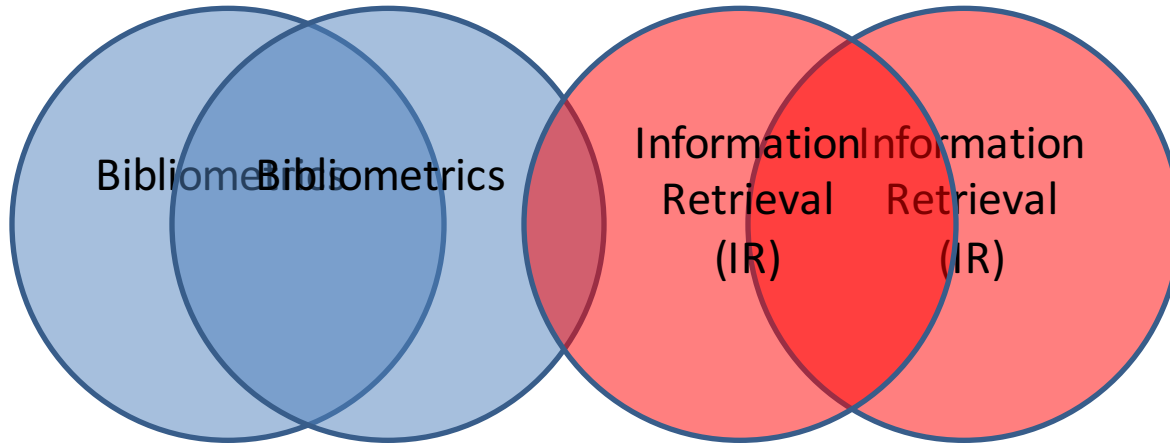


Bibliometrics & Information Retrieval Overview

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ASIST 2016

Overview

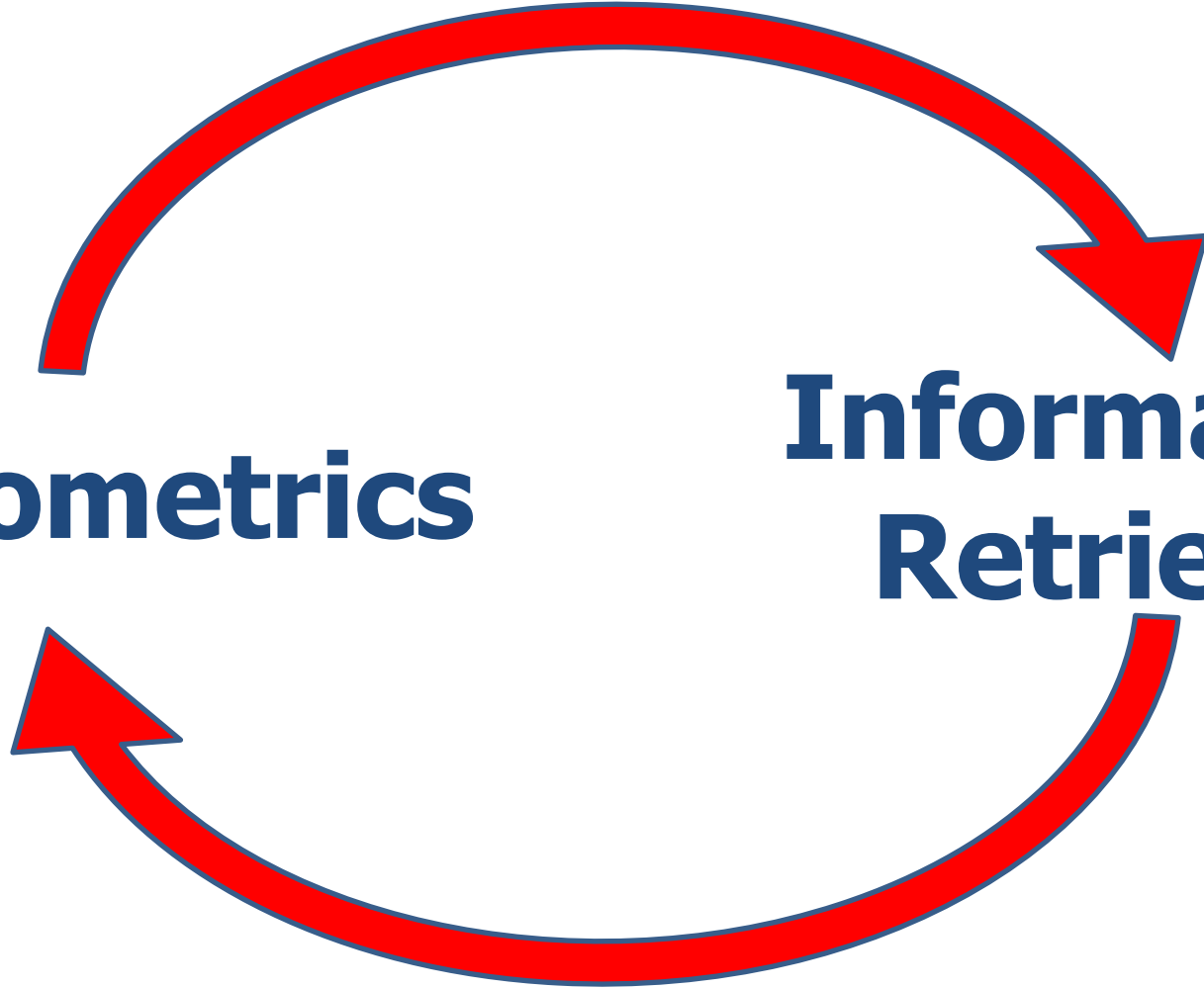


Introduction

