das fontes bibliográficas e patenteadas para identificar os atores, seus relacionamentos e suas tendências” [...] “a bibliometria está preocupada com a produção científica e utilidade”.

Nesse mesmo trabalho, Spinak (1998) identifica as aplicações da bibliometria, cienciométricas e informétricas:

- Identificar tendências e crescimento do conhecimento em um domínio;
- Identificar os periódicos principais de um domínio;
- Identificar os usuários de uma área específica;
- Identificar os autores do domínio estudado;
- Prever tendências de pesquisa;
- Medir a utilização da disseminação seletiva de informações;
- Formular políticas de compras para desenvolvimento de coleções;
- Adaptar as políticas de eliminação de resíduos para publicações;
- Estudar a dispersão e obsolescência da literatura científica;
- Prever a produtividade dos editores, autores individuais, organizações e países.

Os estudos bibliométricos permitem identificar os pesquisadores e temas que são mais valorizados e de melhor qualidade de uma área científica por meio da análise da intensidade da produção e da contagem de citação em determinado período (GRÁCIO; OLIVEIRA, 2017).

Vanti (2002) também mostra algumas possibilidades de aplicação da bibliometria, cienciométrica e informétrica. Entre elas, as aplicáveis a esta pesquisa científica são:

- Análise de citação e cocitação;
- Mensurar o grau e padrões de colaboração entre autores;
- Determinar o desempenho de sistemas de recuperação da informação;
- Medir o crescimento de determinadas áreas e o surgimento de novos temas.

Aos procedimentos quantitativos, e estatísticos que avaliam e medem os índices de produção e também a disseminação do conhecimento científico denominam-se a bibliometria, portanto para conseguir esse estudo utiliza-se da análise de citação, no qual é a área mais importante dentro da bibliometria (ARAÚJO, 2006).

Como podemos perceber, a análise de citação é uma área do estudo bibliométricos utilizada para alcançar os objetivos propostos, visto que:

Os estudos de citação são uma importante ferramenta para o entendimento dos processos de comunicação científica nas diferentes áreas do conhecimento humano. Eles nos permitem mapear um campo emergente ou consolidado, identificar seus principais atores e as relações que se estabelecem entre eles e identificar uma série de características do comportamento de uso da informação recuperada. Assim, os estudos de citação constituem um importante indicador da atividade científica, pois contribuem para entender a estrutura e o desenvolvimento da ciência e também identificam as regularidades básicas de seu funcionamento (VANZ; CAREGNATO, 2003, p. 255).

Segundo Araújo (2006) e Vanz e Caregnato (2003), A análise de citação permite identificar e descrever os padrões em uma literatura científica e para medir o seu impacto na produção científica, tais como: autores, periódicos mais citados, mais produtivos, fator de impacto de periódicos e autores, bem como identifica os países, instituições dos autores mais influentes; a idade média da literatura utilizada, obsolescência da leitura que compõe um campo, área, um domínio do conhecimento.

O conjunto de referências nos trabalhos científicos pode ser visto como reflexo de uma comunidade discursiva “na medida em que explicita os autores reconhecidos e reconhecidos por uma comunidade, retratando característica do domínio”, através da análise das frequências de citações podendo ser autores ou documentos e das frequências de cocitação (GRÁCIO; OLIVEIRA. 2014, p.5). Além disso, permite identificar conjuntos de cientistas e suas publicações, para evidenciar os pesquisadores de maior impacto de uma determinada área científica, mostrando as teorias e metodologias utilizadas (GLÄNZEL, 2003).

Já vimos a importância da análise de citação para entender um domínio. Porém o que leva um pesquisador a citar outro trabalho? Qual a razão para um autor escolher um determinado trabalho e não outro? Como é realizada a seleção das referências no trabalho?

Cesar A. Macias-Chapula realizou um trabalho, publicado em 1998, no periódico *Ciência da Informação* com o título: O papel da informetria e da cienciometria e sua perspectiva nacional e internacional, que pretendeu responder estas perguntas relacionadas à citação, com as 15 funções específicas associadas ao ato de citar um trabalho:

1. prestar homenagem aos pioneiros;
2. dar crédito para trabalhos relacionados;
3. identificar metodologia, equipamento etc.;
4. oferecer leitura básica;
5. retificar o próprio trabalho;
6. retificar o trabalho de outros;
7. analisar trabalhos anteriores;
8. sustentar declarações;
9. informar aos pesquisadores de trabalhos futuros;
10. dar destaque a trabalhos pouco disseminados, inadequadamente indexados ou desconhecidos (não citados);
11. validar dados e categorias de constantes físicas e de fatos etc.;
12. identificar publicações originais nas quais uma idéia ou um conceito são discutidos;
13. identificar publicações originais que descrevem conceitos ou termos epônimos, por exemplo, Mal de Hodgkin;
14. contestar trabalhos ou idéias de outros;
15. debater a primazia das declarações de outros. (MACIAS-CHAPULA, 1998, p.136)

Perceber se que ato de citar envolve muitos aspectos desde psicológicos, sociológicos, políticos. Nesse contexto, a literatura das referências de um trabalho científico, permite conhecer características do autor e do ambiente em que atua. Além disso, é nas referências que irá encontrar outros trabalhos importantes, no qual poderá buscar mais informações para entender o tema estudado.

Percebe-se que a “análise de citação contribui para o entendimento de uma comunidade científica e contribui para a construção da rede de associações de significados, explicitando a comunicação e o relacionamento entre seus pesquisadores” (GRÁCIO; OLIVEIRA, 2012, p.102). Utiliza-se a análise de citação e de redes sociais como “subsídio à identificação, visualização e maior compreensão do universo de marcos teóricos e escolas teóricas que permeiam em um dado domínio científico (GUIMARÃES; PINHO; FERREIRA, 2012, p. 35). Portanto, torna-se um procedimento importante a partir da análise quali-quantitativa, para fins de melhor compreender o universo epistemológico em uma determinada área de um domínio do conhecimento. Segundo Smiraglia (2011), as citações definem o domínio.

Mueller afirma que as citações são componentes de indicadores diversos tais como a comparação entre autores, texto, mensurar vários aspectos da atividade científica. Quando realiza – se uma análise de citação é identificar possível elite ou

padrões de uso e impacto, grupos de autores, revista centrais de uma área ou até caracterizar a literatura estudada em termos de idade e uso. A Análise de citações tem técnicas simples de contagem e porcentagem a estudo de correlção, regressão e outras técnicas mais elaboradas (MUELLER, 2012).

Oliveira afirma que os indicadores básicos de produção são contituídos por meio da contagem do número de publicações do pesquisador, grupo de pesquisa, instituição de pesquisa ou país que pertencem os autores e instituições no qual objetivam a medir seu impacto junto à comunidade científica que pertecem, permitindo a visibilidade dos pesquisadores que mais produzem e as temáticas mais destacadas de uma área do conhecimento. Já os indicadores de ligação, baseados em trabalhos em coautoria em citações pareadas, são utilizados para mapear e construir redes de colaboração científica e citação entre os pesquisadores, instituições ou países. Mediante os indicadores de ligações são formadas as redes sociais de comunicação científica, assim, pode-se aplicar a metodologia de análise de redes sociais para identificar e analisar as estruturas sociais, cognitivas e o comportamento de um determinado domínio. (OLIVEIRA, 2018).

3 Apresentação e Análise dos resultados

As comunicações e conferências dos eventos realizados pela ISKO-Internacional totalizaram 726 trabalhos. Destes, 33 artigos na AKO foram recuperados com os termos definidos nos procedimentos da pesquisa, e na revista KO foram recuperados 21 artigos, totalizando 54 artigos com os termos. As tabelas 1 e 2 apresentam a totalidade destes resultados, por ano.

TABELA 1- Corpus de análise da pesquisa dos papers de AIKO

Ano	Total de artigos publicados	Quantidade de artigos com os termos	Quantidade de artigos selecionados
1994	53	1	1
1996	47	3	3
1998	53	3	3
2000	59	2	1
2002	80	2	1
2004	55	4	2
2006	51	4	1
2008	57	4	1
2010	60	3	1
2012	64	5	2
2014	76	2	2
2016	71	2	1
Total	726	33	19

Fonte: elaborado pelo autor

TABELA 2 - Corpus de análise da pesquisa do Periódico Knowledge Organization

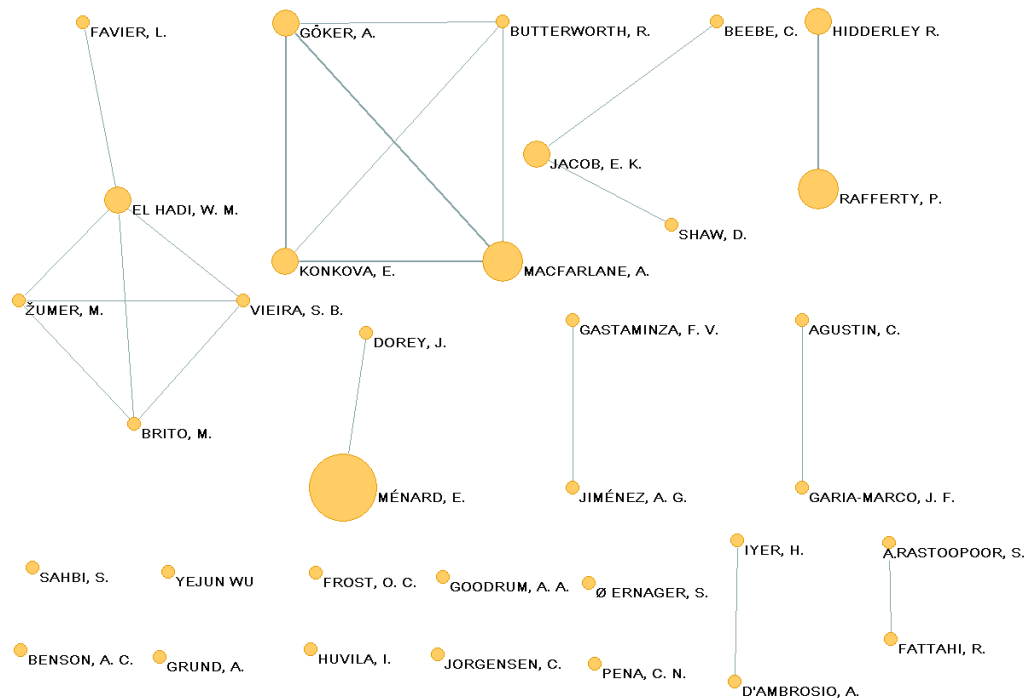
Ano	Quantidade de todos artigos	Quantidade de artigos com os termos	Quantidade de artigos selecionados
1993	17	4	1
1994	15	1	0
1996	18	1	0
1998	9	1	0
2004	15	1	0
2006	13	1	0
2007	13	2	1
2010	24	1	1
2011	23	2	2
2013	25	3	1
2014	21	2	2
2016	55	2	2
Total	248	21	10

Fonte: elaborado pelo autor

Após a recuperação dos 54 artigos com os termos, foi realizada uma leitura para identificar o assunto abordado nos artigos, excluir os artigos que no assunto não abordaram a análise e representação da imagem, resultando 19 artigos na AIKO e no KO foram selecionados somente 10 artigos, totalizando 29 artigos que foram analisados.

A partir dos 29 artigos analisados, identificamos os 34 autores responsáveis pelas pesquisas na temática de imagem dentro da organização do conhecimento que publicaram na ISKO. Desses 34 autores, somente 8 pesquisadores tiveram mais que um trabalho publicado, conforme mostra a Figura 1:

Figura1: Rede de coautoria nos 29 artigos por autores dos papers de AIKO e da KO



Fonte: elaborado pelo autor

Na Figura 1, os círculos são proporcionais à produção dos respectivos autores, ou seja, os pesquisadores com círculos maiores são os que mais produziram e os segmentos de reta identificam as coautorias entre eles.

Os autores que mais produziram foram Elaine Ménard com cinco trabalhos, seguida de Andrew Macfarlane e Pauline Rafferty com três trabalhos publicados e na sequência, os autores com dois trabalhos publicados, a saber: Widad Mustafa El Hadi, Ayşe Göker, Rob Hilderley, Elin K. Jacob and Elena Konkova.

Ainda, a partir da figura 1, podemos ver 24 autores que têm ligação entre eles, isso significa que esses autores trabalham em coautoria.

Os autores Ayse Göker; Rob Hilderley; Elin K. Jacob e Elena Konkova publicaram dois trabalhos em parceria, e um desses trabalhos tem a participação de Richard Butterworth. Outros autores que publicaram mais que um trabalho em conjunto são Pauline Rafferty e Rob Hilderley.

A pesquisadora francesa Widad Mustafa El Hadi e Elin K. Jacob tiveram mais de um trabalho publicado em coautoria, porém com pesquisadores diferentes, como podemos ver na Figura 1, Widad Mustafa El Hadi publicou com Maja Žumer e com os dois únicos pesquisadores brasileiros: Marcilio Brito e Simone Bastos Vieira. Outro trabalho realizado da Widad Mustafa El Hadi foi com Laurence Favier. Já Elin K. Jacob realizou a pesquisa com Debora Shaw e Caroline Beebe com trabalhos separados um do outro.

Já os restantes dos trabalhos em coautoria foram realizados em dupla, tais como Francisco Javier Garia-Marco com Carmem Agustin; Antonio Garcia Jiménez; com Felix del Valle Gastaminza; Hemalata Iyer; Amber D'ambrosio; e Elaine Ménard e Jonathan Dorey.

A Tabela 3 apresenta a tipo de autoria nos artigos analisados, em que se observa que a maioria (61%), sendo assim há muitos pesquisadores que realizam trabalhos sem colaboração.

TABELA 3 – Distribuição dos artigos por autoria

Autoria	Artigos	Frequência relativa (%)
Individual	16	61%
Dupla	10	33%
Tripla	2	3%
Quadupla	1	3%
Total:	27	100%

Fonte: elaborado pelo autor

Os 34 autores do universo de pesquisa dos artigos pertencem a 13 países distintos, entre eles estão Alemanha, Brasil, Canadá, Dinamarca, Espanha, Estados Unidos, França, Inglaterra, Irã, México e Suécia. Destes 11 países os mais produtivos foram 7 países diferentes. Como podemos ver na tabela 4:

TABELA 4 – Distribuição geográfica dos pesquisadores

Países	Quantidade de pesquisadores
--------	-----------------------------

Alemanha	1
Brasil	2
Canadá	2
Dinamarca	1
Escócia	1
Eslovênia	1
Espanha	4
Estados Unidos	10
França	3
Inglaterra	5
Iran	2
México	1
Suécia	1
Total	34

Fonte: elaborado pelo autor

Na Tabela 4 podemos observar que o Estados Unidos é o país que tem mais pesquisadores escrevendo sobre análise e representação de imagem e logo em seguida Inglaterra, França e Canadá.

Os 29 artigos foram reunidos em grupos de acordo com as metodologias comuns entre eles. Os 4 grupos foram: artigos que abordam sobre recuperação de imagem baseado em conteúdo (CBIR); os artigos sobre recuperação de imagem baseado em conceitos; os artigos que abordam sobre a metodologia iconográfica de Erwin Panofsky e por fim aqueles que descreverem sentimentos e emoções da imagem.

Vale destacar que a classificação dos artigos nesses assuntos não significa que o texto trate integralmente sobre aquele assunto.

A seguir, o Quadro 1 com os assuntos e a relação dos autores:

QUADRO 1 - Assuntos e os autores dos trabalhos

Assunto	TRABALHOS ANALISADOS
Recuperação de imagem baseado em conteúdo (CBIR)	BENSON, A. C. (2011) OERNAGER, S. (1994) KONKOVA, E.; GÖKER, A.; BUTTERWORTH, R.; MACFARLANE, A. (2014) KONKOVA, E.; MACFARLANE, A.; AND GÖKER, A. (2016) MACFARLANE, A. (2016) MENARD, E. (2006, 2007, 2008)
Recuperação de imagem baseado em conceitos (TBIR)	FROST, O. C. (1996) JORGENSEN, C. (1996) JACOB, E. K.; SHAW, D. (1996) GOODRUM, A. (1998) GARIA-MARCO, F. J.; AGUSTIN, C. (1998) KONKOVA, E.; MACFARLANE, A.; GÖKER, A. PENA, C. N. (2002) MENARD, E. (2006, 2008, 2010) HIDDENLY, R.; RAFFERTY, R. (2006) HUVILA, I. (2010) RAFFERTY, P. (2011) FAVIER, L.; EL HADI, W. M. (2012) YEJUN WU. (2013) KONKOVA, E.; GÖKER, A.; BUTTERWORTH, R.; MACFARLANE, A. (2014) SAHBI S. (2014) MACFAARLANE, A. (2016) BRITO, M.; EL HADI, W.s; ZUMER, M.; VIERA, S. B. (2016)
Análise Iconográfica de imagem de E. Panofsky	ARASTOOPOOR, S.; RAHMOTOLLAH F. (2012) GRAUND, A. (1993) MÉNARD, E.; DOREY, J. (2014) PENA, C. N. (2002) RAFFERTY, P.; HIDDWELEY, R. (2011)
Descrever sentimentos e emoções da imagem.	FROST, O. C. (1996) JACOB, E. K.; SHAW, D. JIMÉNEZ, A. G.; GASTAMINZA, F. del V (2004) MENARD, E. (2006)

Fonte: Elaborado pelo autor.

Após os agrupamentos dos assuntos, foi realizada uma síntese explicando as abordagens da análise e representação de imagem, como podemos ver a seguir:

- Recuperação de imagem baseado em conteúdo (CBIR)

A recuperação de imagem baseado em conteúdo (CBIR) é um método de busca a imagem através do desenho que o usuário desenha. Ainda que seja mais simples e cru o desenho do usuário, o sistema de busca é usado por semelhança entre a imagem desenhada com a imagem de banco de dados. As semelhanças dos atributos do esboço dos usuários com as imagens no banco de dados são avaliadas automaticamente. As características como cor, textura, forma e outras características visuais são importantes para a representação de imagem, porém ainda é difícil implementar esses atributos para recuperação. (KONKOVA; GÖKER; BUTTERWORTH; MACFARLANE, 2014; MENARD, 2006; OERNAGER, 1994)

O método CBIR não tem a necessidade de que as imagens estejam vinculadas a qualquer forma de legendas, os sistemas CBIR são difíceis de ser executados pelos usuários que não são especializados, tornando um método de recuperação de imagem difícil, por isso as pessoas ainda preferem recuperar imagens usando palavras. Porém, estão limitados às imagens digitais. (BENSON, 2011) MacFarlane (2016) afirma que a maior dificuldade do CBRIR é a interpretação que os humanos possam colocar sobre o objeto.

- Recuperação de imagem baseado em conceitos (TBIR)

A recuperação de imagem baseado em conceitos (TBIR) é algo muito comum, pois utiliza-se de palavras, conceitos indexados para descrever a imagem para que possa ser recuperada, igualmente em livros e monografias. A indexação de imagens visuais por descritores é muito demorada e intensa pelo fato que uma imagem poder transmitir diferentes significados e interpretações. Além disso, as estratégias textuais são muitas vezes incapazes de aproveitar as modalidades de busca e processamento de informações de imagem, tornando uma tarefa desafiadora. (FROST, 1996; JORGENSEN, 1996; KONKOVA.; GÖKER; BUTTERWORTH; MACFARLANE, 2011).

Elaine Ménard (2006) afirma que a recuperação da imagem fica limitada a imagens associadas, as legendas ou anotações semânticas. Pois nem todas as imagens têm acesso a legendas e é difícil reconhecer todos os significados. A mesma autora ainda afirma que tem dois tipos de representação de imagem, a

saber: a representação por indexação com vocabulário controlado e a indexação de imagem gratuita.

A indexação de vocabulário controlado usa os mesmos princípios de indexação de livros, seguida uma política de indexação com tesouro. Já a de indexação gratuita não segue uma política, as pessoas ficam livres para representar com qualquer termo. Esse tipo de indexação é utilizado bastante em site de imagens como Flickr e Instagram.

- Análise Iconográfica de imagem de E. Panofsky

Ervim Panofsky estudou na Universidade de Friburgo na Alemanha nos anos de 1920. Panofsky trabalhou como professor em várias universidades, como a Universidade de Novo York, Universidade de Princeton e de Harvard.

Panofsky tinha interesse na área da história da arte, por isso que desenvolveu o método iconológico para analisar e compreender a arte independente dos momentos históricos da época.

De acordo com Panofsky (2011), a iconografia é a descrição e a classificação das imagens para auxiliar na identificação de temas específicos. Com a iconografia é possível estabelecer datas, origens e até autenticidade.

Como podemos conferir: “Iconografia é o ramo da história da arte que trata do tema ou mensagem das obras de arte em contraposição à sua forma” (PANOFSKY, 2011, p. 47).

A realização de uma análise iconográfica é dividida em 3 etapas: pré-iconográfico, iconográfico e iconologia.

Pré-iconográfico é o tema primário ou natural que pode ser classificado como fatural e expressional no qual se identificam as linhas e as cores das formas puras tais como “objetos, seres humanos, animais, plantas e ferramentas e assim por diante” (PANOFSKY, 2011, p. 50). Panofsky define o mundo dos motivos artístico como os significados primários e naturais das formas puras. Nessa análise pré-iconográfica, utiliza-se da experiência para reconhecer as formas puras. Caso a experiência não seja suficiente para reconhecer algum objeto, é necessário recorrer a outros recursos tais como livros. Todavia nunca se abandona a experiência prática vivida (PANOFSKY, 2011, p.55).

