Images in Social Media

Categorization and Organization of Images and Their Collections

Synthesis Lectures on Information Concepts, Retrieval, and Services

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Images in Social Media

Categorization and Organization of Images and Their Collections

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SYNTHESIS LECTURES ON INFORMATION CONCEPTS, RETRIEVAL, AND SERVICES #62

ABSTRACT

This book focuses on the methodologies, organization, and communication of digital image collection research that utilizes social media content. ("Image" is here understood as a cultural, conventional, and commercial—stock photo—representation.) The lecture offers expert views that provide different interpretations of images and their potential implementations. Linguistic and semiotic methodologies as well as eye-tracking research are employed to both analyze images and comprehend how humans consider them, including which salient features generally attract viewers' attention.

This literature review covers image—specifically photographic—research since 2005, when major social media platforms emerged. A citation analysis includes an overview of co-citation maps that demonstrate the nexus of image research literature and the journals in which they appear. Eye tracking tests whether scholarly templates focus on the proper features of an image, such as people, objects, time, etc., and if a prescribed theme affects the eye movements of the observer. The results may point to renewed requirements for building image search engines. As it stands, image management already requires new algorithms and a new understanding that involves text recognition and very large database processing.

The aim of this book is to present different image research areas and demonstrate the challenges image research faces. The book's scope is, by necessity, far from comprehensive, since the field of digital image research does not cover fake news, image manipulation, mobile photos, etc.; these issues are very complex and need a publication of their own. This book should primarily be useful for students in library and information science, psychology, and computer science.

KEYWORDS

images, social media, image tags, academic image domains, image facets, image indexing, image guidelines, image retrieval, image literature review, PRISMA, Grounded Theory, eye-tracking, salient image features, test image templates, image citation analysis, image management, text recognition, image literacy

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Preface

Social media has focused much on pictures since its inception in 2005, and the amount of images on social media is overwhelming. It is impossible to be certain, but the number of images on social media can be counted in the billions. According to Search Engine Watch (2016), approximately 80 million images are uploaded every day to Instagram alone. What can be done with this titanic number of images? Do we strive for systems that can provide us with systematic access to all available images? Or, are we working toward systems where only a fraction of the available images is also retrievable?

Before the invention of social media, most research literature was concerned with classification schemes and their utilization for indexing and retrieving images as well as the improvement of these systems. Digitization of images began in the 1980s, and apart from storage problems that were resolved in the 1990s, the emphasis was on the amendment of taxonomies and on offering pictures in different sizes, where thumbnail recognition was frequently used because it provides a quick overview of many images. Query by Image Content (QBIC) is an approach that researches ways to extend and improve query methods for image databases. QBIC allows queries on large image and video databases based on example images, user-constructed sketches and drawings, selected color and texture patterns, camera and object motion, and other graphical information. However, none of these approaches have been successful solutions, although they have led the way for today's achievements.

After the launch of social media, experts realized that they could now test various indexing and retrieval methods in a new and cheap fashion using social networks, where they distinguish between controlled indexing based on classification techniques and uncontrolled indexing labeled tags. Several network providers use the successor to QBIC, known as Content-Based Image Retrieval (CBIR), where the contents are color, shape of a particular region in the picture, and texture features. However, these aspects only cover factual information. A picture can have different interpretations and meanings to different people even within the same domain, and the description and retrieval may depend on the user's situation and the research questions the scholar is facing. These interpretations, meanings, and descriptions need to be clarified before digitization.

In this book, we focus on what has been studied by academics and published in research papers concerning images in the digital age. We present a citation analysis to illustrate on which background the scholars build their research and if the history of image studies hamper new digital approaches. In the 1930s, groundbreaking research on eye movements and the connection between visual stimuli and cognitive processes was conducted. This research investigated users' areas of inter-

ests, i.e., measuring where the users' eyes dwell for a longer period of time on an image. Eye movement research still can offer a deeper understanding of our cognitive processes while also showing promising results in identifying the semantic structure of images by analyzing eye movements. Big data is available and data is important; however, data must be used with a strategy, and our smartest machines are still blind, so to take a picture is not the same as seeing a picture. We have to teach the computer to see like a human, which is more than factual CBIR. We want the computer to understand context and semantics from both the images and natural language synthesis, e.g., to dissect images into drops of similar colors and then use these drops as words of a visual vocabulary, i.e., automatic image indexing.

The target audience for this book is students in library information science, psychology, and computer science, but it is also relevant for people working in various fields and the interested non-professional who wishes to have up-to-date knowledge of photographic research.

Susanne Ørnager and Haakon Lund
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Abbreviations

AAT = Art & Architecture Thesaurus
AHCI = Arts and Humanities Citation Index
AOI = Areas of Interest
CBIR = Content-based Image Retrieval
CCO = Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images
COCO = Common Objects in COntext
CoPhIR = Content-based Photo Image Retrieval
DCNN = Deep Convolutional Neural Networks
DLP = Deep Learning Paradigm
FGC = Flickr General Collection
GT = Grounded Theory
HOPR = Hierarchy for Online Photograph Representation model
IPTC = International Press Telecommunications Council
IR = Information Retrieval
LC = Library of Congress
LCP = Library of Congress's Photo-stream
LCSH = Library of Congress Subject Headings
LIS = Library and Information Science
LISA = Library and Information Science Abstracts
LISTA = Library, Information Science, and Technology Abstracts
LoC = Library of Congress
MIR = Music Information Retrieval System
PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses Guidelines
SAM = Self-Assessment Manikin
SCI = Science Citation Index
SD = Semantic Differential
SIGGRAPH =Special Interest Group on Computer GRAPHics and Interactive Techniques
SSCI = Social Science Citation Index
TED = Technology, Entertainment, Design
TGM = Thesaurus for Graphic Materials

TREC = Text REtrieval Conference
UADs = User-Assigned Descriptors
UHDL = University of Houston Digital Library