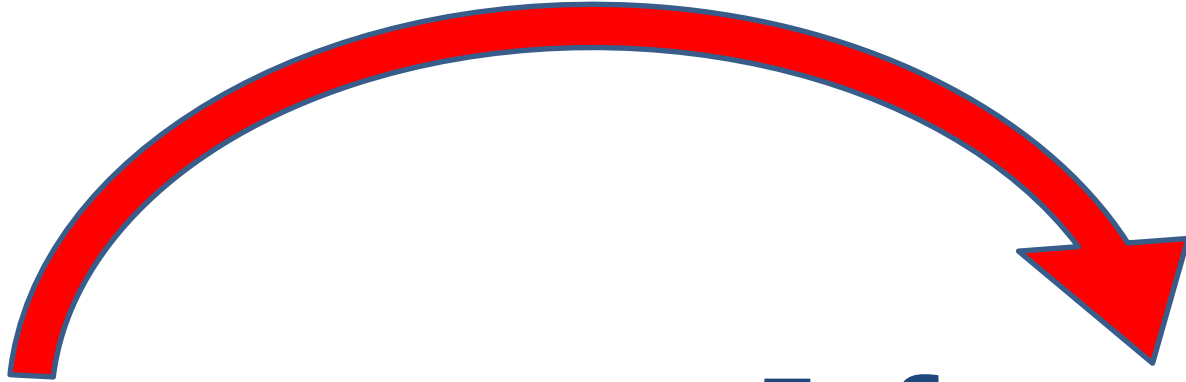
- The intersection of two key areas of information science offers many areas for research
- Recent BIR workshops demonstrate growing interest in the synergies between the two