O nível iconográfico identifica o assunto secundário na obra, no qual está a interpretação das formas puras, isto é, os motivos artísticos com seus assuntos e conceitos (PANOFSKY, 2011, p.50) Um exemplo citado por Panofsky é a imagem de

um grupo de figuras de homens sentados a uma mesa de jantar numa ordem e pose, tornando assim a representação da Última Ceia. Para realizar essa análise é necessário ter “familiaridade com termos específicos ou conceitos, tais como são transmitidos por meios de fontes literárias, quer obtidos por leitura deliberada ou tradicional oral” (PANOFSKY, 2011, p.58).

O nível iconológica é o “Significado intrínseco ou conteúdo, constituindo o mundo dos valores “simbólicos” - Ato da interpretação: Interpretação iconológica” (PANOFSKY, 2011, p. 64). Desse modo, é a etapa que expõe os significados observáveis culturalmente, socialmente e ideologicamente.

A análise iconográfica de Panofsky não está preocupada com a recuperação da imagem, mas sim com o entendimento dos significados em uma obra de arte, com a interpretação dos valores simbólicos, por meio da cultura das pessoas da época, o modo de composição do artista e com o tema da obra. Porém, para uma imagem ser recuperada, deve-se entender também os significados da obra, para assim realizar o tratamento temático. Alguns pesquisadores como Shatford e Smit, utilizaram as categorias da análise iconográfica de Panofsky (nível pré-iconográfico, iconográfico e iconológico) a fim de desenvolver uma metodologia para realizar o tratamento temático (MANINI, 2002).

- Descrever sentimentos e emoções da imagem

Outro aspecto abordado nos artigos é a descrição na imagem, o que descrever na imagem? Quando é realizada a indexação da imagem, os profissionais procuram informações de fundo, elementos que é mostrado na imagem, eventos específicos e elementos visuais. Porém, e os elementos de sentimentos e emoções que a imagem causa? Eles também são essenciais para descrever a imagem.

Konkova, MacFarlane e Göker (2014) definem os atributos encontrados nas imagens. Atributo genérico mostra os objetos e cenas, atributos específicos são os que descrevem objetos e cenas identificáveis e nomeados e por fim os atributos abstratos são os que representam as emoções, sentimentos, e elementos subjetivos. Frost (1996) e Ménard (2006) afirmam que os atributos abstratos são difíceis de descrever em palavras e conceitos.

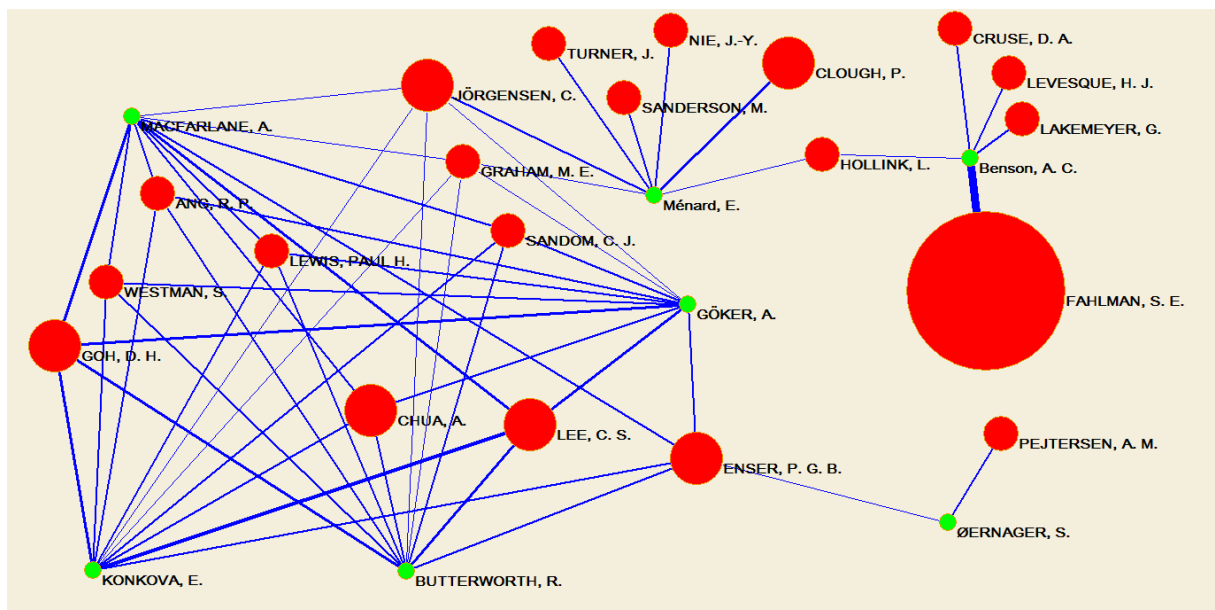
Ménard (2006) denomina a indexação de atributos abstratos como indexação “suave”. A decisão de realizar a indexação suave deve ser analisada de acordo com a natureza da coleção e as necessidades dos usuários.

Para fins de análise das citações presentes nos trabalhos pesquisados, foram excluídas as autocitações e as entidades coletivas, chegou-se aos resultados apresentados a seguir.

Foram realizadas seis redes de citação: uma rede para cada categoria e uma rede com todos os artigos selecionados.

Na Figura 2 apresenta-se a rede de citação da categoria recuperação de imagem baseado em conteúdo, em que pode-se ver que o autor mais citado foi Fahlman, porém ele foi citado somente pelo pesquisador Benson. Os únicos autores que receberam citações de mais de uma pesquisa foi Enser, Jörgense e Hollink. O restante está na lista dos mais citados, porém citados em um artigo. Como podemos ver na figura a baixo:

Figura 2 - Rede de citação da categoria recuperação de imagem baseado em conteúdo



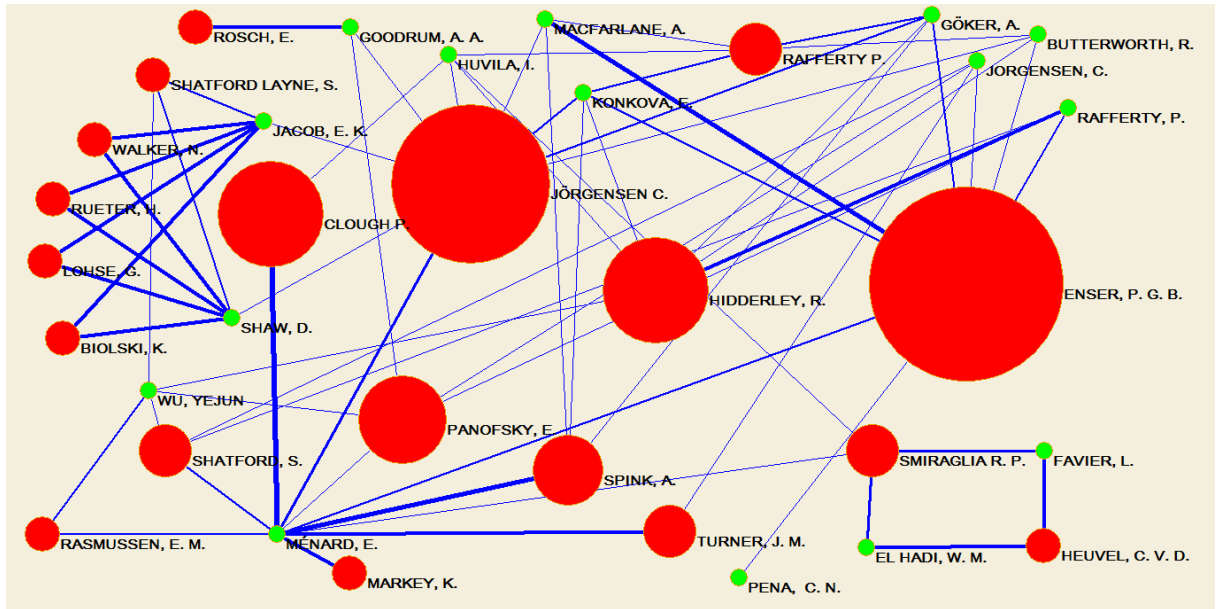
Fonte: Elaborado pelo autor

Legenda: Verde: autores citantes; Vermelho: autores citados

Na Figura 3, há a rede de citação da categoria recuperação de imagem baseado em conceitos. Nessa rede, se repetem os autores da rede da categoria de recuperação de imagem baseado em conceitos, por isso alguns autores citantes se repetem também, porém alguns autores citados em comum são mais citados que na rede 2, como podemos ver no caso Enser, Jörgense, Clough. O pesquisador mais citado foi Jörgensen, com 10 citações, logo em seguida, vireram Clough e Hilderley

com sete citações. Os que receberam seis citações foram Panofsky, Rafferty e Spink. Como podemos ver com mais detalhes na figura 3.

Figura 3 - Rede de citação da categoria recuperação de imagem baseado em conceitos

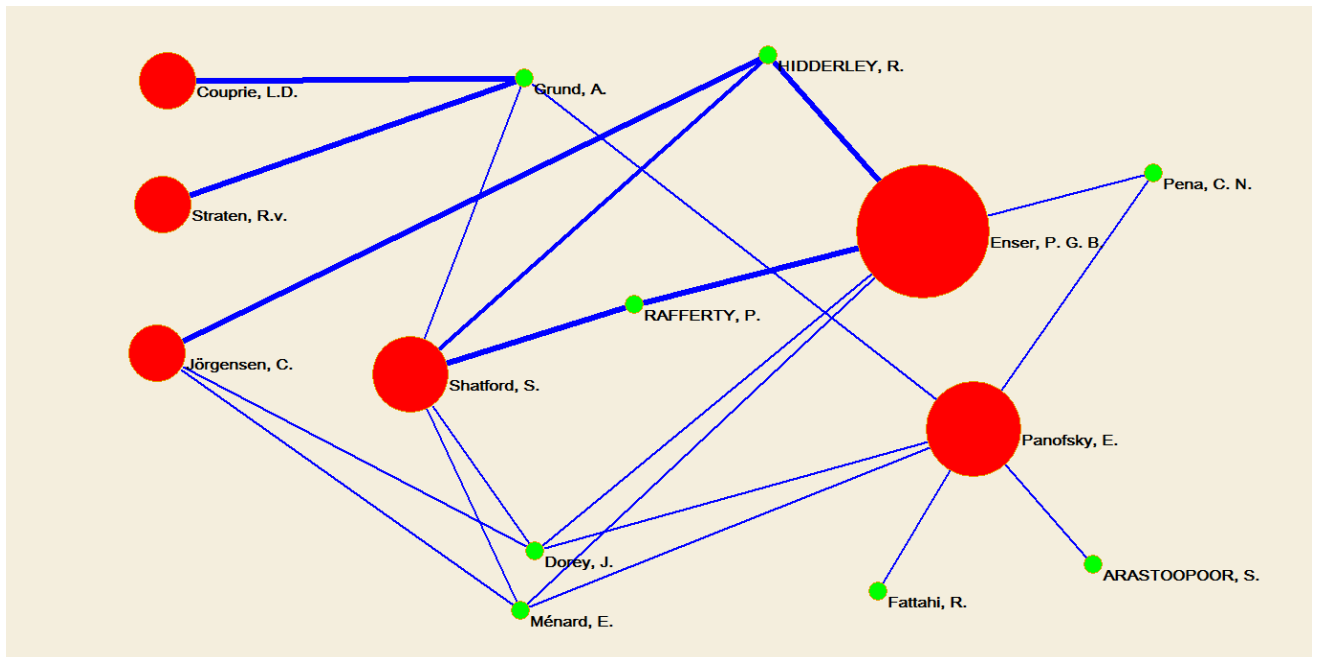


Fonte: Elaborado pelo autor

Legenda: Verde: autores citantes; Vermelho: autores citados

Nas duas últimas categorias, formaram-se redes de citações menores, porém ainda com os mesmos autores mais citados, podemos ver na figura 5, rede de citação da categoria Análise Iconográfica de imagem de Panofsky, os autores mais citados foram Enser, Panofsky e Shatford. Como podemos a seguir na Figura 5:

Figura 5 - Rede de citação da categoria: Análise Iconográfica de imagem de Panofsky

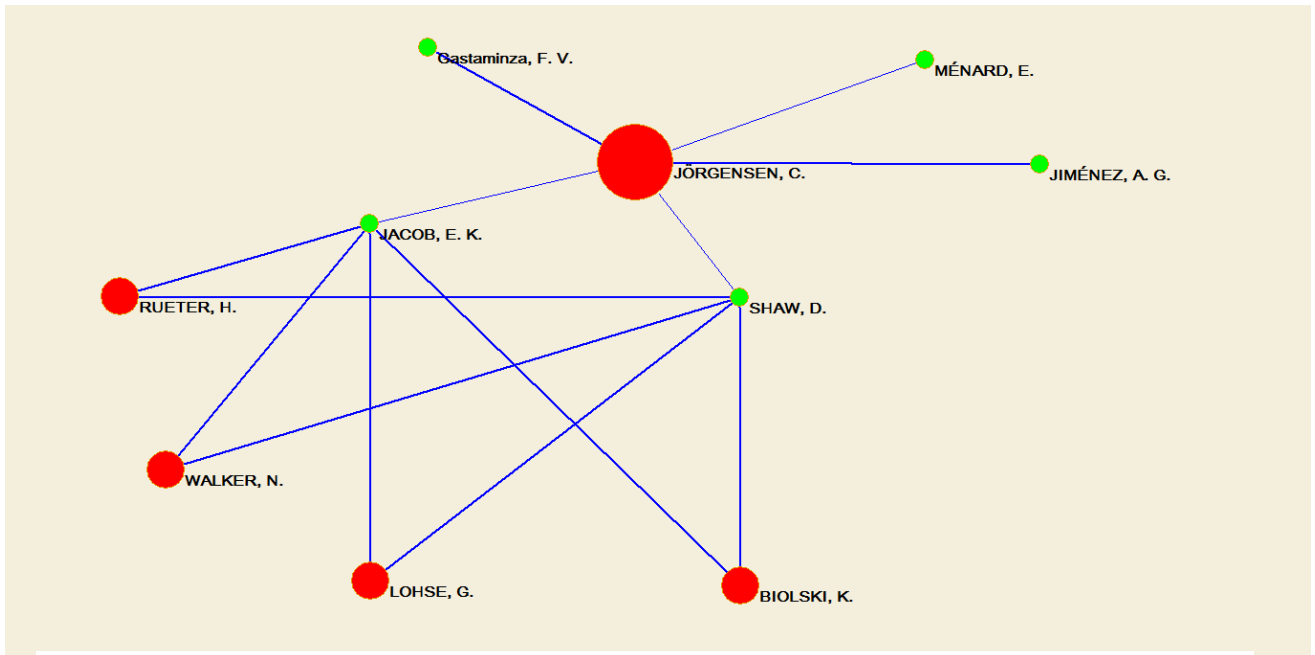


Fonte: Elaborado pelo autor

Legenda: Verde: autores citantes; Vermelho: autores citados

Na rede de citação da categoria descrever sentimentos e emoções da figura, o pesquisador mais citado foi Jörgensen.

Figura 6 - Rede de citação da categoria: Descrever sentimentos e emoções da imagem



Fonte: Elaborado pelo autor

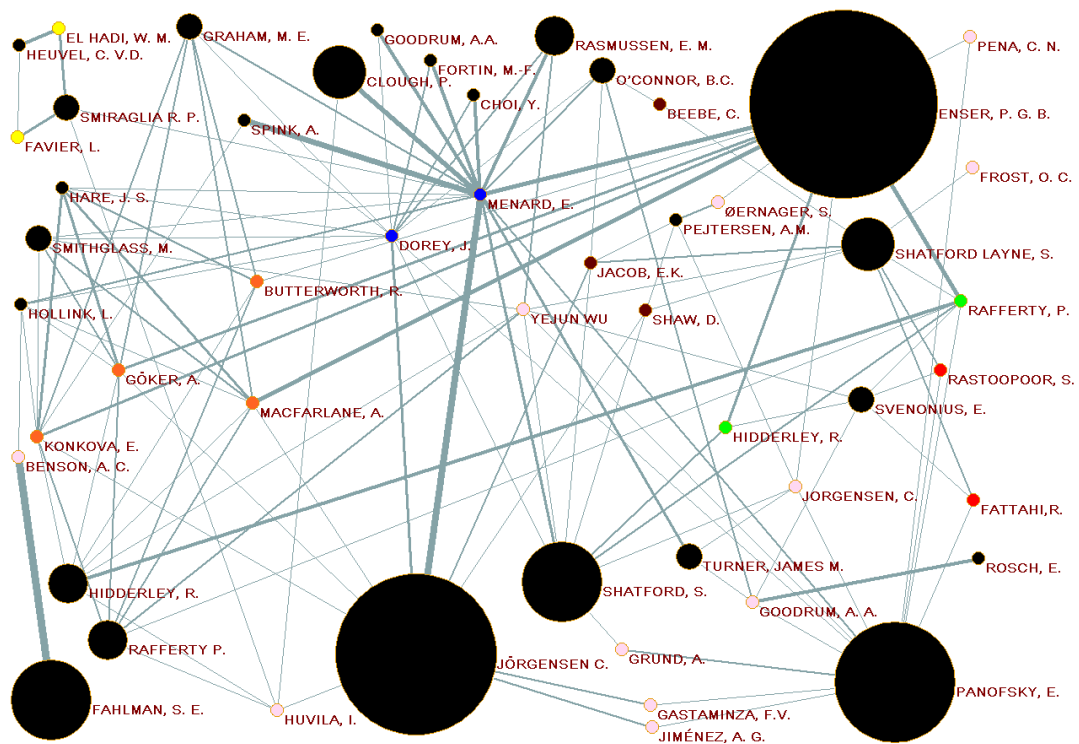
Legenda: Verde: autores citantes; Vermelho: autores citados

Para fins de critério de inclusão na análise de redes de citação, aplicou-se a Teoria do Elitismo de Price, segundo a qual:

A distribuição da produtividade dos autores numa coordenada cartesiana é uma distribuição tão inclinada, que inspirou Price (1963) a propor a Lei do Elitismo. Segundo esta lei, se k representa o número total de contribuintes numa disciplina, representaria a elite da área estudada, assim como o número de contribuintes que gera a metade de todas as contribuições (URBIZAGÁSTEGUI ALVARADO, 2008, p. 1).

Desse modo, foram analisados 28 autores citados, cujos resultados são apresentados nas redes de citação presente na Figura 7, em que se tem um círculo composto pelos autores citantes e, dentro, o conjunto de autores citados.

Figura 7 - Rede de citação



Fonte: Elaborado pelo autor

Na Figura 7, os círculos pretos na rede de citação são os autores citados, já os círculos coloridos são autores citantes. Os círculos que têm as mesmas cores significam que fizeram trabalhos em coautoria, como os círculos laranja, azul, verde, amarelo, vermelho e marrom. Já os círculos rosa-claro são autores que fizeram trabalhos individuais. Quanto maior for o círculo preto significa que recebeu mais citação.

Podemos ver que Enser, P.G.B. foi que o autor que recebeu mais citações (17), logo em seguida foi Jørgensen, C. com 15 citações, Panofsky, E. com 11 citações, Fahlman, S. E. teve 9 citações porém de um autor só, Clough, P.; Shatford Layne, S. e Spink, A. tiveram 7 citações, e os demais foram citados menos de 7 vezes.

Podemos identificar que Jørgensen, C. é o único autor que está na lista de autores citantes e citados, e ele foi o segundo mais citado, e os autores que Jørgensen citou estão na lista dos autores que mais receberam citações.

Elaine Ménard foi a autora que mais citou, pois ela também foi o autora que mais produziu sobre o tema, porém não apareceu na lista dos autores mais citados.

7 CONCLUSÃO

Com a pesquisa, pode-se concluir que análise e representação da imagem é um tema importante, pois cada vez mais se utiliza imagem no dia-a-dia e na ciência, porém é um tema que tem pouca publicação no universo da ISKO, uma vez que foram somente 29 de 974 artigos que trabalharam esta temática.

Dos 34 autores desses 29 artigos, somente 6 foram responsáveis por mais que um trabalho publicado. Os mais produtivos foram Elaine Ménard logo em seguida Andrew Macfarlane e Pauline Rafferty.

Os Estados Unidos é país que tem mais pesquisadores que trabalharam com análise e representação da imagem, logo em seguida ficaram os países Inglaterra, França e Canadá.

Com a análise dos artigos, foram identificadas quatro metodologias mais discutidas entre os autores, a saber: a recuperação de imagem baseado em conteúdo (CBIR), os artigos sobre recuperação de imagem baseado em conceito, os artigos que abordam sobre a metodologia iconográfica de Erwin Panofsky e por fim a descrição sentimentos e emoções da imagem.

Com a análise de citação, foram identificados os autores mais citados, sendo o Enser, P. G. B e logo seguida Panofsky, E, Fahalman, S. E. e Jørgensen, C.

Os autores que foram mais citados em mais de uma categoria foram: Jørgensen, Corinne, que foi citado nas quatro metodologias, Shatford, Sara; Enser, P. G. B.; Panofsky, e apareceram nas redes dos mais citados da categoria Recuperação de imagem baseado em conceitos e na categoria Análise iconográfica de imagem de E. Panofsky. Já o pesquisador Lohser, Gerald está nas redes de citação da categoria Recuperação de imagem baseado em conceitos e também na categoria descrever sentimentos e emoções da imagem. E Turner, James M. aparece nas redes dos autores mais citados da categoria Recuperação de imagem baseado em conteúdo e também na rede da categoria Recuperação de imagem em conceitos.

Podemos identificar que Jørgensen, C. foi o único pesquisador da lista dos mais citados e também está na lista dos autores citantes, isso significa que o trabalho está sendo discutido dentro do domínio de análise e representação da imagem, além disso, apareceu nas quatro redes das categorias.