Bibliometrics

**Information
Retrieval**

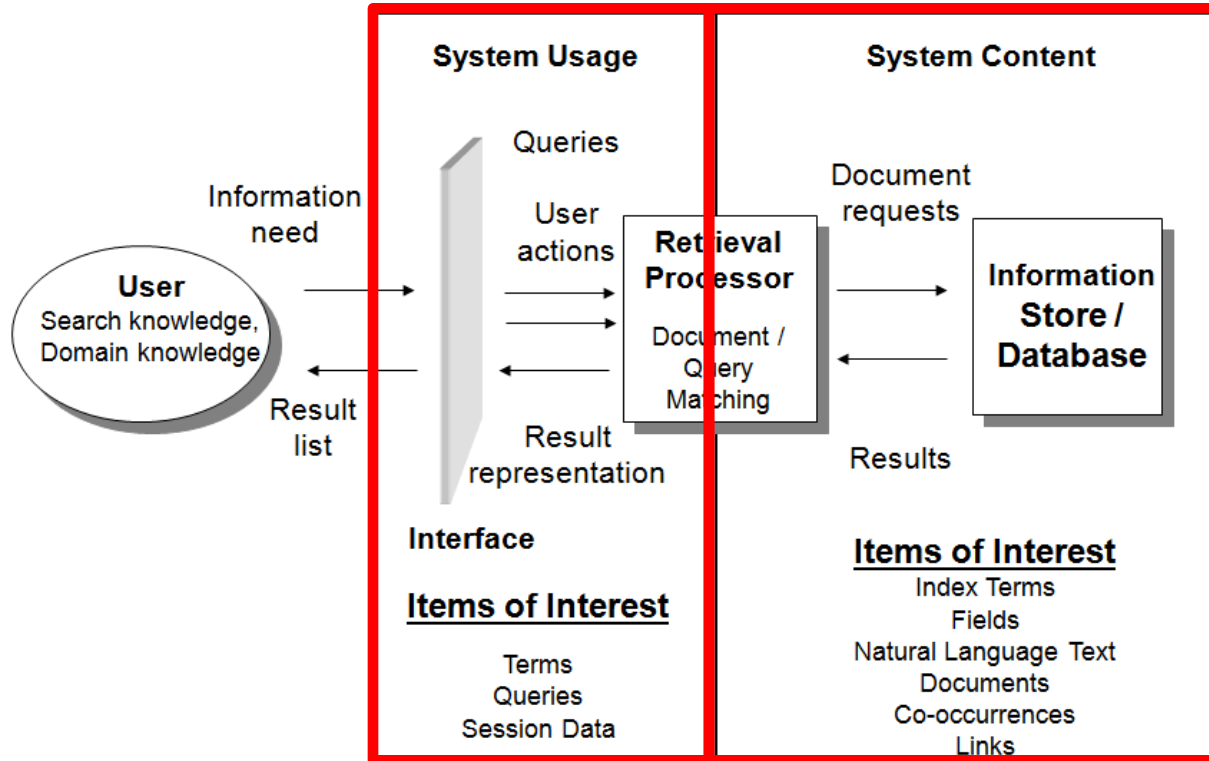


Bibliometrics



**Information
Retrieval**

IR Processes & Associated Data



Areas of Application

- **Modeling IR processes**
 - System indexing & retrieval
 - IR system simulation
- **IR & allied system design & evaluation**
 - Using graph-based approaches / link analysis (co-authorship, citations, hyperlinks)
 - Ranking results
 - Supporting browsing & expanding results

IR System Usage

- Content Use
 - Website visitation
 - Document requests
- User search characteristics
 - Terms
 - Queries
 - Sessions (search and browsing actions)

Linking Citing & Cited Documents

ProQuest

Basic Search Advanced Search Publications Browse Databases (5)

Back to results < 2 of 2,916 >

Multiview Locally Linear Embedding for Effective Medical Image Retrieval: e82409

Shen, Hualie; Tao, Dacheng; Ma, Dianfu; ... One 8.12 (Dec 2013): e82409.