A partir dessa pesquisa, pode-se aprofundar mais sobre as 4 metodologias mais discutidas na análise e representação da imagem, também identificar os autores mais citados e analisar as vertentes deles. Nos apêndices, encontram-se as fichas com as referências dos artigos selecionados, juntamente com os trechos sobre análise e representação de imagem e as referências dos próprios artigos que foram usadas na análise de citação. Com os apêndices, acredita-se que é mais fácil para o leitor ler os trechos dos artigos que abordam sobre análise e representação de imagem.

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APÊNDICE A - Ficha dos artigos selecionados da AIKO

nº de registro 01

FICHA DE REGISTRO DE COLETA

Seccao : knowledge organization in specific domains

Referência bibliográfica:

OERNAGER, Susanne. The Image Database: The Need for Innovative Indexing and Retrieval. *Advances in Knowledge Organization*, Vol.4(1994), p. 208-216

Instituição(ões): Royal School of Librarianship, Birketinget 6, 2300
Copenhagen S, Denmark

Abstract: This paper touches upon the problems arising in connection with indexing and retrieval for effective searches of digitized images. Different conceptions of what subject indexing means are described as a basis for defining an operational subject indexing strategy for images. Fields of application discussed include the messages in an image, linking between information running from text, image to object, user group requirements, and development of user interfaces.

Palavra - chaves : banco de imagem ; imagem digitalizada; indexação

IMAGE:

Images have been collected, stored and retrieved for centuries, but images have been associated with what could be called "special collections" i.e. collections for users with special interests, As the images have belonged to "collection minorities" they have not technically been considered as interesting as document collections. The research carried out in the information area has focused on functions such as database description, data models, retrieval methods etc. for printed material. (p. 208)

It may be asserted that what characterizes such photos is that they show reality in the form of events or objects which may be verbalized. Furthermore, such photographs are a subjective interpretation of reality and a very small part at that. It may present some difficulty verbalizing the space surrounding the photograph. A simplified definition is that the photograph has a literal message and a symbolic message, and whereas the literal message has a descriptive function - and may be described - the symbolic message is partly subjective (Ornager, 1992). (pag. 212)

Análise e representação de imagem:

INDEXAÇÃO:

Talking about indexing we talk about two types of subject information:

- The information which is explicit i.e. information which is expressed in the terminology applied by the author of the document.
- The information which is implicit i.e. information which is not directly expressed by the author, but which is readily understood by a (human) reader of a document (pag.209)

The true image database (Tamura, 1984) contains a visual representation of the image in connection with a text. The primary purpose of a the supplementary verbal description is to retrieve a number of pictures - on the basis of different subject criteria - from the total volume of images in the base. The description must include more elements than those offered by the descriptive cataloguing. The elements to be emphasized must be determined by means of a subject analysis of the material.

When indexing the photos many archives focus on background information, specific names and/or events. The story associated with the photo actually label the surface found in the image. Although the supporting story is important for the content analysis the survey also showed that elements such as feelings and emotions are essential for describing the photo. (pag. 211)

Not a great deal is known about the kind of questions that users are likely to put to an image collection (pag. 211)

The user interprets the picture through his individual (subjective) and cultural (objective to a certain degree) experience and knowledge.

The symbolic message is conveyed through the photograph "itself" on the visual level. (pag. 212)

If the above statement is true the indexing of images is necessary in order to separate them in connection with a subject query, the subject demarcation must be expanded by taking into account the intended use of the image. The selection = the indexing should be made on the basis of the explicit information i.e. the descriptive cataloguing and the picture itself, the implicit information i.e. the assigned keywords from a thesaurus and keywords expressing the intended use of the image. (pag. 212)

In addition to the thesaurus terms, the persons are confronted with a number of photographs. The persons state an x number of single words or brief phrases to describe each photograph. The words derived from the picture are compared with the thesaurus words applied for the indexing of the picture. A picture-associative cluster of terms is assigned to each thesaurus word. The cluster of terms comprises the words derived from the picture that can be annexed to the thesaurus term. The two types of clusters - response words and picture-derived words are merged providing

the thesaurus terms with associative clusters of terms consisting of both response words and picture-derived terms. It should be noted that the cluster words may be words which also occur as descriptors in the thesaurus. (pag.213)

If the thumbnail pictures are used a number of 25 to 30 can be accommodated on a screen and still contain sufficient legible detail to represent parent pictures unambiguously. If it is true that a human can discriminate between pictures in this manner, the need to improve an elaborated indexing scheme for discrimination purposes is reduced. However, to start the browsing one needs a template or a picture thesaurus to find the pattern to begin the retrieval - such a pattern search will probably need words (pag.214)

New advances in image-query systems are shown in the edge-sketch method developed by Niblack & Barber (Niblack, 1993) and in the sketch method developed by Hirata & Kato (Hirata, 1993). In the edge-sketch query method, the user draws a shape, however crude, on the screen, and the machine obliges by presenting those thumbnails which most nearly resemble the sketch in an attempt to reduce the noise retrieved by reason of the sketch's inadequacy. The system is used for approximate matching between an input query-picture and a database picture. The inventors of the sketch method claim that the user has only to draw a rough sketch to retrieve similar images from a picture database. Similarities between the sketch and images in the database are automatically evaluated and the most similar candidates are shown to the user. The system was tested using a database of 205 paintings of full colour landscapes and portraits. (pag.214)

We do assert that there will never be a wordless society, however, the future will head towards an integrated image information system, where one can browse through pictures or words, select an image and either via this as a pattern, or a cluster of words based on the indexing terms of the picture navigate through the system. The image database can be enhanced with a knowledge system, where the clusters of words can be organized in a semantic network, this again could be linked with information about users - a user model built during the navigation, or through an interviewing session. (pag. 215)

This contradicts the authors view which is that searchers will continue to access databases, even image databases, by means of words. The focus in research must change from mainly technological aspects to that of building interfaces for browsing and searching. Traditional subject indexing paired with an associative term clustering system was suggested as the basic for a search vocabulary for the image database.(p.215)

Artificial intelligence and knowledge based systems are central to image management developments. In the future we will probably see more of these technologies as well as the involvement of neural networks in the development and

use of image databases. However tempting it is to be innovative one must not forget that we still need rules to be established for the description of images. (pag.215)

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nº de registro 02

FICHA DE REGISTRO DE COLETA

Seccao : Knowledge Organization and Images

Referência bibliográfica:

Elin K. JACOB and De bora SHAW: Is a Picture Worth a Thousand Words? Classification and Graphic Symbol Systems. Advances in Knowledge Organization, Vol.5(1996), p.174-181

Instituição(ões): School of Library and Information Science, Indiana University

Abstract: Icons are graphic images with functional roles in human-computer interaction. They may be used as conceptual tools to represent the organization of information or as operators effecting an activity such as printing or moving to another document. An icon may represent its referent either as a *sign*, a purely arbitrary relationship that must be learned by the user; as a *pictography*, a visual image of the object represented; or as an *ideogram*, where the referent is not a concrete entity but an attribute, a set of attributes, or an abstract concept associated with the referent. The *symbolicity* of an icon reflects the degree of representativeness that obtains between an icon and its referent(s). We propose to examine symbolic languages composed of sets of icons and to assess their effectiveness as classificatory structures in terms of: 1.) representation of hierarchical structure; 2.) level of symbolicity; 3.) contexts that promote the capability of icons to represent organization; 4.) relationship between an underlying metaphorical framework and iconic representation of the organization; 5.) graphic elements of effective symbolic languages; and 6.) social or cultural factors related to the effectiveness of icons.

Imagem:

Arnheim (1969) observes that an image functions at one of three representational levels: as a sign, standing for "something" but not reflecting the perceptible characteristics of its referent (e.g., the diagonally crossed bars within a circle that serve as the traffic sign indicating a railroad crossing); as a picture, employing a relatively low-level representation of the perceptible qualities of its referent (e.g., the silhouette of a deer to indicate a deer crossing on the highway); or as a symbol, representing its referent at a higher level of abstraction that is frequently, but not always, metaphorical (e.g., the profile of a soldier to represent the concept "war").

A sign constitutes a one-to-one mapping of a graphic to the entity or concept for which it stands, but the basis for the relationship established between the sign and its referent is purely arbitrary. (pag. 175)

In contrast, a picture, or pictograph, is the visual image of an object that refers directly to the object represented. It is, as Gittins points out, "a graphic representation whose decomposition makes interpretation impossible" (Gittins, 1986, 520-52,1). A pictograph provides a one-to-one or one-to-many mapping between the graphic image and its intended referent(s). (pag. 175)

A symbol is an ideogram (Krull, 1988) in that its referent is not a concrete entity but either an attribute, a set of attributes, or an abstract concept that is characteristic of or associated with the intended referent. (pag. 176)

A symbolic language is a visual language. More specifically, a symbolic language can be defined as an integrated set of graphic images— of signs, pictographs and/or ideograms— usually organized around a central metaphor, that represents a specific domain and is intended to convey information about that domain through visual, non-linguistic means. It is important, therefore, to distinguish between a symbolic language and the symbolicity of a visual language. The symbolicity of a visual language refers to the level of representativeness that obtains between individual images and their intended referents. As such, it may range from the purely arbitrary level of the sign, through the concrete level of the pictograph, to the more complex level of the abstract ideogram. The symbolicity of a visual language may be pure, in that it consists of visual images that function at a single level of representation (e.g., all images are arbitrary signs), or it may be mixed and include images drawn from across the three levels of sign, pictograph and ideogram. (pag. 175)

Análise e representação de imagem

But advances in the generation, storage and transmission of images in digital format have heightened awareness of the information-bearing role of images and have led to a general recognition of the need for increased access to images in both traditional and digitized formats through the development of visually-oriented cataloging and indexing techniques (Austin, 1994; Shatford Layne, 1994). (pag.174)

The last two components are figurative properties which determine the shape and form of the graphic within the visual field, thereby either facilitating or hindering an appropriate and meaningful interpretation.

* Pragmatic component: The context within which a graphic image is to be used or interpreted.

* Semantic component: The relationship between the graphic image and the object, concept or activity to which it refers.

* Syntactic component: The relationship between the set of graphic images that comprise the symbolic language.

Visibility component: The visual clarity of the graphic image.

Discriminability component: The ease with which one graphic image can be differentiated from other graphic images in the same set. (pag. 177)

While each of these components contributes to the conceptual meaning of the graphic image,

Geiselman, Landee and Christen (1982) developed an index of perceptual discriminability based upon measures of the configurational and graphical attributes that were shared by the images within an existing symbolic language. The index could then be used as a performance-based criterion for selecting candidate images to be incorporated within the existing language.

Gittins (1986) attempted to create a classification for graphic images based upon common design features (e.g., type, form and color) and shared display structures (e.g., boundary, location, and figure grounds). While his effort is interesting, it fails to capture essential commonalities that could be used to construct a true classification of icons. More recently, Lohse et al. (1991, 1994) have undertaken a series of empirical experiments intended to provide the foundation for a taxonomy of visual representations based upon measures of visual similarity across a wide range of graphic presentation methods including, among others, maps, graphs, tables, and time charts. Their research identified eleven classes of visual representations, including a class identified as "icons". It is interesting, however, that their findings indicated that subjects viewed icons as unable to convey much information in that each icon represented a one-to-one mapping between the graphic and its referent. (pag. 177)

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nº de registro 03

FICHA DE REGISTRO DE COLETA

Seccao : Knowledge Organization and Images

Referência bibliográfica:

Olivia C. FROST: The University of Michigan School of Information Art Image Browser: Designing and Testing a Model for Image Retrieval. *Advances in Knowledge Organization*, Vol.5(1996), p. 182-188

Instituição(ões): School of Information, University of Michigan

Abstract: A team at the University of Michigan School of Information designed, implemented and is evaluating a World-Wide Web (WWW)-based experimental system which uses classification to facilitate browsing of art images. The research team built a database of approximately 3,000 digitized images from Art History to determine if classification can be used for retrieving images from a digital database in a networked environment. A key premise in this research is that browsing can serve an important role in retrieving image information. The system was evaluated in controlled tests and through a questionnaire available to WWW users.

Imagem

Furthermore, browsing lends itself particularly well to visual images since a pictorial image is able to present itself whole (Arnheim, 1970, 211) and in its own medium of expression (pag.186)

Análise e representação de imagem

Abstract or subjective concepts are difficult to convey in a textual description. Or, scanning a selection of images may prove more efficient than indexing at a high level of detail. Shatford Layne further argues that "the emphasis when indexing images should be on recall, rather than on precision. Rather than devoting time to extraordinarily detailed or complicated indexing . . . it might be better to concentrate on indexing the basic elements of an image and rely on scanning, or browsing, to make the fine distinctions" (pag. 186)

Methods for accessing image databases have relied primarily on either indexing of individual items or automatic image recognition (Cawkell, 1992; Leung, 1990). Both approaches have their limitations. While systems based on feature-extraction and object-recognition can provide powerful means of searching images by their visual content, these automated approaches are often computationally expensive and tend to be domain specific. Indexing of visual images by textual descriptors is very time consuming and labor intensive. In addition, image collections pose problems of

intellectual access because of the different meanings that images can convey to different users (Besser, 1990). Since images are often subject to a wide range of interpretations, textual descriptions can only begin to capture the richness and complexity of a visual image. In addition, textual strategies are often unable to take advantage of modalities of searching and processing image information (Römer, 1995). (pag. 183)

To develop a classification retrieval system for images from a given content domain, attention must be given to content balance and depth. Too few or too many images of a given type, style or genre will lead to an imbalance in the category content, and may tend to discourage comparison of images, or reduce its diversity and interest value to users. (pag. 183)

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nº de registro 04

FICHA DE REGISTRO DE COLETA

Seccao : Knowledge Organization and Images

Referência bibliográfica:

Corinne JORGENSEN: The Applicability of Selected Classification Systems to Image Attributes. *Advances in Knowledge Organization*, Vol.5(1,996), p. 189-197

Instituição(ões): School of Information and Library Studies, University at Buffalo

Abstract: Recent research (Jorgensen, 1995) investigated image attributes as reported by participants in describing, sorting, and searching tasks with images and defined forty-six specific image attributes which were then organized into twelve major classes. Attributes were also grouped as being "perceptual" (directly stimulated by visual percepts), "interpretive" (requiring inference from visual percepts), and "reactive" (cognitive and affective responses to the images). This research describes the coverage of two image indexing and classification systems and one general classification system in relation to the previous findings and analyzes the extent to which components of these systems are capable of describing the range of image attributes as revealed by the previous research.

Análise e representação de imagem

indexing of images has lagged far behind that of indexing of textual materials.

Images, by their very nature, are capable of eliciting such a number of individual interpretive and perceptual responses that any attempt at indexing them beyond a minimal, bibliographically-based level of description, seems to be an almost insurmountable task

Many authors have written about the complexity of image interpretations (Panofsky, 1962; Amheim, 1974; Drabenstott, 1986) and the literature of image indexing suggests that it is a complex and poorly understood process (Lynch, 1991, Shatford, 1986; Turner, 1993).

While there have been several studies aimed towards understanding the types of queries formulated by different groups of image users (Enser, 1993; Bakewell, 1988; Keister, 1994), there has been little empirical investigation of those attributes of images which are typically described by humans in various types of tasks and interactions with images. Knowledge of the range and distribution of image attributes typically described in different types of situations can provide an empirical basis for choices as to which image elements are most usefully indexed for retrieval.

A recent research project (Jorgensen, 1995) gathered evidence to address this gap in our knowledge by asking subjects to describe images in several types of tasks. The researcher analyzed the image attributes in both verbal and written descriptions using the constant comparative technique to define attribute types and build higher level classes of attributes. For the purposes of this research, an image attribute was not limited to purely perceptual elements, but included a variety of cognitive, affective, or interpretive responses to the image as well; thus attributes included semantic, symbolic, or emotional characteristics of the image. There were a total of twelve attribute CLASSES and forty-six individual Attributes, The twelve CLASSES were LITERAL OBJECTS, PEOPLE, PEOPLE ATTRIBUTES, COLOR, CONTENT/STORY, LOCATION, DESCRIPTION, ART HISTORICAL INFORMATION, VISUAL ELEMENTS, ABSTRACT, VIEWER RESPONSE and EXTERNAL RELATION.

The research indicated that type of task (describing, sorting, or searching) has a major effect on the distribution of image attributes that are typically reported by subjects. Numerical distribution of attributes was not the only factor evaluated; term consistency and term level (superordinate, "basic level," and subordinate) in classes and attributes were also analyzed.

Additionally, evaluation and analysis of the context in which image attributes occurred (term order, application of conceptual frameworks such as "Figure-Ground") added to the informativeness of the data. Suggestions were offered for ways in which researchers may apply the results to the development of heuristics for indexing of images for generalized access and drew upon both empirical results and theoretical considerations.

The variety of image attributes noted by the subjects reinforces the notion that images are capable of stimulating complex verbal and written descriptions and that creating an indexing tool for images is a challenging task. However, this variety also suggests that multiple approaches to indexing of images would be beneficial.

Existing classification systems have been described as "sparse" indexing languages for the visual content of images. However, the current research suggests the need to access other elements of images besides those of specific visual content. Therefore, one possible approach to indexing of images is not to create yet another indexing or classification system, but first to define those specific attributes to which access is needed and then to investigate existing indexing systems for their potential to contribute to this access. (pag. 191)

According to the introduction, the LCTGM "provides a substantial body of terms for subject indexing of pictures, particularly large general collections of historical images" and "offers catalogers a controlled vocabulary for describing a broad range of

subjects, including activities, objects, and types of people, events, and places depicted in still pictures” (Parker, 1987, v). (pag. 191)

The descriptors are divided into two fundamental groups, under the terms “Themes” and “Subjects.” Themes describe elements and relations of general significance concerning human life and individual behavior or the deeds of society. The subject descriptors assist with situating pictorial elements historically and geographically (pag. 193)

Gamier (1984) is one of a very few published systems to deal with stylistic information such as the presence of a specific item in a picture, the nature of the image in relation to others, and the dominance of a particular technique such as relief, color, or perspective. There are two interesting aspects to this descriptive system in relationship to the current research: the incorporation of many different types of attribute information, and the emphasis on such aspects as meaning, themes, and “stories.” The thesaurus section covering “General characteristics of the representation” provides terminology for describing such specific attribute information as the type of representation, the view, the type of figure, the position of the figure, the angle of view of a figure, the material situation and orientation, and “formal effects” such as line, form (color, surface, volume), effect of light, reflection, and superposition. Also under general characteristics are such factors as thematic relations (theme, narrative, symbol), “finality” (comic, instructive, moralistic, satiric), manner (antique, oriental), and “truthfulness” (anachronism, exaggeration, fantasy, supernatural). (pag. 193)

Beghtol (1991) notes that certain domains, such as fiction, may not be amenable to traditional classification approaches which emphasize mutually exclusive categories and exhaustivity. She describes some of the ways in which fiction varies from non-fiction. First, fiction may not be “about” a “subject” in the usual sense; a novel whose story takes place in a chemistry laboratory does not deal with chemistry as a “subject.” Second, fiction is not restricted to the “possible or the “real” ; it can contain anything the imagination can invent and these imaginary things are considered “true” in the fictional world. Third, fiction authors do not eschew ambiguity in the same way authors of non-fiction are assumed to do; the details and outcome of a story may be deliberately unresolved by the author and unresolvable by the reader (Beghtol, 1991, 3). (pag. 196)

Fiction and pictorial images also share the need to specify imaginary, non-existent, or impossible things, making controlled vocabulary difficult to establish. Some of the problems of ambiguity which Beghtol notes could be solved in both fiction and image indexing by use of the specific and generic levels of indexing, as discussed earlier.

Researchers in image indexing could thus usefully draw upon some of the concepts put forth by those concerned with indexing fiction. (pag. 196)

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nº de registro 05

FICHA DE REGISTRO DE COLETA

Seccao : Cognitive Approaches to Knowledge Organization (B): Applications:

Image

Retrieval

Referência bibliográfica:

Caroline BEEBE and Elin K. JACOB *Graphic Language Documents: Structures and Functions. Advances in Knowledge Organization, Vol.6(1998), p. 245 - 255*

Instituição(ões): Indiana University, USA

Abstract: This paper proposes to explore the nature of graphic language documents from the contrasting perspectives of structure and function ~ from the perspectives of the document's structure as a spatially-oriented object. Using design principles derived from Gestalt theory and the Bauhaus concept that form (or structure) follows function, the paper addresses the relationship that exists between structure and function in the broad domain of graphic language documents.

DEFINIÇÃO DE IMAGEM

In the literature on non-verbal phenomena, the terms image, graphic, and picture are frequently used interchangeably or with topical specificity. Within the present context, image is defined as a collection of signs and symbols that have been created or mediated. (PAG. 244)

This does not deny that mental representations do not impact processing and interpretation of images; rather, they are simply not the focus of the current discussion. This definition would place image in the first of the five categories that comprise the typology proposed by Mitchell (1986): graphic (e.g., pictures or statues); optical (e.g., mirrors or projections); perceptual (e.g., sensory data); mental (e.g., memories, ideas or dreams); and verbal (e.g., descriptions or metaphors). (pag. 244)

Due to the nature of the digital environment, an image can be static or dynamic. Taking film as an example of dynamic image, there is ongoing discussion as to whether the basic coherent unit of filmic representation is the frame (or still), the shot or the scene (Barthes 1985, Carroll, 1992; O'Connor, 1996). In the digital environment, and for the purposes of this discussion, the frame or static display will be considered the basic unit. Dynamic images can then be subsumed as a specific context in which static images occur. The dynamic context and its associated conventions will impact perception as well as the mental representations and interpretations of the viewer; but, in combination, the context and its convention shape the semiosis of the image. Working from the definition of image as a static collection of signs and symbols which have been created or mediated, it can be seen that the visual display on a digital device, regardless of the codes used to manifest the image, cannot be interpreted without considering its immediate context and the sociocultural knowledge of the viewer. (pag. 246)

The function of an image can broadly be defined as communication. (PAG. 249)

There is wide-spread acceptance of the notion of document as more than written text and including graphic images, pictures, and objects. Twyman (1979) defines graphic language as two-dimensional, intentional, visible communication. This leads to a notion of graphic language documents which subsumes any traditional alphanumeric text as well as any combination of text, graphics, and/or pictures. The image as display of signs and symbols in a digital environment can be reconciled with Twyman's definition of graphic language documents by applying traditional graphic design principles drawn from Gestalt psychology. (PAG. 252)

ANALISE E REPRESENTAÇÃO DA IMAGEM

Teoria Gestalt - voltada para psicologia, a interpretação da imagem –

In this sense, Gestalt is based in perceptual simplicity and basic geometry for visual analysis; and the extreme position that there are basic privileged forms is reminiscent of schemata. (pag. 248)

Rather, gestalt theory contributes to the definition of image the principles of perception, continuation, similarity, proximity, and closure. These form a geometric basis for visually analyzing the physical world and inform the interpretation of the viewer

SEMIOTICA

According to Moles, the perception of a visual image is a process of integrating such subsigns and supersigns within the pictorial whole. More specifically, he proposes a

hierarchy of perceptual levels extending from a differential optical element, a geometrical morpheme, a partial image of a signifying object to an iconic phrase and discourse. (451) (PAG. 248)

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FICHA DE REGISTRO DE COLETA _____ nº de registro 06

Seccao : Cognitive Approaches to Knowledge Organization (B): Applications: Image Retrieval

Referência bibliográfica:

Abby A. Goodrum. A Cognitive Approach to Representing Moving Image Documents. Advances in Knowledge Organization, Vol.6(1998), 256 - 263

País(es): Drexel University, USA

Abstract: This study explored text-based and image-based representations of moving image documents from a cognitive perspective. The study measured the degree of correspondence between moving image documents and their representations, both text and image based, in a non-retrieval environment with and without task constraints. Multidimensional scaling (MDS) was used to examine the dimensional dispersions of human judgements for the full moving images and their representations. Congruence between judgements for the full moving image documents, and the various representations was used as a measure of the degree of representativeness. On the basis of the findings, a cognitive model of moving image document representation incorporating both text-based and image-based representations was developed.

Representation is a fundamental concept in information science, and communicates how information is structured and expressed both cognitively and in information retrieval systems. Representations, whether of documents, or of users' needs, must be able to adequately convey the content of their referent. This need to adequately represent documents is not only important for the retrieval of textual information, but also for the retrieval of visual information such as still and moving images (PAG. 256)

Nonetheless, systems used for moving image retrieval have most often been based on bibliographic conventions, which utilize textual representations of image documents. The use of textual representations for the retrieval of moving images has been problematic and has generated increasing interest in non-textual image retrieval systems. (PAG. 256)

IMAGEM

image information is conceptualized as functionally pictorial in nature, and images map more quickly to other images without semantic translation (PAG. 257)

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FICHA DE REGISTRO DE COLETA _____ nº de registro 07

Seccao : Cognitive Approaches to Knowledge Organization (B): Applications:

Image

Retrieval

Referência bibliográfica:

F, Javier GARIA-MARCO and Carmen AGUSTIN

Cognitive models in pictorial image retrieval. Advances in Knowledge Organization, Vol.6(1998), 264 - 269

País(es): University de Zaragoza, Spain

Abstract: Pictorial image retrieval is analysed as a cognitive process. Such a model could build on the physical paradigm of information science, based on the general model proposed by Shannon and Weaver. Some of the different cognitive approaches which are possible are modeling: a) the communicative interaction, with different possibilities depending on which level of the process the researcher wishes to emphasise; b) the acquisition of image information, attending to the perceptual qualities of images, the recognition of objects, the assigning of meaning and the gestalt process; c) the image retrieval process as a problem solving interaction, where the user solves an informational problem by using metacognitive processes, such as search strategies and translation processes; and d) the translation processes between imagination and conceptual thinking that image retrieval requires. The first has a great theoretical potential to integrate the rest of them. From a general point of view, information retrieval interactions constitute communication processes, where semantic and pragmatic aspects are as important as the transmission of a message. In this context, images and text conform to two distinct forms of communication, deeply rooted in our cognitive system, that produce distinct forms of knowledge, in spite of that, pictorial retrieval requires the involvement of conceptual thinking, requiring some kind of translation between concepts and images on the part of the system, the user or the mediator, that is, the information professional.

imagem

Images cannot express the potential for logical reasoning of verbal communication, and it is difficult to find words to express the perceptual and emotional quality of the immediate descriptive power of images. (pag. 266)

análise e representação de imagem

express the perceptual and emotional quality of the immediate descriptive power of images.

But in fact, most of the retrieval operations are based on set theory and other applications of traditional logic. This implies that most of them require the use of conceptual thinking and some form of language.

Even the systems that enable us to draw images or select parts of images to search similar forms require cognitive processes based on concepts that transform such pictures into signs and sets of signs. Image retrieval, and therefore indexing, becomes an operation of translation if we want conceptual control.

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nº de registro 8

FICHA DE REGISTRO DE COLETA

Seccao : *Information Systems: Concepts, Design, and Implementation*

Referência bibliográfica:

Michele HUDON, James M. TURNER and Yves DEVIN. How Many Terms Are Enough? Stability and Dynamism in Vocabulary Management for Moving Image Collections. *Advances in Knowledge Organization*, Vol.7(2000) p. 333- 338

École de bibliothéconomie et des sciences de l'information, Université de Montréal, CANADA

Abstract: Most moving image collections have existed for less than a century, and as we enter the new millennium we observe that the organisation of these collections is still characterized by ad hoc practices. An important stream of research in this area focuses on high-level access to images using methods from library and information science, and using text to create information useful for retrieval. It has been established that common names for objects seen in the image are the key to retrieval in such collections. On a day-to-day basis, those responsible for collection management build indexing vocabularies, creating terms as necessary, and often structuring them loosely into a thesaurus. Discussions with moving image collection librarians have led us to believe that there may be an optimal number of common names a thesaurus for managing general collections of moving images should contain, and that the terms may even be the same from one thesaurus to the next. In this paper, we describe the methodology adopted for studying this question, and report preliminary results.

Fichamento

The first, called content-based, focuses on low-level access to images using methods borrowed from computer science, and concentrates on statistical techniques for deriving characteristics of images that help promote retrieval. The second stream, identified as concept-based, focuses on high-level access to images, borrowing methods from library and information science, and concentrating on the use of text to create metadata useful for retrieval, information which is especially important since it is not available from the images themselves. (pag. 333)

Referencia - Não tem.

nº de registro 09

FICHA DE REGISTRO DE COLETA

Seccao : Models and Methods for Knowledge Representation

Referência bibliográfica:

Pena, Catalina Naumis. Images and Words. Collections. Advances in Knowledge Organization, Vol.8(2002) p. 120- 126

University Center for Library Research, Autonomous National University of Mexico, México, D.C., México

Abstract: The image as a new indexing resource to be integrated to the information systems, must be studied with the final purpose of representing its contents according to the special characteristics it exhibits. Differences between the traditional documents and the singularities of digital audiovisual information that is substituting analogical information, are being researched. Another aspect being examined is the re-evaluation of the thesaurus and the convenience of its use in the new informative environment. It has been proposed an image analysis extrapolated from the Panofsky's proposal to analyse art works and, therefore, foresee the representation of the different elements necessary for the audiovisual document analysis in the thesaurus to be built,

analise de imagem

The librarianship' role in the synthesis and analysis of information has been more appreciated due to the fact that it has not been limited to the description of form and content of traditional documents; on the other hand, according to this new need of interpreting contents in a world saturated with images, the librarianship has had to lean on thesaurus techniques that help him normalize to a certain extent images and contents associated in the web, so that the librarianship has become a sort of cartographer to the cyberspace navigators.

The abundance of images and the necessity to classify and organize them, makes necessary the creation of controlled languages with a hierarchical structure to represent from the most general to the most specific topics, relating them among themselves and with other similar issues. This task has become a necessary work for information analysts, associated to the new knowledge production trends.

Linguistic mediation through a documentary thesaurus with representations, including the different aspects of images¹ content allows the indexing for further recovery of the digital image and audiovisual documents in general. (pag. 122)

Santos Martinez proposes a model of iconological analysis for the cinematographic short story that seems to be also adequate to be extrapolated to the audiovisual information. (Santos Martinez, 2001, p. 2) The principles it uses come from iconology, which is the branch of history that deals with the theme or meaning of the works of arts, disregarding the form. They also come from iconography that studies the form. (Panofsky, 1970, p. 41)

Panofsky's contribution consists in the classification of the different meanings present in a work of art; in order to do this he relates us common episodes of man's life and classifies them with the same criteria that he uses to classify the work of art. According to this, it can be explained the extrapolation towards the audiovisual information that we need to do " ...by transferring the results of this daily life analysis to any work of art, we can distinguish the three same strata in its theme or meaning." (Panofsky, 1970, p. 39) (pag. 122)

The content or intrinsic meaning is recognized above the underlying principles that are manifested through an attitude or lifestyle, condensed in a play. These principles are revealed through the composition methods as well as the iconographic meaning. The pure forms, motives, images, narrations, allegories are recognized as manifestations of underlying principles, interpreting all these elements as symbolic. The discovery and interpretation of these symbolic values (that are many times unknown by the creator of the work and that may even differ from what it was intended to express) is the object of what Panofsky designates as iconology. In our example about the Titanic, the content or intrinsic meaning referring to the sinking scene prompted by the intensity of the music, the sound, the actors' physical appearance, their anguished faces, represents the impotence in front of nature, the immensity of the ocean, the sense of prioritise profits over safeness, etc.

The transmitted knowledge by means of the audiovisual document is a human cultural product and the word is used in order to transmit it, due to the fact that the word gives it the meaning, the precision and the clarity even to silent images, such as photographs. In a documentary system, the words that represent the meanings of the included documents are represented in the descriptors selected to index the document and extracted from a thesaurus. In general terms, the objective of the content description is to determine the field of knowledge, classify the different meanings that conform it, express them in concrete terms and without ambiguities, translate such terms to the most appropriate language expressions, all of this with the final purpose of:

- Acknowledge the document object of analysis in a whole mass of documents.
- Represent the knowledge and learnings implicit in the document through a classification.

® Substitute the document.

Until recent years, the predominant paradigm was the linguistic communication for information, teaching and even for entertainment (Enser, 1995, 127), but in the multimedia digital documents the image constitutes the speech central element. It occurs the same, for example, as with a surgery procedure recorded for medicine students or the internal exploration of the human body. Images constitute a language analogous to any other the human being deals with, such as the verbal or the musical one. Despite all this, the image must be

accompanied of an explanation of what is being seen, in order to guide the brain and the sight, “...and, however, the image is not the spoken tongue of our children because it lacks syntax and grammar. An image is neither true nor false, neither contradictory nor impossible. As long as it is not an argumentation, it is not refutable. The codes that it can or cannot mobilize are just readings and interpretations.” (Debray, 1994, 53)

The image must be represented in its contents in order to locate it among a series of documents with images and can only be represented by indexing terms belonging to the written or spoken document, from where key words for indexing can be extracted. If a written document deals, for instance, with Greek columns, only one term would probably be enough to represent the theme. In an information system containing the image of a Corinthian column, although the spoken text accompanying it is general, if the system policies constitute the precision of artistic elements, the column of the image should be described; moreover, it's even probably required to add the type of acanthus- shaped leaf decorating its capital.

Description as well as representation of contents in the digitalized audiovisual information constitute basic elements for its broadcasting and recovery. It's necessary to study the analysis and synthesis process to be able to translate the knowledge they contain and incorporate it to the information systems. The Panofky's method to examine the audiovisual information constitutes a proposal to be taken into account.

Thesaurus constitute a linguistic tool structured in descriptors' categories and are adequate to represent the audiovisual digital information, if the different aspects of their content are incorporated to them. The representation of images demands the use of a greater amount of indexing expressions due to the fact that forms, conventions, contents, characters and institutions must be interpreted.

Words are valid to represent images and this is the adequate way to do it because, through language, the intellect abstracts what is observed in three dimensions and represents it.

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nº de registro 10

FICHA DE REGISTRO DE COLETA

Seccao : Knowledge Organization of Universal and Special Systems 3

JIMÉNEZ, Antonio García; Gastaminza, Felix del Valle. **From thesauri to ontologies: a case study in a digital visual Context.** Advances in Knowledge Organization, Vol.9(2004) p. 227- 332

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Library and Information Sciences Dept., Complutense University, Madrid, Spain

Abstract: In this paper a framework for the construction and organization of knowledge organization and representation languages in the context of digital photograph collections is presented. It analyses exigencies of photographs as

documentary objects, as well as several models of indexing, different proposals of languages and a theoretical revision of ontologies in this research field, in relation to visual documents.

Análise e representação de imagem

In considering the photograph as an analysis object, it is appropriate to study all its attributes: features, components or properties of an object that can be represented in an information processing system. The attributes which are related to visual features include cognitive and affective answers and elements that describe spatial, semantic, symbolic or emotional features about a photograph. In any case, it is necessary to treat: a) morphological and material attributes (emulsion, state of preservation); b) biographical attributes: (school or trend, publication or exhibition); c) attributes of content: what and how a photograph says something; d) relational attributes: visual documents establish relationships with other documents that can be analysed in order to understand them. (pag. 227)

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FICHA DE REGISTRO DE COLETA

Seccao : Knowledge Organization of Universal and Special Systems 3

RAFFERTY, Pauline; HIDDENLEY Rob. A survey of image retrieval tools. *Advances in Knowledge Organization*, Vol.9(2004) p. 303-308

University of Central England, Birmingham, UK

Abstract: Issues regarding interpretation and the locus of meaning in the image sign {objectivism constructionist or subjectivist} are clearly important in relation to reading images and are well documented in the literature (Svenonius, 1994; Shatford, 1984,1986; Layne, 1994; Enser, 1991, 1995; Rafferty Brown &Hiddenley, 1996), The same issues of interpretation and reading pertain to image indexing tools which themselves are the result of choice, design and construction. Indexing becomes constrained and specific when a particular controlled vocabulary is adhered to. Indexing tools can often work better for one type of document than another. In this paper we discuss the different 'flavours' of three image retrieval tools: the Art and Architecture Thesaurus, Iconclass and the Library of Congress Thesaurus for Graphic Materials,

Tesouro

The vocabulary can also be used in manual indexing systems. TGM I can be used to index subjects represented in a variety of media and formats including prints, photographs, drawings, posters, cartoons and architectural drawings. The thesaurus provides a controlled vocabulary describing a broad range of subjects including activities, objects, and types of people, events and places, (pag. 305)

analise e representação de imagem

The second section of the introduction to the 1995 printed edition, reproduced on the internet, is concerned with the principles of indexing images. The editors make the point that whereas subject indexing of textual materials can often be aided by the availability of a range of sources of information, such sources are frequently not available to picture indexers. The cataloguer has to identify the 'who, what, when and where' of the material's creation and

purpose and beyond these issues the cataloguer has to ask further questions:

« How historically significant is the subject matter of the images?

° Is the subject matter widely depicted, or are there aspects which are not widely represented and included in collections?

« Is the depiction of a specific subject clear or can that subject be represented better through another image?

B How does the material relate to other material within the collection?

» Can any such relationships be highlighted through consistent indexing across

collections?

« Does a group of images show that the creator had a certain point of view or a particular message?

(Library of Congress Thesaurus for Graphic Materials I: Subject Terms (TGM I), 1995)

In the first place, the research into models of photographic document interrogation/indexing tries to obtain a pertinent method applicable to photograph libraries, digital collections and archives. All the models studied that try to evaluate the main meaning of documents departed from an intelligent reading of both the documents and all related materials attached to them: captions, complementary texts, etc. So, the following models are applied:

Ⓢ “iconographie” or iconological model (Panofsky, 1976). His objective is to interpret the meaning of works of art. The model consists of several levels of analyses related to icons

» structural model. This studies the content of a photograph in different aspects: explanation of what is seen in the image, the connotation of the image, the elements that appear in the photograph and finally, what the visual document suggests and in the context in which it takes place

Ⓢ categorial model. The grammar of cases, as a way of reading of photographs, allows the analysis of the content of a photograph and the main action that is developed

Ⓢ syntactic and semantic conceptual model (Jørgensen et al., 2001). This studies elements related to the perception expressed in syntactic levels and related to the visual content expressed in semantic levels

» semantic model (Jørgensen, 1999). This pays attention to concrete objects, states of being, beings, artistic and historical information, perception elements, colour, situation, keywords and abstract concepts.

Aboutness

The editors also refer to the ‘ofness’ and ‘aboutness’ issue of images discussed by Layne. Most images are ‘of’ something, that is, they depict a signified object. Abstract images are not clearly ‘of’ a signified and may well depict different things to different viewers. Images can also be ‘about’ something, that is, there may be a discernible intent or theme. The editors of TGM 1 believe that subject indexing must take both of these aspects into account to satisfy as many queries as possible, but they distinguish between an ‘aboutness’ which is objective, and an ‘aboutness’ which is subjective, arguing that subject cataloguers should limit their **indexing and avoid the inclusion of subjective interpretation**. However, making such distinctions could be quite difficult. (pag. 306)

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Nº de registro 12

FICHA DE REGISTRO DE COLETA

Seccao : Multilingual problems of information retrieval

MENARD, Elaine. Image Retrieval in multilingual environments: research issues. *Advances in Knowledge Organization*, Vol.10(2006) p. 165- 172

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Abstract: This paper presents an overview of the nature and the characteristics of the numerous problems encountered when a user tries to access a collection of images in a multilingual environment. The authors identify major research questions to be investigated to improve image retrieval effectiveness in a multilingual environment.

Análise e representação da imagem

For example, the retrieval of digital images differs from the retrieval of textual documents. Consequently, with the advent of the Web as one of the most popular medium for delivering and accessing image information and the quick development of image technology, there is an increasing need for more research in image indexing and retrieval.

Although images by their very nature are usually language-independent resources, image captions or other text associated with images may be available for retrieval in a variety of languages. As a result, some form of multilingual retrieval approach can be considered. To this date, very little research has been done on the effectiveness of image retrieval in multilingual environments. Nevertheless, image retrieval in multilingual environments still presents its share of problems. (pag. 165)

The need to retrieve a particular image from a collection is shared by several user communities including teachers, artists, journalists, scientists, historians, film makers and librarians, all over the world. Image collections also have many areas of application: commercial, scientific, educational, and cultural. Until recently, image collections were difficult to access because of limitations in dissemination and duplication procedures. The advent of the Web highlighted the pressing need to develop suitable tools for the documentary description of digital images, since these can be found in the majority of the available resources: personal Web pages, digital libraries, commercial services and products catalogues, government information, and all the collections related to fine art, architecture, archival materials, and other cultural material. (pag. 165)

On most image search engines on the Web, users will basically express their needs using textual queries which describe the images they want. Analyzing and understanding the query pattern used and the user behaviour is the first significant step necessary to meet their needs.

Recent research involving non-art images (Turner, 1998; Jörgenson, 2003) suggest that image management can be very much informed by focusing on users and their information seeking behaviours (pag. 166)

One key component of the conceptualization of image retrieval is the particular context of the retrieval (motivation, seeking strategy, familiarity with the retrieval system, resources available, and barriers to retrieval). The user must be studied within the context of the retrieval in which the information needs take its source. Although a great deal of research which attempts to model the user of traditional text-based retrieval systems, very little work have concentrated on the users' behaviour when they seek for images on the Web. (pag. 166)

Different approaches can be used for image retrieval: (1) a user can submit an image query (i.e. an example image selected from a database or drawn by the user); (2) a user can submit a textual query and the system searches for images using image captions; or (3) some semantic meaning is assigned to images and they can also be retrieved by a textual query (Alvarez, Oumohmed, Mignotte & Nie, 2004). With the first approach, the user must provide an example offering some visual feature to be used for image comparison and matching. The two other approaches require a textual query and it implies that retrieval is limited to images associated with captions or semantic annotations. However, these two approaches have limitations since

captions are not always available and it is difficult to recognize all the semantic meanings of images. (pag. 167)

Regarding what is the best approach to describe images, two schools of thought present divergent points of view: “those who feel that images are so different from text that there can be no similarity in methods for providing access and those who feel that a single set of rules based on conditions of authorship can be satisfactorily applied to all materials” (Jørgensen, 2003, 75). It is nevertheless not recommended to apply to visual resources such as digital image, the same metadata schemas expressly designed for textual documents because they are usually too general to describe images adequately. (pag. 167)

Over the years, different approaches have been developed by researchers for conducting studies on image retrieval. As the number of digital image collections is rapidly growing, we need efficient browsing and searching tools to manage these large image databases.

Content-Based Image Retrieval (CBIR) was proposed to address this problem. The CBIR approach is based on the primitive features of images such as colour, texture and shape. With this specific approach, most of the queries in CBIR systems are expressed as a visual exemplar of the type of image or image attribute being sought and retrieval operates by comparing physical features. The CBIR systems allow users to form queries by either: (1) selecting or providing an example image, (2) graphically sketching or drawing a query image, or (3) filling-in fields for query-by-example provided by the retrieval system. Once the query is submitted, the CBIR system goes through the database containing features representing the images to retrieve stored images that exhibit a high degree of similarity to the requested features by matching the query against the descriptive information in the database.

While attributes such as colour, texture and shape and other visual characteristics are unquestionably important features for image representation, it is still difficult to implement these attributes for image retrieval. Without human supervision CBIR can only extract low-level visual features. It is generally accepted that effective browsing requires semantic information. The information relates to the composition of the image. Moreover, since this method does not require the images to be associated with any form of text (i.e. captions), CBIR systems are often complex to use for a non-expert user. This is the main reason why people still prefer to retrieve images using words. (pag. 167)

As a result, it seems that the CBIR approach can hardly replace the text-based approach, but rather constitutes a complement to the latter. The text-based (or context-based) approach uses the textual features associated with the image for retrieval purposes. With the text-based approach, human beings are directly or indirectly involved in the image description process.

A lot of information about the content of an image comes from other sources than the image itself. Context-based image retrieval can rely on manual annotations (descriptors, keywords or other metadata) or on collateral text (captions, titles, nearby text) provided directly with the image. With the text-based approach, the similarity is then based on the word similarity between the associated texts (manually added or accidentally provided by the image) and the text of the queries. (pag. 167)

Inevitably, one important problem with this approach is the difference between words used to describe and words used to retrieve the images. Moreover, manual annotations of images is both time consuming and expensive. The assignment of keywords for description of images is also problematic for another reason. Since human indexers describe the image according to a specific indexing policy (i.e. ofness, aboutness, or a combination of both), it will not necessarily correspond to the words the end-users will use to search. The main difficulty related to context-based retrieval is that it requires most definitively a match between the representation the indexer will assign to the image and the representation used by the searcher. However this “match” will not be obtained easily due to factors such as misspelling of query or indexing terms, inaccuracy of the descriptors, images that are too old or of too poor-quality to be easily analyzed during the indexing process and so on. Despite these apparent weaknesses it seems that context-based image retrieval will continue to be the best technique to search images since language is our principal mode of communication. (pag. 168)

In recent years, many metadata schemas and specifications have been designed in order to meet specific needs or specific document types. Metadata schemas (MIX NISO, VRA Core, CDWA, MPEG-7, RLG, etc.) can be used to describe images. However, most metadata schemas intended for the description of digital images are only available in English. Success of retrieval in such a case will depend for the most part on completeness and the accuracy of the associated metadata, as well as on the translation infrastructure provided by the retrieval system. (pag. 168)

One of the most important ambiguities of the indexing process is the choice to be done between two types of indexing. Turner (1998) made the distinction between the “hard” indexing which is the description of what the indexer sees on the image and the “soft” indexing which refers to the significance of what he sees. The second type of indexing, the “soft” indexing (the level “about”) contains the moods, the emotions, the abstractions and the symbols contained by images (Hollink, Schreiber, Wielinga & Worring, 2004). With this second level, it is possible to interpret the image in several manners, using abstract concepts such as richness, success, sadness, and other connotations attached to an image. The decision to index in a “soft” way must be made according to the nature of the collection and compared to the image uses which will be made once retrieved. However, it is necessary to keep the idea that this type of indexing remains difficult to realize. Moreover, since it will not necessarily

bring the level of specificity necessary to optimal image retrieval, it becomes perhaps useless to include it in an image indexing policy. In clear, it is generally easier to determine the contents of an image than to interpret its significance. (pag. 169)

The problem of polysemy at the time of indexing is another problem known since a long time, but we can wonder if it does also exist in the case of the digital image. Actually, images are rich in various elements and basically, they are several levels of significance (Shatford,1986). Therefore we can conclude that images are polysemous by nature. In fact, the problem of image polysemy is even more complex because it emerges from two levels. First, this problem occurs at the time of the translation of the concepts chosen to describe the image.

Semantic and syntactic ambiguity is also a direct consequence of the lack of quality of the linguistic resources used for multilingual retrieval. The problem of semantic ambiguity often occurs when a query does not provide necessarily enough information to be well translated.

Consequently, this ambiguity can have a negative impact on images retrieval. Second, and what is even more important, is the polysemy of the image itself since the image can have as many meanings as there are indexers. As we use to say: an image is worth a thousand words! (pag. 169)

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Nº de registro 13

FICHA DE REGISTRO DE COLETA

Seccao : KO for non print multimedia

Hidderly, Rob; Rafferty, Pauline. Flickr and Democratic indexing: disciplining desire lines. *Advances in Knowledge Organization*, Vol.10(2006) p. 405- 411

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Abstract: In this paper, we consider three models of subject indexing, and compare and contrast two indexing approaches, the theoretically based democratic indexing project, and Flickr, a working system for describing photographs. We argue that, despite Shirky's (2005) claim of philosophical paradigm shifting for social tagging, there is a residing doubt amongst information professionals that self-organising systems can work without there being some element of control and some form of 'representative authority' (Wright, 2005).

Fichamento

Flickr has been described as a folksonomy (Wright, 2005), but in practice Flickr works not as a user-indexed, but as an author-indexed database, where the term 'author' refers to the person who uploads the image on to the site and creates tags for the image. The construction and use of a tag is left entirely to the 'author'. There are discussions of how tags should be used (Ideant, 2005) within the internet community. In practice, tags often correspond to well-understood, usually English. However, tags are also used that are private codes and sometimes as a code used by some sub-group of users to facilitate semi-private communication. Other tags are developed that are actually phrases without spaces. Tags are uncontrolled (except by the 'author' of an image) and unmediated, there is nothing to stop inappropriate use nor the generation of tags that are (nearly) identical in meaning or (mis-)spelling to other tags. There does not appear to be a single list of all the current tags in use, Flickr adopts summaries of 'hot tags' and 'all time most popular tags' neither of which provide any kind of comprehensive listing. (pag. 407)

General/specific vocabulary A key difficulty with any retrieval system is to use a set of terms that are not too general as to apply to all items and not too specific that they only apply to a very small number so that they are able to distinguish items. The uncontrolled use of tags leads to terms that are too broad, retrieving a set that is too big to browse, or so specific that few items are associated with the term. However, given that there is no upper limit to the number of images that a system like Flickr may store, this may be an insurmountable problem through any statistical approach to the control of tag use. (pag.407)

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Nº de registro 14

FICHA DE REGISTRO DE COLETA

Seccao : MULTILINGUAL AND MULTICULTURAL ENVIRONMENTS

MENARD, Elaine. Indexing and retrieving images in a multilingual world. Advances in Knowledge Organization, Vol.11(2008) p. 77- 83

Université de Montreal

Abstract

This paper presents the problem statement, the methodology and the preliminary results of a research project aiming to compare two different approaches for indexing images, namely: traditional image indexing with the use of controlled vocabularies, and free image indexing using uncontrolled vocabulary. The experiment intends to measure their respective performance for image retrieval in a multilingual context, in terms of effectiveness, efficiency, and satisfaction of the user.

Fichamento

In general, two categories of queries are used to retrieve images on the Web: graphic or textual queries. In the first category, the individual submits a graphic query using an image or a drawing and the system tries to retrieve a similar image by using

certain physical characteristics of the image such as color, shape or texture. However, the majority of image searches on the Web still use textual queries and the retrieval's success depends on the correspondence between the query terms and the text (ancillary text or indexing terms) associated with the images. Since images do not always include a caption or any kind of text, the indexing process remains crucial. Image indexing has, so far, been divided between two camps: the proponents of "controlled vocabulary", and the proponents of "uncontrolled vocabulary". The former method focuses on indexing terms extracted from thesauri, classification schemes or subject heading lists, while the latter focuses on terms drawn from the natural language and does not impose any structure or mandatory element. This long-neglected form of indexing is currently becoming very trendy with the emergence of picture sharing web sites. (Pag. 77)

Image retrieval presents two major obstacles. Firstly, the process of transposing the content of an image into a verbal expression poses significant challenges to the individual. The second barrier comes from the "language" of the image itself. By their very nature, images are considered to be language-independent resources. Nevertheless, the text associated with the images gives the image a linguistic status similar to any other textual document, which can significantly affect its retrieval. And given the great linguistic diversity existing on the Web, we must expect that the text associated with the images exists in many different languages. For example, if a user formulates a query in English and the images to be retrieved are associated with English text, the cross-lingual problem does not arise. However, if the query language and the associated text of the image are different, the retrieval will not be possible, unless the retrieval system includes a Cross Language Information Retrieval (CLIR) mechanism which allows cross-language mapping between the query terms and the associated text.. (pag. 77)

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Nº de registro 15

FICHA DE REGISTRO DE COLETA

Seccao: General problems of natural language, derived indexing, tagging

HUVILA, Isto. Aesthetic judgments in folksonomies as criteria for organising knowledge. *Advances in Knowledge Organization*, Vol.12(2010) p. 308- 315

Abstract

Principles, justifications and their subjective nature are central issues of knowledge organisation research and practice. This study discusses folksonomies a source of aesthetic judgments and whether those judgments can provide justification for knowledge organisation. Using Flickr photosharing service as an example, the folksonomies are examined as potential source of collective judgments of a larger group of people with a special focus on everyday life aesthetics. The study is based on a visual analysis of clusters of photographs formed by Flickr with a set of common aesthetic adjectives.

Fichamento:

There are a number of well-known general issues in image indexing and retrieval (e.g. Jørgensen 2003). (p.309)

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FICHA DE REGISTRO DE COLETA

Seccao: Classing and indexing of non-book materials (images, archives, museums)

IYER, Hemalata; RORISSA, Abebe. Representative images for browsing large image collections: a cognitive perspective *Advances in Knowledge Organization*, Vol.12(2010) p. 412 – 416

State University of New York, Albany

Abstract

In large collections of images, one of the ways to facilitate browsing is by providing thumbnails of representative images. This paper seeks to examine the issue of choice of representative images within the categories. Towards this end, a study of free sorting of 50 images by 75 participants was conducted, in which they sorted the images into categories and selected a representative image for the categories and also indicated the prominent feature in the selected image. The results indicate that there is reasonable agreement in the choice of representative images and the selection of prominent features appearing in the images. The prominent feature seems to be one of the factors that have a bearing on the way people categorize.

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Nº de registro 17

FICHA DE REGISTRO DE COLETA

Seccao: KNOWLEDGE ORGANIZATION FOR SPECIFIC DOMAINS

FAVIER, Laurence; EL Hadi, Widad Mustafa. From text to Image: the concept of Universality in the Knowldge Organization System Designed by Paul Otle and the Internacional Institute of Bibliography . *Advances in Knowledge Organization*, Vol.13(2012) p. 220-228

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Abstract

This paper will examine the documentary universalism defended by Paul Otlet, as an aspect of his universalist philosophy. We will particularly be focusing on two elements of his knowledge organization theory: text and image documents. Then we will compare Otlet's universalist approach with the challenges of the "universal search" at the internet age. In order to discuss Paul Otlet's legacy, related to universal search and UDC role, we are currently analyzing the UIR archives, and more broadly, the Mundaneum's archives. The most important part of our research carried in the Mundaneum's archives will concern the Universal Iconographic Repertory (UIR) and what it reveals about the nature of the UDC and its's role in the universal search. This term covers both search engines and online libraries' catalogs tailored for searching on the Web.

Fichamento:

In the same way as bibliographic documentation is delineated, images were also catalogued on individual normalized cards. Illustrations had to be displayed separately from their context and only the title and the index had to mention the original context. Displaying a continuous series of illustrations on the same card had to be avoided, and each card had to carry one single piece of information.

The printed label at the back of each card had to include three information fields:

Title Identification i.e. entry number, source, date of the document

Classification : subject matter , persons, place, date

Classification indexes had to be organized according to UDC rules

Iconographic document indexing had to extract all the relevant subjects, selecting them according to the possible future uses of the document. The anticipation of the users' needs constitute the main indexing principle for images. Indexing has to link users' needs and knowledge universe expressed by the UDC.

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Nº de registro 18

FICHA DE REGISTRO DE COLETA

Seccao: KNOWLEDGE ORGANIZATION FOR SPECIFIC DOMAINS

LA BARRE, Kathryh; CORDEIRO, Rosa I. de Novais. Unmasking "That obscure object of desire": a Brief Report from the film and facets projet. *Advances in Knowledge Organization*, Vol.13(2012) p. 229-235

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Abstract

The use of facet analysis as an analytical tool for identifying salient access features of moving images was tested in this exploratory project. Twelve participants viewed three films, and created keywords and summaries for each film. These textual descriptions and access features from four moving image repositories were subject to facet analysis. A comparison of the facets elicited by this approach indicates that subject-related content; especially *theme*, *genre* and *action* may be highly salient access points for searchers in moving image repositories.

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Nº de registro 19

FICHA DE REGISTRO DE COLETA

Seccao: KNOWLEDGE ORGANIZATION FOR SPECIFIC DOMAINS

IYER, Hemalata; D'AMBROSIO, Amber. Archetypes, Idealized cognitive models and prototype effect: a discussion of images and cognition in categorization. *Advances in Knowledge Organization*, Vol.13(2012) p. 236-241

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Abstract

Explores the usefulness of the idealized cognitive models (ICM) and related cognitive models in image organization. Discusses archetypes, ICMs and the prototypes visible in illustrations from historical children's literature and considers the pitfalls and challenges inherent in selecting prototypes of images for representation in Web-based resources, children's catalogs and database.

Fichamento

Whether or not someone believes in the "collective unconscious" and its power, archetypal images can be utilized as prototype images in knowledge organization to group concepts under a broader idea represented by the image. Images speak across cultures in a manner that language cannot and can also span generations and age groups. Visual memory also often operates much more effectively than conceptual or word memory. While the applications for digital image collections are readily apparent, this can also be used when designing information systems aimed at children or for designing cross-cultural or cross-linguistic information systems. Representative images are also used in browsing large image collection (p.237)

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Nº de registro 20

FICHA DE REGISTRO DE COLETA

Seccao: USERS AND CONTEXT

ARASTOOPOOR, Sholeh; Rahmatollah Fattahi. Users' percepton of aboutnees and ofness in images: na approach to subject indexing based on ervin Panofsk's theory and Users' view. *Advances in Knowledge Organization*, Vol.13(2012) p. 345 – 351

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Abstract

It is widely accepted that subject indexing of an image is based on a two-dimensional approach. The first is the ofness and the second focuses on aboutness of the image. Assigning a suitable set of subject tags based on these two groups depends, to a great deal, on users' perception of the image. This study aims at analyzing users' perception of aboutness and ofness of images. 25 in-depth semi-structured interviews were conducted in two phases. In the first phase a collection of 10 widely known photographs were given to the interviewees and they were asked to assign subject tags (as many as they wanted) to each image. In the second phase some facts regarding each image were given to him / her to assign further tags (again as many as they wanted) or even modify their previous tags. The results show that the interviewees do focus both on ofness and aboutness in subject tagging; but it seems that they emphasize more on aboutness in describing images. On the other hand, as

soon as the interviewees were able to distinguish the iconographical ofness, they could speak of iconographical and iconological aboutness. The results also show that subject indexers must focus on the iconographical level, especially regarding those tags which represent the ofness at this level.

Fichamento:

Ofness/ Aboutness and Panofsky's Theory in Iconography

As Shatford Layne (2002) puts it, subject access to images is among the most important means through which users can find their desired pictorial works. From this point of view there are two main aspects in subject interpretation of pictorial works; ofness which considers what is depicted in an image and aboutness which deals with the interpretation of the subject matter and identifying what has been symbolized in an image. As Yee (1990) mentions, this aspect covers a broad territory due to the fact that it includes expressional and latent meaning. Thus index terms for images are assigned based on these two aspects.

Although different scientists adhere to the fact that differentiating ofness and aboutness in images is an accountable way for interpreting the subject and these two dimensions do give us the clues to select the correct terms for subject tagging of pictorial works, there are other specialists such as Svenonius (1994) who believe that it is almost impossible to express what is symbolized in one medium in another. In other words, it is difficult to adequately index visual and/or pictorial works by means of verbal language. The dilemma is only solved (at least to some extent) if both subject indexing knowledge and a bit of visual/verbal symbolism knowledge are mixed together. Here rises another point regarding the subject matter in works of art based on Panofsky's theory in iconography, since iconography as a branch of art history deals with the subject matter or meaning of works of art. Panofsky (1962) identifies 3 different strata for subject meaning of pictorial works: 1)

The Primary subject matter which is identified through pre-iconographical description. In order to develop such a description practical experience (i.e. familiarity with objects and events) is required. Identifying lines, colors, basic shapes, objects and etc. takes place at this level (Peters & Stock, 2006). 2) The secondary or iconographic subject matter which is identified through iconographical analysis. This type of analysis requires knowledge of literary sources (i.e. familiarity with specific themes and concepts). Events, Personas, specific objects and concepts are to be identified at this level. It is here that the interpreter is able to explain what is really going on in an image. If the image's icons are correctly identified then its true story is revealed. 3) The intrinsic meaning of the image (Iconology)

which is identified through iconographical interpretation in a deeper sense (i.e. Iconographical synthesis). Developing such an interpretation requires synthetic intuition which is familiarity with essential tendencies of human mind and it is

conditioned by personal psychology and “weltanschauung” 1 . At this level things which have been inferred from the image are not necessarily depicted in it.

Arriving at the intrinsic meaning of an image requires correct pre-iconographical description and then correct iconographical analysis. The first phase is simple. It deals with lines, colors, basic shapes and as long as we have the practical experience of encountering the motifs, we would certainly be able to distinguish them. Yet Iconographical analysis phase focuses on the stories and themes (Sieger, 2010). It requires the capability to derive right conclusions regarding the aboutness of an image in the primary level; the stage when one can name the icons and say what is really happening in the work of art. Yet interpretation of the intrinsic meaning of an image is based mainly on the symbolic interpretation, and requires the knowledge and ability to make sense of what has been expressed behind those depicted. This skill is equal to the capability in inferring the aboutness of the image in a more elaborate level. Fujita (2000) in a paper describes this aboutness at primary level and elaborates level as the foreground image where main motifs are placed and background images where clues are hidden in order to give implicit information in the picture. (pag. 346)

The results show that the interviewees focus both on ofness and aboutness of an image in subject tagging; but it seems that about two-third of their subject tags are assumed to reflect the aboutness of each image. For instance regarding Fig. 1, for every single tag focusing on ofness, 2.2 tags regarding aboutness of the image was assigned. Popular ofness tags assigned to this image were “Two Hands”, “Black hand”, “Africans”, and “Ugandan Child”. Popular wrong ofness tags were “Somalies”, “Somali child”, “Somalia”. Although these tags share some semantics and symbolic icons with the main idea of the image, wrong tags here best denote the important effect of familiarity with themes based on the literary (i.e. recorded) knowledge in Panofsky’s theory. Recently Iranians have been bombarded by myriads of news about the drastic situation of Somali people. Thus first impression of some of them was that this picture is actually depicting a Somali child. Next, when the real date and theme of the image was revealed to them, they just kept correcting their previous tags regarding the time and also the place. In other words, after explaining the theme or story of each image, most of the interviewees began to correct their iconographical impression. Yet their tags of aboutness remained mostly unchanged. (pag.357)

Based on analyzing the tags provided for each image by interviewees, a matrix was prepared showing the confluence of aboutness and ofness tags as columns and Panofsky’s three strata for each image. Based on the interviews the discerning sequence, through which each group of keywords is provided, could be developed. Table 1 depicts a merged matrix with the discerning sequence for each group of keywords. (pag.348)

During the interviews it was observed that at the first sight there is a tendency to tag

based on objective impression. (For instance: “Tanks”, “People”, “street”, “A man in front of tanks”, “Army”, “Tanks in the city”). At this stage only the objects depicted directly in the image are mentioned. Gradually those who were not familiar with the theme of the image, expanded their description to tags such as “Military Parade”, “war”, “Civil war”, “Invasion to country”, “demonstration” at first and then to more symbolic terms such as “Resistance”, “Sacrifice”, “Life vs. death”, “Faith”, “Freedom”, “Hegemony”, “Forced to fight”, and “capitalism 6”. As it is evident in these three groups of tags, two types of aboutness are to be inferred. The tags regarding ofness at this stage are well-classified under preliminary interpretation of ofness. Those aboutness tags inferred from the objects including terms such as military, war, or demonstrations could be classified under preliminary/ pre-iconographical interpretation of aboutness. But the latter group of aboutness tags is symbolic enough to be classified under iconological interpretation of aboutness. Wrong interpretation of aboutness at this level is inevitable as it is evident in both groups of aboutness tags. (pag. 348)

The next stage is the iconographical interpretation of aboutness. Some reached this level (4 persons) but others asked the interviewer to tell them the image’s theme. Among those four who guessed the theme 2 were right. One of them exactly mentioned Tiananmen and the other person mentioned China, and both of them enhanced their tags with the date in the second phase of the interview. Those who gave wrong tags mentioned “American tanks” and “Israeli tanks”. At this level the correct icons are identified. And only based on a correct iconography, a correct aboutness in iconographical and iconological levels is reached. At this level ofness tags such as “Chinese demonstrator”, “Tank-man”, and “Chinese army tanks” are provided. Iconographical aboutness tags such as “Tiananmen demonstrations”, “Tiananmen square demonstration”, and “1989 China” were provided afterwards and totally wrong tags in iconological aboutness level mentioned prior to the correct iconological notion of the image such as “capitalism” changes to “communism”. In table 1 the whole sequence of interpretation is shown through numbered arrows. To sum up, we infer that one can interpret objects in a picture and infer the aboutness of it. At this stage if the observer develops a false impression from what has been depicted, false aboutness is inevitable. According to Panofsky it is hardly possible for a person to base a correct iconological impression on a pre-iconographical inference. This study shows that at least regarding the news images this doesn’t always hold true, since from the primary stage one can infer to some extent the iconological aboutness of the image (Table 1). On the other hand, as soon as the interviewees were able to distinguish the iconographical ofness of the images, they could speak about iconographical and iconological aboutness. (pag.350)

Another important question which remains is the significance of each group of keywords for better retrieval. Each group of tags was searched in “Google Image” and the results showed that by utilizing those tags which deal with ofness and

aboutness at the Iconographical level of description, the desired image is returned within the first page of the retrieval. Further investigations revealed that those tags regarding pre-iconographical interpretation of ofness and aboutness are weak in retrieving the image within the first page of retrieval (for 50% of images the results appeared in the 3rd or up). As for those symbolic tags the search results were hopeless. But the interviews showed that the number of people who exactly know the theme of the picture and thus those who could correctly interpret the iconography of image elements is not large. Also due to the fact that people are not eager to give tags regarding ofness, it would be a reasonable decision to assign some elemental primary-level tags regarding the ofness to each image. Based on the tags that interviewees assigned, it is evident that aboutness tags at iconological level could be sufficiently provided by users; but since personal judgment highly affects the decision regarding the keywords at this stage and because these tags are not successful in providing precision, it is better to keep these groups of tags as small as possible. This means that a subject indexer is needed to assign/add necessary tags regarding iconographical ofness and aboutness and keep the amount of tags regarding iconological aboutness small, since users are weak in this regard. During this process, special favor should be given to those tags which are classified under iconographical ofness. (pag.350)

Subject indexing of images is important as people show more interest in image objects on the Internet and in databases. An important point is that interpretation of news images is to some extent different from the works of art. Whether this difference is because of their simpler or less symbolic nature or due to the subjects depicted in them, different audiences with different backgrounds do understand (at least to some extent) them, and their meanings could be conveyed. The whole process of absorbing the deepest symbolic meaning of each image is gradual. During different phases of this process different notions of ofness and aboutness are perceived. On the other hand, general information/knowledge plays an important role during interpretation of the meaning of an image. More general knowledge leads to better iconographical interpretation. This means that knowledgeable people, who have access to information media/sources, assign better iconographical tags regarding ofness and aboutness; and this helps them in developing more precise idea of iconological aboutness. Also it seems that iconographical tags on both ofness and aboutness retrieve better results. But based on the findings of this study, users are not always familiar with icons in an image. The role of subject indexer or in some systems the image provider (the one who uploads the image) would be of great help through providing iconographical ofness/ aboutness tags, or providing a short summary and/or a caption for the image. (pag. 351)

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Nº de registro 21

FICHA DE REGISTRO DE COLETA

Seccao: Methods of Knowledge Organization

Chen,Shu-Jium; Lee, Hur-Li. Art images and mental associations: a preliminary exploration. *Advances in Knowledge Organization*, Vol.14(2014) p. 144 – 351

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Abstract

This paper reports on the preliminary findings of a study that explores mental associations made by novices viewing art images. In a controlled environment, 20 Taiwanese college students responded to the question “What does the painting remind you of?” after viewing each digitized image of 15 oil paintings by a famous Taiwanese artist. Rather than focusing on the representation or interpretation of art, the study attempted to solicit information about how non-experts are stimulated by art. This paper reports on the analysis of participant responses to three of the images, and describes a 12-type taxonomy of association emerged from the analysis. While 9 of the types are derived and adapted from facets in the Art & Architecture Thesaurus, three new types - Artistic Influence Association, Reactive Association, and Prototype Association - are discovered. The conclusion briefly discusses both the significance of the findings and the implications for future research.

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Nº de registro 22

FICHA DE REGISTRO DE COLETA

Seccao: Knowledge Organization and Representation for

Sahbi Sidhom. Numerical training for the information retrieval in medical imagery: modeling of the gabor filters. *Advances in Knowledge Organization*, Vol.14(2014) p. 413 – 420

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Abstract

We propose, in this work, a method of medical image indexing and research by exploiting their own digital component. We represent the image digital component by a vector of characteristics what we will call: numerical signature of the image. Using the Gabor wavelets, each image of the training medical base is indexed and represented by its characteristics (texture). We thus will build (in offline) a numerical data base of signature. This enables us (in online) to carry out a numerical search for similarity compared to a request image. In order to evaluate the performances we tested our application on a training mammography images basis. The results obtained show well that the representation of the digital component of the images proves to be significant as regards search for information in imagery.

Fichamento

In the imagery domain, systems of images research based on the text (Text-based Image Retrieval: TBIR) were elaborate. In this type of system, the indexing is carried out while being interested only in the textual descriptors. It is the case today of the majority of the search engines on the Web following the example Google, Yahoo, Altavista ...etc. However, it proved that this mode of indexing is not sufficiently effective in particular when it is a question of indexing a significant number of images such as we find it on the Web sites. A representation thus should be found more explicit making it possible to better represent the images. For this reason, since the beginning of the Nineties, scientific community implemented systems of indexing and images research based on the contents. They are the CBIRS (Content-Based Image Retrieval System) [3], [4], [5], [6], [7]. (pag. 413)

Nao fala da analise de imagem em si mas a forma numerica de recuperacao, voltada paa mais prar ciencia da computacao.

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Nº de registro 23

FICHA DE REGISTRO DE COLETA

BRITO, Marcilio; EL HADI, Widad Mustafa; ŽUMER, Maja; VIEIRA, Simone Bastos. Indexing with Images: The Imagetive Conceptual Methodology. Advances in Knowledge Organization, Vol.15(2016) p. 265 –

BRITO, Marcilio - Universidade de Brasília ; EL HADI, Widad Mustafa - Université Lille 3 França ; ŽUMER, Maja - Universidade de Ljubljana – Eslovénia ; VIEIRA, Simone Bastos - Universidade de Brasília - Brasil

Secção: Applied Dimension of Knowledge Organization

Abstract

This proposal presents the methodology of indexing with images based on Peirce's semiotics. The indexing processes are analysed under the perspective of the sign both as a word and as image to show correlations between signs from literal and imaged universes. It is explained how the traditional indexing mechanisms are related to Peirce's semiotics in its simplified triad form of icon, index and symbol. Imaged indexing leads to more intuitive interfaces, an imaged KOS (iOPAC), improving the communication process throughout information systems. iOPAC would be a solution for supporting information access and navigation, language and concepts fostering better understanding and could pave the way towards semantic, social and cultural interoperability. Furthermore, the indexing methodology is

analysed in line with the FRSAD model providing the entity-relational frame of reference for relating images to *nomens*.

Fichamento :

Semiotics shows that image is a communication language and people have natural competencies to assimilate linguistic properties from images to engage in a communication process, what corroborates with prior linguistics theories. In fact, the grammar codes that govern imaged communication are easier understood by a larger public, although structurally more complex and less explicit. (pag. 265)

Indexing with images consists of using images instead of key-words or descriptors, to represent and organize information. Profundity in discourse is a characteristic of the written language, yet its representation is only possible with elements of cognition. It is a complex process to make use of words to represent knowledge. Yet, text contents have been embodied by textual elements themselves. Admitting the multidimensional characteristics of images to broadcast messages, this work proposes a different point of view in the communication perspective. It certainly means a shift on knowledge organization systems (KOS) and leads towards the achievement of social and cultural interoperability as defined by Mustafa El Hadi (2015). (pag.266)

To go further in developing the imaged KOS we will consider implementing it as a user-focused mechanism compatible with FRSAD (Functional Requirements for Subject Authority Data).FRSAD supports the idea that a work has subjects (thema), and a thema has one or more appellations nomen. Nomen is any sign or combination of signs (alphanumeric characters, symbols, sound, images, etc.) that a thema is known by, referred to or addressed as. FRSAD is focused on aboutness to provide a clearly defined, structured frame of reference for relating the data that are recorded in subject records and tailored to meet the needs of the users of these records, and to assist in an assessment of the potential need for a global information share and use of subject data, both within the library sector and beyond. While associated with topics, images can be interpreted as nomens within FRSAD conceptual model. (pag. 267)

The information retrieval process contains a complex relationship between communicating and describing the language to express thoughts. In fact, what is needed is to represent materialized knowledge in a text by acts of language. This sort of representation applies methods to canalize intrinsic properties from language and from its grammar. Content transposition to a meta-language that uses images as representatives of this controlled (meta) language is which we are looking for. (pag. 267)

o texto fala sobre indexar com imagem e nao indexar imagem

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APÊNDICE B - Ficha dos artigos seleccionados da K.O.

Ficha 1

Grund, A.: ICON CLASS. On subject analysis of iconographic representations of works of art. *Knowl.Org.* 20(1993)No. 1, p.20-29, 32 refs.

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RESUMO

The special classificati9n system ICONCLASS, created by Henry van de Waal for the description of occidental art, is considered against the background of art-historical iconography. By means of a number of examples the structure and use of ICONCLASS and its importance for art-historical documentation are illustrated.

Fichamento:

According to Panofsky, the interpretation of a work of art is carried out on three levels. On the first level the 'pre-iconographical description' takes place. Here the artistic motif, the so-called 'primary or natural subject matter', is studied: pure forms are identified as objects and their interrelationships as events, a process for which the spectator's practical experience is sufficient.

On the second level, the 'iconographical analysis' is performed, whose object is the 'secondary or conventional subject matter'. The previously identified motifs and compositions are now linked with themes or concepts. This presupposes, on the part of the spectator, the knowledge of literary sources, ancient myths and Biblical tales.

Third and last is the 'iconographical interpretation in a deeper sense' or the 'iconological interpretation'. Its object is: the true meaning of content, the essence of a work of art. To be able to interpret the pictures, anecdotes and allegories, the work of art is viewed as an object within its historical environment. This requires from the spectator detailed knowledge in the field of social history and calls upon his 'synthetic intuition'.

Panofsky's investigations gave rise to the first consistent system of an integral interpretation of works of art based on an analysis of their contents. Originally receiving but little attention outside the Warburg-Panofsky circle, it was only in the 50s that Panofsky's theory developed into a theory that has remained fundamental and an object of much discussion to this very day (I). (pag. 21)

If we transpose Panofsky's model to the indexing process, a correct description of the subject matter represented must be given first place. Here it is primarily important in what form the work of art to be described is available: as an original or a reproduction, or as a file card bearing a title entry with or without supplementary data. This step usually does not require any special knowledge from the indexer. The next step, the iconographical ana-

lysis, proceeds from the description prepared and depends on the indexer's knowledge level and the reference works available to him. With the aid of typological history, such things as personifications, symbols, allegories and emblems can be recognized and identified with relative certainty. If several, conflicting interpretations are to be found in the literature, a selection problem presents itself: Should all these or only one of them be indicated? Finally, the indexing result is added as a descriptor and/or notation to the data collection, thus being able to serve as a basis for a final iconological interpretation. It should be borne in mind here that even a great descriptive depth does not rule out losses of information. (pag,21)

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Ficha 2

Menard, Elaine. Study on the Influence of Vocabularies used for Image Indexing in a Multilingual Retrieval Environment. Knowledge Organization, 34(2), 91-100. 23 references.

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Fichamento

The growth of the Web highlighted the pressing need to offer suitable tools for image description aiming to facilitate their location since we now find those in the majority of the Web resources: personal pages and sites, virtual libraries, museum collections, commercial services and product catalogues, government information, etc. (pag.92)

In general, two categories of queries are used for retrieving images on the Web: graphic or textual queries. In the former category, the individual submits an "image" query (using an image or a drawing) and the system tries to retrieve a similar image by using certain physical characteristics of the image such as the colour, the shape or the texture. However, the majority of image searches on the Web still use textual queries (Clough et al. 2006). (pag.92)

When using textual queries the success of the retrieval largely depends on the correspondence between the query of the searcher and the text associated with images.

Given the great linguistic diversity existing on the Web, we must expect that the text associated with images exists in many different languages. Consequently, when using a textual query, the user faces a double challenge when he tries to retrieve images. (pag.92)

Image retrieval exhibits some similarities with textual document retrieval, but distinguishes itself in many ways such as the query formulation, the retrieval method, the technique in which the relevance of the results is evaluated, the participation of the individual in the retrieval process, and the fundamental cognitive differences in the interpretation of the visual rather than textual material (pag.92)

By their very nature, images are language-independent resources. The main difference and difficulty in indexing and classifying images, as opposed to text, is that images do not satisfy the requirements of a specific language. In other words, we cannot automatically label a specific language to this particular document type. For example, we can not say that an image is Chinese or German, as we would say about a textual document written in one of these languages. Nevertheless, the indexing process, with controlled or uncontrolled vocabulary, gives the image some linguistic status similar to any other textual document, which can significantly affect its retrieval in a multilingual context. For example, if a user formulates a query in French and the images are also indexed in French, the cross-lingual problem does not arise. However, if a French query is used and the images are indexed in English (or any other language different from the query language), the retrieval will only be possible if the retrieval system includes a Cross Language Information Retrieval (CLIR) mechanism which allows cross-language mapping between the query terms and the indexing terms. (pag.92)

The second indexing approach studied constitutes an alternative to traditional indexing using controlled vocabularies. Indeed, free indexing which, in addition, does not impose any structure or mandatory element, generally uses uncontrolled vocabulary.

This long-neglected form of indexing is currently becoming very trendy. As an example of free indexing, let us mention the indexing we encounter in photo sharing sites, like Flickr (www.flickr.com).

These sites allow massive image storage and diffusion on the Web. In these systems, the users upload their own images and index them using their own terms. It is also possible to make these images public, i.e. the images can be seen by all users or by a group of people chosen by the system user, thus forming a vast and communal image database. In a flickr system, the user who uploads images can thus determine who will have access to these images by stating certain rules of access control. In parallel, other users of the system have the possibility to update the image indexing by adding other keywords (tags) or comments to any image they have access to. These annotations assigned by the uploader or any other user of the flickr system constitute a form of free indexing called collaborative tagging. (pag 94)

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Ficha 3

Ménard, Elaine. Image Retrieval: A Comparative Study on the Influence of Indexing Vocabularies. *Knowledge Organization*, 36(4), 200-213. 80 references.

Resumo

This paper reports on a research project that compared two different approaches for the indexing of ordinary images representing common objects: traditional indexing with controlled vocabulary and free indexing with uncontrolled vocabulary. We also compared image retrieval within two contexts: a monolingual context where the language of the query is the same as the indexing language and, secondly, a multilingual context where the language of the query is different from the indexing language. As a means of comparison in evaluating the performance of each indexing form, a simulation of the retrieval process involving 30 images was performed with 60 participants. A questionnaire was also submitted to participants in order to gather information with regard to the retrieval process and

performance. The results of the retrieval simulation confirm that the retrieval is more effective and more satisfactory for the searcher when the images are indexed with the approach combining the controlled and uncontrolled vocabularies. The results also indicate that the indexing approach with controlled vocabulary is more efficient (queries needed to retrieve an image) than the uncontrolled vocabulary indexing approach. However, no significant differences in terms of temporal efficiency (time required to retrieve an image) was observed. Finally, the comparison of the two linguistic contexts reveal that the retrieval is more effective and more efficient (queries needed to retrieve an image) in the monolingual context rather than the multilingual context. Furthermore, image searchers are more satisfied when the retrieval is done in a monolingual context rather than a multilingual context.

Fichamento

According to Guinchat and Menou (1990), the indexing process of visual material poses particular problems because of its own nature and mode of consultation. Clearly, the choice of suitable indexing terms for image description is an enduring issue whether it is in a monolingual or multilingual retrieval context. This research project examines what occurs at the retrieval stage when an image is indexed according to each of the two following approaches: traditional image indexing, which recommends the use of controlled vocabularies, that is, the indexing terms are chosen from an artificial language whose main function is to generate formal document representation; or free image indexing, which uses uncontrolled vocabulary, that is, the indexing terms being used to describe the image do not follow any pre-established rules. While these two indexing approaches show common characteristics, there are also differences that may influence image retrieval. This research aims to establish whether one of these indexing approaches surpasses the other in terms of effectiveness, efficiency and satisfaction of the searchers for image retrieval in a multilingual context. (pag.201)

Over the years, image indexing has been the focus of several key studies. Panofsky (1955) identified three levels of meaning in works of art: pre-iconography for the primary or natural subject matter, iconography for the secondary subject, and iconology for the intrinsic content of the work. A few years later, Markey (1983; 1988) applied these levels for the identification of themes or concepts illustrated in images. Shatford (1986) defined three groups of attributes, which are “specific of,” “generic of ” and “about,” corresponding to the three classes in Panofsky’s (1955) classification. In the same manner, Krause (1988) divided the information contained in an image into “hard indexing” (what can be observed in a picture) and “soft indexing” (subjective meaning and the personal response that it evokes). Layne (1994) suggested that an image could be of and about something. While ofness is mainly concrete and objective, aboutness is more abstract and subjective. The various types of attributes of images and the terms used to describe them have been the subject of several studies. In order to determine what the appropriate access points are, image indexing and retrieval have been studied extensively over the years (Turner 1993; Turner 1994; Ornager 1996; Armitage and Enser 1997; Jörgensen 1998; Chen 2001; Goodrum and Spink 2001; Choi and Rasmussen 2002; Choi and Rasmussen 2003; Greisdorf and O’Connor 2008). When examining the different approaches to indexing an image, it is clear that the majority of the images are indexed on a minimum and often offer a single point of access (Jörgensen 1998, 162). Several studies (Besser and Snow 1990; Roddy 1991) show

that most of the indexing approaches are not suitable for picture researchers, while other studies (Ohlgren 1980; Krause 1988; Turner 1993) emphasize the fact that the main problem concerning image retrieval is the approach chosen for the indexing process. (pag.201)

Some individuals use many keywords, others only a few to describe an image according to how they perceive it. However, in cases where several words are used, it seems that this procedure is for personal purposes rather than public. Indeed, the meaning of some keywords often remains ambiguous for the larger number of users (e.g., mylife, strangeday_14nov07). The information added by many users of the system is useful only to the extent that all users understand the content in the same way and if there is an overlap in their choice of categories of keywords. Nevertheless, the collaborative indexing, even if it largely depends on the ability of individual indexers, can be of great value, provided it is used across the Web and not just by a few individuals (Golder and Huberman 2005).

Several elements emerge from this review of literature. First, the ordinary image, contrary to the artistic image, is not really described in the literature.

Second, this review highlights that we know very little about the influence of the vocabulary used for indexing images on its retrieval in a multilingual context. Third, analysis of the literature reveals that there are two approaches to indexing images, one using the more traditional controlled vocabulary and the other advocating the use of uncontrolled vocabulary. The latter approach is attracting increased interest with the phenomenon of collaborative indexing. (pag.202)

The use of either controlled or uncontrolled vocabulary raises a number of difficulties for the indexing process that impact image retrieval. The choice between the two approaches is extensively discussed in the literature surrounding this study where scholars explore which is the best vocabulary to be used for the indexing process. Some results indicate that uncontrolled vocabularies offer a better retrieval performance than the controlled vocabularies

For the indexing process with uncontrolled vocabularies (French and English), the indexers saw the images and then used their own words as indexing terms. No limit was imposed on the number of indexing terms assigned to one image. At the end of the indexing process, all images were associated to four categories of indexing terms as illustrated in Figure 1.

The indexing with controlled vocabulary was the most efficient in terms of queries required compared to the indexing with uncontrolled vocabulary. No significant difference, however, was observed between the combined and the controlled indexing approaches, or between the combined and the uncontrolled indexing approaches. (pag.208)

The results of our research have led to the conclusion that the retrieval of ordinary images representing common objects, when initiated with a shown image, is more effective (proportions of retrieved images) when the images are indexed with the combination of controlled and uncontrolled vocabularies rather than the controlled vocabulary or the uncontrolled vocabulary approaches respectively. Since the combined indexing approach holds the advantages of both indexing approaches, the effectiveness of the retrieval is

maximized. The results of our study also indicate that differences in terms of temporal efficiency (average time required to retrieve an image) are not significant.

For human efficiency, the results indicate that the controlled vocabulary indexing approach is more efficient than the uncontrolled approach in terms of the number of queries required to retrieve an image. In the context of this study, the use of the controlled vocabulary offers the maximum consistency for the representation of concepts contained in the image and has an influence on the human efficiency of image retrieval. However, the combination of the controlled and uncontrolled vocabularies, while improving effectiveness by providing more mapping possibilities between the query terms and the indexing terms, results in an increased number of images displayed and hence a loss in temporal efficiency. With regard to the satisfaction of the image searcher, the results of the analysis confirm that searchers consider themselves more satisfied when retrieving images indexed with the combined approach rather than the controlled approach. Regardless of its subjectivity, the assessment of image searcher satisfaction reinforces the results obtained for the effectiveness and efficiency of image retrieval from the perspective of the image searcher. (pag. 209)

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Ficha 4

Benson, Allen C. *OntoPhoto and the Role of Ontology in Organizing Knowledge*. *Knowledge Organization*, 38(2), 79-95. 32 references.

ABSTRACT: This article is concerned with ontology and its applications in Knowledge Organization (KO) activities. Connections are drawn between efforts in artificial intelligence (AI) to capture the meaning of information and make it accessible to machines and the efforts made in libraries to use KO tools in machine-based record building and search and retrieval systems.

The practices used in AI that are of interest here include ontology and ontology-based knowledge representation. In this article their applications in KO are directed towards a particularly problematic document type—the photograph. There are two arguments motivating this article. First, ontology-based KO systems that join AI techniques with library cataloging practices make it possible to utilize higher levels of expressivity when describing photographs. Second, KO systems for photographs that are capable of reasoning over concepts and relationships can potentially provide richer, more relevant search results than systems utilizing word-matching alone.

Fichamento

The organization and representation of photographs in twentieth century archives have focused on the objectives of bibliographic systems, and retrieval has focused on matching indexed terms. It appears we are approaching the limits of what this model can accomplish. More recently, attempts have been made to automatically extract and acquire knowledge about digital photographs through content-based image retrieval (CBIR). While it is desirable in many applications, CBIR is limited to digital images and must overcome several challenges including recognizing image features and their semantics that match higher-level concepts humans tend to use. Knowledge-based data structures, and, in particular, ontology-based knowledge representation, hold promise for image information organization and retrieval in the twenty-first century. But as the research shows, the concepts and relation types associated with photographs are subtle and complex and present serious challenges for computers to recognize and process effectively.

There are three factors that have held back progress in the effective use of knowledge-based information systems for describing and retrieving photographs. First, there is the problem of recognizing useful applications that require high-level semantics, richer than those provided by existing controlled vocabularies such as *Thesaurus for Graphic Materials* (Parker and Zinkham 1995). Second, there is the problem of “the semantic gap,” which Laura Hollink defines as, “the discrepancy between the information that can be derived from the low-level image data and the interpretation that users have of an image” (Hollink 2006, 3-4). Finally, the use of ontology based representation of images is still in its infancy and focuses primarily on the content of specific images in specialized domains, thus limiting reuse. One promising application area for the use of rich semantic image descriptions is to improve upon precision and recall currently provided by word matching systems of finding, collocating, and retrieving photographs. A second, even more promising application area is question-answering. That is, the ability to ask questions about history, interpretation, aesthetics, a photograph’s relation to other photographs, and the relationships among entities within image content. To address the semantic image gap problem, provide a

framework for the question-answer system, and address the problem of reusability, I propose developing an alternative system for cataloging photographs. The new system utilizes ontology-based representations in a knowledge-based environment. (pag.80)

The photograph and its image content can be viewed and described from an unlimited number of perspectives. From the viewpoint of LIS, KO provides a general framework for describing and organizing individual photographs and collections of photographs. Hjørland (2008) describes KO in terms of three components: 1) activities such as cataloging and indexing performed by information professionals; 2) a field of study concerned with KO processes and systems; and, 3) a social process engaged in producing and disseminating knowledge. (pag.81)

Scone is an open-source knowledge-base system currently under development in the Language Technologies Institute of Carnegie Mellon University (Fahlman n.d.). Scone supports representation, searching and limited forms of common sense reasoning, all features that are useful for expressing and using knowledge relating to photographs. Knowledge is stored in Scone as a set of files written in a computer language called Common Lisp (Fahlman 1982). A core set of these files makes up Scone's upper-level ontology. The knowledge represented in OntoPhoto, which is also expressed using Common Lisp, is saved to a file and uploaded to the server where the Scone engine and knowledge base files reside. Together, all of these components form a single knowledge-base system.

OntoPhoto functions as a mid-level ontology, representing objects in the domain of the photograph at a more granular level than what is represented in the upper ontology of Scone. The boundaries are not clearly drawn between upper-, mid-, and lower-level ontologies. The upper ontology is limited to generic, very abstract concepts such as "physical object" and "action" and the relationships that link them together. As one moves down through the taxonomic relationships, concepts take on narrower, more specific meanings. Figure 2 presents an example of how a photographic concept might be mapped across these three broad ontological layers.

In one sense, OntoPhoto can be likened to a data structure like MARC21. Where MARC21 provides a template for describing facts about bibliographic artifacts stored in a library information system, Onto-Photo defines the landscape that makes up interesting distinctions between different aspects of the photograph and defines how these relate to each other in a knowledge-base system. Unlike MARC21 and natural language database systems, however, knowledge stored in OntoPhoto is represented in a formal language and organized around a hierarchical framework of concepts and relationships among concepts.

One final characteristic worth noting for its relevance to the photograph is a feature Fahlman calls multiple contexts. A context in Scone is a labeled node that represents some state (real or hypothetical) of the world, or some viewpoint. Every referent in a knowledge base is connected to a context node, and every context is interlinked through a hierarchy of is-a links just like other nodes in the knowledge base (Fahlman 2006a, 123). Fahlman describes driving from home to the airport, an action that creates two contexts, "one representing the world before the event and the other representing the world after the event" (Fahlman 2006a, 124). Applied to photographs, multiple contexts can be used effectively for representing a collection of photographs that are first located in an individual's safety deposit

box and later moved to an archive, where the collection is accessioned, processed, and cataloged. Both settings share some features in common, for example, restrictions on access and image content. There are specific aspects that change after the move, such as the geographic location and relation to other photograph collections that are part of an archive. (pag.86)

Photographs are objects in the world. As far as we know, any photograph can be modeled or represented in a library catalog system. Whether a library catalog embodies or materializes a photograph is a different matter. The word “photograph” is not the object. It is a representation of the object, and, as Timothy Binkley (1997) portrays this notion, using words to represent image content can be problematic. When Binkley claimed (p. 107), “pictures are superbly demonstrative and eminently computable, transcending the parochial limitations of natural languages,” he was asserting that visual information supplies its own content. The purpose of this section is to begin working through these problems of representing the meaning of photographs in the context of constructing an ontology of the photograph. Binkley’s claim may be true when viewing the photograph itself, but in library catalogs and knowledge-base systems, knowledge about the photograph is most often re-presented in linguistic forms. This section introduces the nomenclature and conceptual framework used for making this transition from being an object in the world to becoming a concept and then a representation in a knowledge base. (pag. 87)

Extending ontology-based representation to the visual modality—image content or the semantic content of images—and mapping this to the physical manifestation of the photograph requires a radically different approach to representation than is currently applied in descriptive cataloging methods. One must make explicit in the knowledge base the relationship that exists between the physical manifestation of the photograph and the image content. The manner in which this relationship is represented determines, among other things, the knowledge that can be extracted from the knowledge base as it gets populated. This section first provides examples of interesting concepts and relation types pertaining to the image and then explains how OntoPhoto makes the conceptual link between image and medium.

6.1.2.1 Describing the image In these early stages of development, OntoPhoto regards the subject of the photograph as the content of the image and groups all of the attributes an image may have under two broad categories: physical and abstract. This may be viewed as corresponding to the classic dichotomy in subject analysis that asks the questions: what is the picture about and what is it a picture of. These two entity types are expressed in Figure 8 as {subject matter physical} and {subject matter abstract}. OntoPhoto does not yet make explicit the subject facets of who (person), when (time), where (place), what (activities, events and objects), and so on. Facets would describe homogeneous classes of concepts, the members of which share characteristics that distinguish them from members of other classes. Distinctions could also be made between generic and specific. For example, a given photograph could be described generically as a “holiday event” or specifically as a “Fourth of July parade.” (pag.92)

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Ficha 5

Rafferty, Pauline. Informative Tagging of Images: The Importance of Modality in Interpretation. Knowledge Organization, 38(4), 283-298. 34 references.

ABSTRACT: The term “tagging” is widely used for the assigning of terms to information objects in user-driven websites, although a cursory examination of such websites suggests that the communicative functions undertaken by taggers are not always driven by concerns about inter-subjective informative communication. At the heart of the debate about social indexing are issues relating to meaning and interpretation. Even where the intention is to assign informative tags, there is an issue about the relationship between the modality of an information object and its subsequent interpretation in historical time. This paper tests a model of image modality using four test images, which are interpreted and tagged by a group of distance learner students at the Department of Information Studies, Aberystwyth University. The results are described, and the implications are discussed. Overall, this limited exercise suggests that the modality model might be of some use in categorizing images within an image IR system. The exercise also suggests that leaving annotation and tagging entirely to users could lead to information loss over time. Finally, the exercise suggests that developing a retrieval tool using genre and the intertextual nature of multimedia objects might lead to the construction of rich, knowledge based systems.

Fichamento

In the domain of image indexing and retrieval, writers generally acknowledge that establishing the meaning of images is a complex business (e.g., Brown and Hilderley 1995; Burke 1999; Enser and McGregor 1992, Enser 1995; Krause 1988; Shatford 1986; Shatford-Layne 1994; Svenonius 1994), and that the thorny question of meaning and interpretation of images can be usefully explored using the literature of art theory and visual semiotics. Shatford, Enser, and Burke in particular have referred to Panofsky’s “levels of meaning” model as a way of thinking about the operation of meaning in images. In his essay “Iconography and Iconology” (1993 [1933]), Erwin Panofsky identified different types of meaning in art and constructed a framework of meaning, which he then applied to the interpretation of Renaissance art. The three levels of meaning Panofsky identified are:

- Primary or natural subject matter: which is subdivided into factual and expressional subject matter. This is the pre-iconographical level of art.
- Secondary or conventional subject matter: identifying the male figure in the painting with the knife as St Bartholomew (54). This level of subject matter depends on cultural knowledge and is called the iconographical level of art.
- Intrinsic meaning or content: This level of meaning depends of the viewer synthesising information gathered at the first two levels of meaning with additional information, which

might include information about the artist and the socio-political cultural moment of production. A work of art might be interpreted as evidence of Leonardo's personality, or "of the civilization of the Italian High Renaissance, or a peculiar religious attitude" (55). It involves historical, psychological, or critical approaches to art.

Achieving iconological interpretation depends on having "synthetic intuition" according to Panofsky, an attribute which might be more often to be found in the talented layman than the erudite scholar.

Panofsky's model has been used by information theorists interested in mapping the specificities of meaning in images (for example, Shatford, 1986, Enser 1995, Burke 1999). Shatford (1986) discussed at length the notion of "ofness" and "aboutness," an analytical distinction drawn from Panofsky's work. Her model identifies the pre-iconographic level as "generic Of"; the iconographic as "specific Of"; and the iconological as "About" (Shatford 1986, 43-45). Peter Enser's analytical categories (iconography refers to specifics; pre-iconography refers to generics; iconology refers to abstract meaning) are based on Shatford's model, while Mary Burke constructed her own version of Panofsky's table of levels of meaning (1999). While information scientists tend to emphasise the subjective interpretational aspects of iconological content, Panofsky insisted that the more such interpretation is based on individual psychology and *Weltanschauung*, the more crucial it is that objective correctives be applied. (pag.284)

A logonomic system is a set of rules which specify who can claim to initiate (produce, communicate) or know (receive, understand) meanings about what topics under what circumstances and with what modalities (how, when, why.) Logonomic systems prescribe social semiotic behaviours at points of production and reception, so that we can distinguish between production regimes (rules constraining production) and reception regimes (rules constraining reception). (pag.284)

There is necessarily a gap between visual signs and their interpretation in and through language. Content-based image retrieval may offer the facility to search visual signs using visual signs but currently context-based linguistic searching is still used by many image retrieval systems including Web based systems. The shift from a visual semiotic model to a linguistic semiotic model is not a straightforward one, as each sign system is made up of its own semiotic structure. Visual signs have both denotative and connotative values, and the translation from perception of this system to interpretation through language, the signs of which have their own denotative and connotative values, assumes some equality or similarity in the translation from one system to another. To actualize this study, we have to accept for the moment that this translation is possible, certainly Volosinov's view of language might allow us to argue that all meaning is articulated in and through language. In this study, terms which are descriptive and mainly common and proper nouns are assumed to constitute denotative tagging, while terms that are more associative, a category that might include abstract nouns, are assumed to constitute connotative tagging. (pag.287)

We have already considered the problematic nature of the term "black," which, although it is categorised descriptive within this study, could be categorised as associative. The term

“black” could be categorised as pre-iconographic or, perhaps more accurately, iconographic. This term is an example of how difficult it can be to distinguish clearly between terms that might be categorised as pre-iconographic and those that are iconographic. This might be a function of being contemporary with the image and the responses.

The same is true of the terms “young” and “handsome,” which are categorised as descriptive terms in this study but which might, under different analytical conditions, be categorised as associative. In this study, it is believed that the respondents meant these terms to be descriptive and so this is how they are categorised by the researcher. However, what is considered “young” and “handsome” may well be determined by logonomic parameters. In addition, these terms might be categorised as pre-iconographic or iconographic depending on how encultured our notions of beauty and age are. We are all encultured and operate within the logonomic parameters of our society and our time. It might be that distinctions between natural and cultural become clearer with historical distance: an argument perhaps for the archiving of tags. (pag.291)

The image that was used to test the second element in the modality model was a generally unknown modern abstract. This image evoked responses that were primarily denotative and focused on the colours, shapes, and form of the image. Where connotative tags were used, the range was relatively wide, although the term “rain” was used by four of the respondents. This result is of some interest. There is nothing in the image to explicitly suggest rain; indeed, the brush strokes are in a range of colours not normally associated with natural hues of rain. The connotative association with rain is likely to come from the brush strokes, which are broad and linear.

This result is of some interest in relation to the broader discourse of semiotics, in particular, Peircean semiotics. Peirce was interested in the process of semiosis through which meanings could be generated endlessly from signs, and, as explained earlier, Peircean sign functions include the index, the icon, and the symbol. A specific sign can operate as any or all of these functions at any given moment read from different perspectives by different readers, and the functions may be historically contingent. It can be difficult to distinguish between iconicity and indexicality. Hodge and Kress (1988, 27) explained that indexicality is a matter of judgement, so that icons are the class of signs which has the highest modality, in other words, icons have a higher reality status than either indexes or symbols, where reality refers to a relationship with the world. In relation to this exercise, the brush strokes which evoke “rain” for some of the respondents are operating at an indexical and symbolic level. The broad straight brush strokes representing rain is a culturally learned sign.(pag.297)

The analytical model used in this study would record this tag as a descriptive tag. It is iconographic in that it draws on cultural knowledge. The analytical model does not distinguish between accurate and inaccurate cultural knowledge, but in its inaccuracy, this tag becomes an interesting connotative tag. For the tagger, this image evokes Mackintosh. Such an evocation might suggest that incorporating some form of intertextual links in an image storage and retrieval system could enrich the system as a knowledge base. (pag, 296)

the notion of the range or spectrum of meaning is potentially interesting in relation to the tagging of images. This exercise was too small to explore the issue in detail, but the

inclusion of both positive and negative tags in response to a modern, high modality image suggests that the issue is worth exploring. (pag. 296)

We have seen that within the communicative domain of visual communication, images range from those which are extremely high in modality to images which have self-consciously low modality, most images occupying a point within those two extremes along a continuum representing relationship with reality. The purpose and provenance of the image, if it can be identified, will be important in thinking about semiotic encoding and about whether the “preferred” reception position has been determined and controlled by the encoder, or whether the meaning(s) might be more fluid, ambiguous, and open to interpretation. This issue leads to questions about the interpretation and reception of signs. Does the meaning of an image depend on the meaning attached by its creator, and, if so, how can we know what that meaning is, or does the construction of meaning occur when the viewer interprets the image? Is the image the sole source of meaning or does the viewer (re-) create meaning in interpreting the image? These questions are of some interest in relation to the interpretation of multimedia images, as demonstrated in the research activity, perhaps particularly in relation to the abstract images. (pag.296)

The template is partly built on Panofsky’s (1993, [1933]) approach to interpreting images and partly influenced by Barthesian (1973, [1957]) distinctions between denotation and connotation. Underpinning this model is a view that meaning is not ontological, and even in the case of the highly readerly text, resident in the signifying object, but rather that meanings are historically contingent and constructed by human interpreters of the signifying object. (pag. 296)

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Image URLs

Image 1 Barack Obama. Available <http://www.flickr.com/photos/fastlaine/3057356781/>
Image 2 Jersey charabanc. Available <http://www.flickr.com/photos/fabulousminge/1848905384/>

Image 3 Modern abstract artwork. Available <http://www.flickr.com/photos/mrfitz/94388435/in/set-72157603892112260/>

Image 4 Mondrian: Composition with yellow, blue, and red, 1921, Webmuseum, Paris. Available <http://www.ibiblio.org/wm/paint/auth/mondrian/ryb.jpg>

Ficha 6

Wu, Yejun. Indexing Historical, Political Cartoons for Retrieval. Knowledge Organization. 40(5), 283-294. 40 references.

ABSTRACT: Previous literature indicates that political cartoons are difficult to index because they have a subjective nature, and indexers may fail to understand the content of a cartoon or may interpret its content subjectively. This study aims to investigate the index-ability of historical, political cartoons and the variables that affect the indexing results. It proposes an indexing scheme for describing historical, political cartoons, and uses that indexing scheme to conduct indexing experiments. Through indexing experiments and statistical analysis, three variables, which affect the indexing results, are identified: indexers, indexing fields, and cartoons. There is a statistically significant difference in inter-indexer consistency on indexers, indexing fields, and cartoons. The paper argues that historical, political cartoons can be indexed if knowledgeable indexers are available, and the context of the cartoons is provided. It also proposes a mediated, collaborative indexing approach to indexing such materials.

Fichamento

Managing cartoons for scholarly use presents two challenges: indexing and searching. People typically search cartoons by text surrogates. Searching is performed in an index. However, indexing cartoons using text is challenging.

Short captions and scant text embedded in cartoon images may not effectively convey subject content. "Cartoon drawings, though they do often contain text, usually donot contain text that usefully describes their contents"

(Bovey 1995, 115). Furthermore, "cartoons often represent a rather controversial perception of a historical event instead of an objective and impartial portrayal of the historical 'facts'" (Schnakenberg 2010, 32). Indexers may fail to reveal the content of a cartoon or may interpret its content subjectively. (pag.284)

Since searching is performed in an index, the difficulty of indexing naturally poses challenges to searching. Not knowing how different types of users want to retrieve historical, political cartoons from cartoon retrieval systems also presents challenges to searching. How users can translate their information needs to queries is restricted by the system's indexing capabilities and other search features. For example, if a user wants to find a historical cartoon with a Mexican man with a knife in it and is about the US-Mexico war, a cartoon retrieval system needs to allow the user to search for the subject of the cartoon, and the symbols and objects depicted in the cartoons. This asks for an appropriate indexing approach that responds to user's information needs. Understanding how to index historical, political cartoon is the starting point of building a cartoons retrieval system, which can be used to further solicit user's information needs. (pag.284)

Indexing political cartoons asks for understanding thecartoons. Interpreting cartoons can be challenging to not only indexers but also users. "Contrary to popular perceptions, political cartoons are complex and polysemous and require a particular form of literacy" because they "convey particular meanings within a specific social and cultural context" (El Rafeie and Horschelmann 2010, 195). A particular difficulty with understanding cartoons "consists usually of the decoding of symbols, personifications and other stylistic devices frequently used by cartoonists" (Schnakenberg 2010, 32). The symbols and words in cartoons often

make an allusion to news events and politics, or popular culture at that time, which might make understanding cartoons a problem, especially for readers who are not aware of the related events or readers from a different culture.

Political cartoons are complex and polysemous, multimodal texts, and interpreting cartoons is a complex process

that requires a whole range of different literacies. These include the ability to read visual grammar, a familiarity with the cartoon genre, broad knowledge of past and current events, a vast repertoire of cultural symbols, experience of thinking analytically about real-world events and circumstances, and the ability to convey particular meanings within a special social and cultural context (El Refaie 2009; El Refaie and Hörschelmann 2010). “Cartoons are typically highly complex texts that are often hard to interpret; a particular difficulty consists usually of the decoding of symbols, personifications and other stylish devices frequently used by cartoonists” (Schnakenberg 2010, 32).

Indexing political cartoons is rarely studied in academic literature and has not been the focus of study in the field of library and information science (Landbeck 2008). ChappleSokel (1996) pointed out “the controversy as to whether editorial cartoons are appropriate subjects for indexing and inclusion in bibliographic databases” (21) because the subjective nature of cartoons makes them challenging to index.

Landbeck (2001) found that research subjects would universally use the words in a cartoon’s caption, signs, or dialogue when searching a database of cartoon images.

Landbeck (2008) assumed that the cataloging needs of political cartoons could be divided into three groups: bibliographic, descriptive, and subject. The needs of the bibliographic description can be categorized by the following fields: author (or cartoonist), date of publication, and media used. It is more important to include fields describing the cartoon and its subject (or subjects). Chapple-Sokel (1996)

surveyed several indexers of cartoon collections, and her results indicated that no standard of indexing for editorial cartoons existed. The following cataloging fields, more or less, were used in the cartoon collections she surveyed:

- format (e.g., cartoon, caricature, comic strip),
- title,
- legend,
- cartoonist (or illustrator),
- medium,
- a copy of the cartoonist’s signature,
- inscription,
- publication date,
- condition (physical description),
- source (e.g., newspaper, magazine, syndicate),
- abstract (verbal description of the graphics, delivering the message the creator intended),
- personalities or figures in the illustration (real or fictitious, depicted or alluded to),
- subject (a one-sentence visual description of the cartoon, or rarely available),
- subject headings.

Schnakenberg (2010) proposed the consideration of the following elements when studying a cartoon: the source of the cartoon; publication time; historical events; figures and objects in the cartoon; the meanings of the symbols; the purpose of the written comments; who is speaking to whom; all labels and caption; play on words (hidden or double meanings of the words); issue and speculated aboutness; the cartoonist's intention/aim/point of view and sentiment (expressed through satirical/critical genre, positive/negative presentation of the figures); and the reader's view on the cartoon's message.

Among the current cartoon projects, the University of Kent's metadata scheme, used in their cartoon database, is the most comprehensive. It includes as metadata fields:

publication, date, artist, title or caption, format, series, collection, copyright holder, size, technique, embedded text, subjects, names of the real or fictional people caricatured in the drawing, notes (background information provided by artist, indexer or from publication media), implied text (any piece of text that is implied by the drawing but is not explicitly included—usually a quotation or a line from a well-known song or poem) (Hiley 2006).

When dealing with the conflict between the subjective meaning of the political cartoons and the art of indexing which is to objectively describe the aboutness of those images, Chapple-Sokel (1996) suggested the inclusion of multiple possible descriptions when assigning terms. For example, in a cartoon about Watergate, it is uncertain whether it was a grimace or a grin on Nixon's face. Therefore, an indexer might use both grin and grimace as index terms and indicate the ambiguity. Since cartoons are a kind of image, and image indexing has been studied extensively, the following section reviews image (pag.286)

The previous works that have had significant impact on this study are Panofsky's theory defining three levels of meaning in a work of art (Panofsky 1974), and Shatford's interpretation of Panofsky's theory when analyzing the subject of pictures (Shatford 1986; Shatford Layne 1994). The interpretation is also discussed in Svenonius (1994).

Panofsky's (1974, 28) first level of meaning in a work of art is the "pre-iconographical description," which is "primary or natural subject matter, subdivided into factual and expressional." It requires the "practical experience ... of everyday familiarity with objects and events" to understand this level of meaning (Panofsky 1974, 27). Shatford (1986, 43) interpreted this as the "generic description of the objects and actions represented in the picture." She interpreted factual meaning as the ofness of the picture, and expressional meaning as the aboutness of the picture, using the example of "Dorothea Lange's Migrant Mother ... a picture of a woman and children, and probably about strength, or suffering, or determination" (Shatford 1986, 43). At this level, ofness is a "generic description of objects and event;" aboutness is a "description of the mood of the picture" (Shatford 1986, 45). (pag. 286)

Panofsky's (1974, 29) second level of meaning is "iconography," which is the "secondary or conventional subject matter, viz., the world of specific themes or concepts manifested in images, stories and allegories." It requires "knowledge of literary sources (familiarity with themes and concepts)" to understand this level of meaning (Panofsky 1974, 41). Shatford (1986) interpreted the objective meaning as ofness, and mythical, abstract, or symbolic meaning as aboutness. She gave the example of Sir Joshua Reynolds'

portrait of Mrs. Siddons as the Tragic Muse. The picture is “of Mrs. Siddons (pre-iconographically of a woman) but about the Tragic Muse” (Shatford 1986, 44). At this level, ofness is “a specific, or proper, appellation of those objects and events;” aboutness is “an identification of mythical beings that have no unique and verifiable concrete reality, of symbolic meanings and abstract concepts that are communicated by images of the picture” (Shatford 1986, 45). (pag.286)

Rafferty and Hilderley (2005) proposed a “levels of meaning” indexing template for still images, which contains the following levels:

A1: biographical: information about the image as a document, such as title, date, artist,

A2: structural contents: significant objects and their physical relationship with the picture,

B1: overall content: overall classification of the image, type of image,

B2: object content: classification of each object in the image (defined in A2),

C1: interpretation of whole image: overall mood; words or phrases to summarize the image,

C2: interpretation of objects: mood of individual objects (when relevant).

The higher levels of meaning (C1, C2) are similar to Panofsky’s iconological level, and the lower levels (A2, B1, B2) are similar to Panofsky’s first two levels or Shatford’s ofness and aboutness. (pag.287)

Previous studies show that political cartoons are difficult to index because they have a subjective nature, and indexers may fail to understand the content of a cartoon or may interpret its content subjectively. (pag.287)

Previous literature indicates that political cartoons are difficult to index because they have a subjective nature, and indexers may fail to understand the content of a cartoon without the knowledge of history, politics, culture, and visual literacy. This study aims to investigate the indexability of historical, political cartoons, and the variables that affect the indexing results. (pag., 292)

Rafferty (2011) asked the question of whether the preferred meaning of an image is determined and controlled by the encoder or whether the meanings(s) might be ambiguous, fluid, and open to interpretation by the readers. (pag.292)

The proposed indexing scheme includes four general description fields, five more subjective, historical/sarcastic description fields, and an all-inclusive comprehensive field. Inter-indexer consistency on some fields is statistically significantly different from the others. On average, the four general description fields have higher inter-indexer consistency than the five historical/sarcastic description fields.

The higher inter-indexer consistency in the general description fields indicates that those fields are easier to index than the historical/sarcastic fields, therefore, the differentiation of general description fields from historical/sarcastic description fields may help to increase the index-ability of the cartoons. (pag.293)

These findings can be useful to find a feasible approach to indexing historical, political cartoons. The basic objective cataloging fields can be filled by a professional indexer in a cartoon library or museum. Indexing the subjects and other subjective fields can be open to multiple indexers in order to provide a higher recall in cartoon retrieval. However, hiring multiple indexers to index one cartoon can be expensive. Rafferty and Hilderley (2005) proposed the democratic indexing approach as an alternative, as it allows users to record their private indexes for retrieval.

This approach is similar to collaborative tagging, which has economic advantages (Macgregor and McCulloch 2006). Collaborative indexing can be done by users, thereby “reducing the potential costs associated with the indexing performed by the intervention professionals” (Ménard and Smithglass 2012, 301). However, Rafferty’s (2011) study suggests that leaving image annotation and indexing solely to users could lead to the loss of historically contingent information over time unless conscious efforts are made to preserve it. Furthermore, the findings of our pilot study imply that the indexing of historical, political cartoons should be limited to knowledgeable users who have the historical, political, and cultural knowledge of the persons and events depicted in the cartoons.

This would require a validation of the user’s qualification (such as membership of a historical, political association in an online information system), and intervention of a professional indexer. The professional indexer, and the less knowledgeable users, can index the general description fields, whereas the historical/sarcastic description fields can be open to the more knowledgeable users for indexing. Some cartoons are harder to interpret, and hence index, than others, so the professional indexer can invite more knowledgeable users to index certain cartoons. The indexer will then approve the user-generated index, in order to preserve historically contingent information and prevent purposeful pollution of the index.

This approach can be called mediated collaborative indexing. Once the user-generated index is collected and approved, the professional indexer can also add controlled vocabularies to improve retrieval effectiveness (Muddamalle 1998). For instance, controlling the various forms of a person’s names (e.g., President Roosevelt, Teddy Roosevelt, Theodore Roosevelt) may increase recall. (pag. 293)

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Konkova, Elena , Göker, Ayşe, Butterworth, Richard, and MacFarlane, Andrew. Social Tagging: Exploring the Image, the Tags, and the Game. Knowledge Organization. 41(1), 57-65. 21 references.

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Abstract: Large image collections on the Web need to be organized for effective retrieval. Metadata has a keyrole in image retrieval but rely on professionally assigned tags which is not a viable option. Current content based image retrieval systems have not demonstrated

sufficient utility on large-scale image sources on the web, and are usually used as a supplement to existing text-based image retrieval systems. We present two social tagging alternatives in the form of photo-sharing networks and image labeling games. Here we analyze these applications to evaluate their usefulness from the semantic point of view, investigating the management of social tagging for indexing. The findings of the study have shown that social tagging can generate a sizeable number of tags that can be classified as interpretive for an image, and that tagging behaviour has a manageable and adjustable nature depending on tagging guidelines.

Fichamento

A large quantity of social media data (text, audio, video, images, etc.) is uploaded to the web constantly, due to the popularity of digital photo cameras, mobile phones (with cameras) and social networks. Images used to be managed and categorised by librarians and archivists, amongst others. However, professional keyword assignment is too time-consuming to be used effectively on large image collections available on the web. Although a number of content-based image retrieval systems have been launched, they have not demonstrated sufficient utility on large-scale collections like the web. These systems are usually used as a supplement to existing context-based (or metadata-based) image retrieval systems using text, with additional functionality (e.g. search of similar images, search of specific colour scheme, etc). (pag. 58)

The main aim of this work is to investigate whether an alternative, social tagging, can efficiently provide images with semantic descriptions, and how the social tagging behaviour can be managed. The work focuses on the following research questions:

- What are the facets of image tags in a popular photosharing social network?
- How do these tag facets change in a gaming environment? and,
- Can imposing restrictions on a game along with the provision of guidelines improve the semantic description of images? (pag.58)

According to Ferecatu et al. (2008), the value of interpretive (defined below) and semantically rich keywords for image retrieval is undeniable. However, these keywords cannot be derived automatically from image content, as there is a need for an association between content low-level features (defined below) and the high-level semantic concepts behind them. This kind of reasoning can only be done by a human either through professional description of images or through image tagging in various social applications.

Image retrieval systems can be broadly categorized into two main categories: context-based and content-based (Westman, 2009). Context-based (also known as metadata, piggy-back) text-based or concept-based) image retrieval systems use text to describe the image, whereas, contentbased image retrieval (CBIR) systems employ visual features such as colour, shape, texture, object position for image description. Context-based image retrieval systems have been used since late 1970s, and are still the predominant method used for image search. They are known to be more efficient and accurate, and are based on assigning metadata to images. Content-based image retrieval (CBIR)

is an alternative to a context-based approach, as it does not involve text to describe images. It focuses on low-level features (colour, texture, and shape) in an image. However, they are unable to retrieve high-level features such as subject and meaning, which are of primary importance in image search. The discrepancy between low-level visual features and high-level semantic concepts is often referred to as the problem of the semantic gap (Eakins and Graham 1999; Sawant et al. 2010).

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An online object can have multiple tags, and objects with the same tags can be grouped together, with the tags themselves being used to create a folksonomy (GordonMurnane 2006). The term folksonomy was coined in 2005 by information architect Thomas Vander Wal by combining the words “taxonomy” and “folk” (Dye 2006). Folksonomies can be of two types: the first is a broad folksonomy, which is created by assigning various tags to the same content by different users; the second type is called a narrow folksonomy, where users tag their own content for future retrieval and sharing (Dye 2006). Probably the best known example of a photo-sharing environment is Flickr.

Tagging, comments and rating used in this and other systems have a huge impact on image description. Flickr predominantly addresses ‘findability’ within personal content (Dye 2006). Although Flickr is more about narrow folksonomy, where creation of metadata is the business of the person who posts the image, it also has social groups collecting tag specific photos. This is called “tagography.” (pag.59)

In order to analyse tags, it is necessary to understand image attributes—features that can include visual, as well as spatial, semantic or emotional characteristics (Jorgensen 1996). There are many frameworks for classification of image attributes. Some of them are oriented towards indexing (Jaimes and Change 2000), some towards searching (Chung and Yoon 2011), and some combine both, concentrating on image descriptions which can be both search terms and indexing terms (Jorgensen 1996; Westman 2009). (pag. 60)

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For tag analysis we have chosen the following classification method. The coding of tags was done in two steps. First of all, tags were assigned to the following levels of image attributes: 1) metadata features, 2) primitive features, 3) visible general objects, and 4) semantic features (see table 1). Then, as the Level 4 (semantic tags) is of primary interest for this work, tags which fell into this category were analysed according to further facets: who, what, where and when. The coding system was initially tested on a sample set of descriptive words.

The chosen classification scheme is derived from the literature and corresponds to existing frameworks (Jaimes and Change 2000; Jorgensen 1996). Table 1 compares it to the classification used with Jorgensen's framework. It contains levels of non-visual, visual and conceptual information. The main difference is that this classification consists

of four levels, splitting visible objects from the interpretations of visible objects (people vs. family or friends). It is similar to Jorgensen's (1996) division of image attributes into perceptual and interpretive groups. The term "perceptual" refers to things in the image e.g. person, ship, beach, whereas the 'interpretive' term refers to a subjective view of what is happening in the image e.g. person laughing, having a good time, being sad, etc. This differentiation will help to evaluate the significance of interpretive attributes for image description in contrast to perceptually visible objects that could be indexed by automatic indexing algorithms. The derived image attributes' levels are listed below:

Level 1 – non-visual metadata features: contain information about the author of the image, creation/upload date, photo camera characteristics, etc.

Level 2 – primitive syntactic features: are the basis for CBIR systems and include colours (yellow, green, hue, saturation, brightness), shapes (round, triangle) and textures (a texture of a tissue, bricks, orange peel).

Level 3 – visible objects/people on the image: are usually generic in nature (ball, chair, child).

Level 4 – semantic (conceptual) features: involve interpretation of the meaning and the purpose of the visual features (see below).

As the primary interest of this work is the influence of social tagging on bridging the semantic gap, Level 4 tags are analysed in more detail. Based on a combination of Enser et al. (2007) and Sawant et al.'s (2010) definitions of semantic levels, Level 4 tags are divided into four groups:

– Who: Who is portrayed on the image? The facet includes specific naming of people (John, Michael Jack son), general naming of professions (lawyer, businessman) and the naming of people's groups (family, couple, crew).

– What: What does the picture portray? The facet deals with visual semantic interpretation (gift, education, football, etc), aesthetical and emotive features (cute, sexy, happy, etc).

– When: When is the picture taken? This facet identifies person-specific (birthday), community-specific (New Year, Second World War), global events (swimming, skiing, cooking, etc.), time with no direct visual presence presented as natural values (night, autumn, etc.), artificial values (year, week, era), and specific values (1st January, 2011, 8:15 am, etc).

– Where: Where is the picture taken? This facet is associated with “geographically-grounded places” (London, Brazil, etc) and “non-grounded” entities (restaurant, museum, etc.) (Enser et al., 2007; Sawant, 2010).

Interestingly, in contrast to a traditional filing system of image storage, where people tend to organize their collection chronologically, Flickr users are more location-oriented. However the second refinement in both systems is event information, which in the classification system employed was assigned to the ‘what’ facet and partially, if it was a community seasonal event like Christmas or Halloween, to the ‘when’ facet. It could be argued, that online systems like Flickr or Facebook provide easier access to tagging functionality for users. However, PC applications like Picasa also offer its users the functionality to identify people.

To conclude, it should be said that most of the user assigned tags are by nature interpretive. In social networks and photo-sharing websites it is more evident, as the main purpose of these online communities is story-telling by means of pictures – hence the dominance of the interpretive category. This explains why images were described with information like place name and history, event and event participants. (pag.62)

However, due to the CBIR systems development and enhancement of object description algorithms, the need for object naming could be less important than image semantic interpretation which cannot be achieved through computer-based algorithms. Thus, in order to benefit from human input, there is a need for image tagging guidelines which prompt for more semantic, interpretive tagging. (pag. 63)

On this evidence games with a purpose (GWAP) are a useful application for image tagging, and could be used for various purposes depending on the game’s rules and winning conditions. Within unconditional gaming environments, players tend to use a balance of perceptual and interpretive image attributes. However, the limitation on words that could be used for tagging may stimulate players’ interpretive descriptions. This helps to beneficially employ human abilities – without having duplicate data that can be extracted by CBIR or automatic indexing systems. According to the results of this study, the variety of social tagging applications could satisfactorily generate semantic descriptions of images. Although photo-sharing networks support more balance in terms of semantic facets tagging, games with a purpose can be used to augment the tagging process. (pag.64)

The results of the research showed that social tagging is predominantly an interpretive activity. However, the number of perceptual tags depends on the context of image use. Photo-sharing communities mostly use images for story-telling and/or as an event diary; therefore, there is more semantic information associated with images with a prominent amount of people and location recognition, and event and activities tags. The gaming application has shown to be slightly more perceptual oriented, as visual features (colours, shapes, and distinct objects) are easier to spot and to match. However, specific guidelines

can influence the game's outcome in order to obtain a given result (or more particular types of tags). This shows that social tagging is a manageable process, but this does to some extent depend on the taggers' understanding of the image use and on the nature of the tagging environment. It is also seen from the study that games are more oriented towards describing 'what' in an image, while photosharing social networks present a more balanced picture of semantic facets (what/where/when/who). It would be useful to analyse whether person, place and time recognition is needed and achievable through GWAP. (pag. 64)

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Ménard, Elaine and Dorey, Jonathan. TIIARA: A New Bilingual Taxonomy for Image Indexing. Knowledge Organization. 41(2), 113-122. 46 references.

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Abstract: This paper presents the final phase of a research project that aims to develop a bilingual taxonomy (English and French) for the indexing of ordinary digital images. The objective of this last stage was to ask a representative sample of image searchers to complete retrieval tasks of images indexed using the new taxonomy TIIARA to measure its degree of effectiveness and efficiency. During this experiment, a sample of 60 participants were asked to indicate where in the taxonomic structure they thought they would find each one of the 30 images shown. Respondents also completed a questionnaire intended to obtain their general opinion on TIIARA and to report any difficulties encountered during the retrieval process. The quantitative data was analyzed according to statistical methods, while the content of the open-ended questions was analyzed and coded to identify emergent themes. The findings of this ultimate phase of the research project indicated that, despite the fact that some categories still need further refining, TIIARA already constitutes a successful tool that provides access to ordinary images. Furthermore, the bilingual taxonomy constitutes a definite benefit for image searchers who are not very familiar with images indexed in English, which is still the dominant language of the Web.

Fichamento

Others argue that, given their versatile nature, images can only be well represented using the maximum freedom offered by uncontrolled vocabularies (Matusiak 2006; Svitlia and Jörgensen 2009). (pag. 114)

Text-based image indexing and retrieval have been studied extensively over the years (Panofsky 1955; Krause 1988; Markey 1988; Armitage and Enser 1997; Jörgensen 1998, 2003; Markkula and Sormunen 2000; Conniss et al. 2000; Conniss et al. 2003; Goodrum and Spink 2001; Choi and Rasmussen 2002, 2003; Matusiak 2006; Enser et al. 2007; Enser 2008; Greisdorf and O'Connor 2008; Ménard 2008; Rorissa 2008; Chung and Yoon 2009; Svitlia and Jörgensen 2009; Benson 2011). These studies describe the considerable amount of work that accompanies image organization. (pag. 114)

One of the main problems acknowledged in the pertinent literature is the subjectivity inherent to the very nature of images (Shatford 1986). The choice of vocabulary can, of course, reduce the possibilities of indexing inconsistency. Traditionally, image indexing has been done with controlled vocabulary not necessarily created for the specific nature of the images, with a resulting inconsistent degree of precision. For example, Library of Congress Subject Headings (LCSH), Getty's Art & Architecture Thesaurus (AAT) and the Thesaurus for Graphic Materials (TGM) constitute interesting alternative controlled vocabularies because they are universal enough to be useful for almost all types of images.

If most TIIARA categories and subcategories seem intuitive and comprehensible for most participants, it is a different story for the “Abstract Ideas” category, which continued to cause difficulty for image searchers as it did for indexers during the indexing process. Even if few images were indexed with a term extracted from that category (Ménard 2013), this category includes terms that refer to a different level of description, that is, the iconological level identified by Panofsky (1955). Panofsky distinguished three levels of subject matter or meaning: preiconographical description, iconographical analysis and iconology. Preiconographical description relates to everyday objects and events and requires no specialist knowledge. Iconographical analysis deals with images, stories and allegories for which knowledge of specific themes or concepts is needed. Describing an image at the third level (iconology) necessitates interpretation of the “intrinsic meaning or content.” It seems that participants encountered difficulty looking for images with that specific category or did not even browse that category at all.

As observed by several studies (Jørgensen 1998; Hollink et al. 2004), users still favour conceptual image description compared to perceptual or iconographic description.

This observation is important and leads to the possibility that “Abstract Ideas” could be removed from TIIARA since it is proven to be difficult to use for indexing (Ménard 2013) and almost ineffective for image retrieval. However, before permanently removing that category from TIIARA, more testing seems necessary. (pag.119)

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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.

Fichamento

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. (pag.14)

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). (pag.15)

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 Smith 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.

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. (pag.17)

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Abstract: Various kinds of knowledge organisation, such as thesauri, are routinely used to label or tag multimedia content such as images and music and to support information retrieval, i.e. user search for such content.

In this paper, we outline why this is the case, in particular focusing on the semantic gap between content and concept based multimedia retrieval. We survey some indexing vocabularies used for multimedia retrieval, and argue that techniques such as thesauri will be needed for the foreseeable future in order to support users in their need for multimedia content. In particular, we argue that artificial intelligence techniques are not mature enough to solve the problem of indexing multimedia conceptually and will not be able to replace human indexers for the foreseeable future.

Fichamento

A proposed solution to the problem (Rueger 2009) is to use content-based information retrieval (CBIR) methods, and index the multimedia document by its underlying low level content. For images, this would be colour, shapes, texture, etc., (Rueger 2009, 44) and for music, key, tempo, harmony, etc. (Chowdhury 2004, 302). For some applications, this

technology works well, e.g., in pattern and design matching, artwork textural analysis, trademark matching and music services such as Shazam™. However, the key problem in many applications is that these low-level features do not match high-level concepts, and, therefore, CBIR technologies have had only limited success. This problem is known as the “semantic gap”—this can be defined more formally as, quoting Enser (2008a, 537), the “rift in the information retrieval landscape between the information that can be extracted automatically from a digitized object and the interpretation that humans might place upon the object.” We argue in this paper that content-based technological solutions to multimedia retrieval are a long way off due to this semantic gap, and that knowledge organisation techniques such as thesauri will be required for many years to come (an argument developed further in section 4). (pag. 181)

TGM is a more generic scheme and covers all kinds of graphical media including photographs, prints, paintings and drawings etc. Indexers can choose terms based on objects in the image, relationships between those objects, choose broader or narrower terms, establish syntax, and refer to notes which give context of use etc. Iconclass focuses specifically on art images, providing the indexer which three general areas to choose from—abstract art, general division (religion and magic, nature, humanity) and specific divisions (history, Bible, literature). (pag.181)

Clearly this has not been totally successful to date, so what are the barriers to success in the use of AI technologies to solve multimedia indexing problems? To understand this, we need to understand the knowledge that an indexer has built up over years in the subject in which he or she is working. For example, a human indexer needs to understand the concept of “genre” in music and images, the cultural context in which they are used both in terms of space and time (e.g., a renaissance painting with an aristocratic Italian woman as the subject). The indexer needs to build up a significant body of tacit knowledge (Polanyi 1966), both in terms of the subject itself and the process of indexing (e.g., many years of engaging with renaissance literature and art to interpret Italian renaissance painting). For example, in image retrieval, the indexer needs to understand both the “of-ness” and “aboutness” of an image (e.g., what is the context for the painting of the Italian woman—who was she and why was the portrait commissioned?). This knowledge is experiential and is hard to pass on to other humans, let alone software products. (pag.182)

We turn to the use of AI techniques specifically for image retrieval as a technology which can be applied to multimedia IR. Enser (2008a) relates the failure of CBIR systems based on AI techniques to fulfil their promise, with critics in the information science community demonstrating through experimentation that users do not find low level features useful for search. Commercial systems that proposed using such an approach have failed to make any headway as a result. A focus on the more semantic aspects of the content (Enser 2008a) has proved to be problematic also as some concepts in an image are intrinsic to it and are not physically present (e.g., a picture of a politician involved in an election—the politician is identifiable, but the concept of an election is more difficult to detect). Technologies which detect these intrinsic concepts, or their

aboutness, do not currently exist—this is the core problem in the field (see examples above). The use of ontologies has been proposed, but this requires significant user input to build the ontology and does not get us nearer to the process of automating indexing of an image without human intervention. As (Enser 2008a, 539) argues:

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