Full text Full text - PDF Abstracts References

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Search with indexing terms

Subject

- Image retrieval
- Decision making
- Algorithms
- Experiments
- Principal components analysis
- More

MeSH subject

Full Text Translate Turn on search term navigation

Abstract

Content-based medical image retrieval continues to gain attention for its potential to assist radiological image interpretation and decision making. Many approaches have been proposed to improve the performance of medical image retrieval system, among which visual features such as SIFT, LBP, and intensity histogram play a critical role. Typically, these features are concatenated into a long vector to represent medical images, and thus traditional dimension reduction techniques such as locally linear embedding (LLE), principal component analysis (PCA), or laplacian eigenmaps (LE) can be employed to reduce the "curse of dimensionality". Though these approaches show promising performance for medical image retrieval, the feature-concatenating method ignores the fact that different features have distinct physical meanings. In this paper, we propose a new method called multiview locally linear embedding (MLLE) for medical image retrieval. Following the patch alignment framework, MLLE preserves the geometric structure of the local patch in each feature space according to the LLE criterion. To explore complementary properties among a range of features, MLLE assigns different weights to local patches from different feature spaces. Finally, MLLE employs global coordinate alignment and alternating optimization techniques to learn a smooth low-dimensional embedding from different features. To justify the effectiveness of MLLE for medical image retrieval, we compare it with conventional spectral embedding methods. We conduct experiments on a subset of the IRMA medical image data set. Evaluation results show that MLLE outperforms state-of-the-art dimension reduction methods.

l: e82409

One 8.12 (Dec 2013): e82409.

References 38

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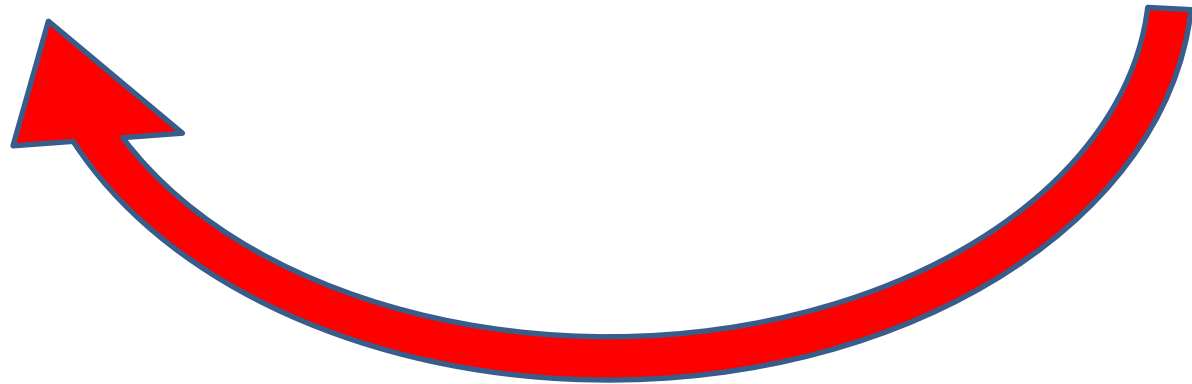
Content-based medical image retrieval continues to gain attention for its potential to assist radiological image interpretation and decision making. Many approaches have been proposed to improve the performance of medical image retrieval system, among which visual features such as SIFT, LBP, and intensity histogram play a critical role. Typically, these features are concatenated into a long vector to represent medical images, and thus traditional dimension reduction techniques such as locally linear embedding (LLE), principal component analysis (PCA), or laplacian eigenmaps (LE) can be employed to reduce the "curse of dimensionality". Though these approaches show promising performance for medical image retrieval, the feature-concatenating method ignores the fact that different features have distinct physical meanings. In this paper, we propose a new method called multiview locally linear embedding (MLLE) for medical image retrieval. Following the patch alignment framework, MLLE preserves the geometric structure of the local patch in each feature space according to the LLE criterion. To explore complementary properties among a range of features, MLLE assigns different weights to local patches from different feature spaces. Finally, MLLE employs global coordinate alignment and alternating optimization techniques to learn a smooth low-dimensional embedding from different features. To justify the effectiveness of MLLE for medical image retrieval, we compare it with conventional spectral embedding methods. We conduct experiments on a subset of the IRMA medical image data set. Evaluation results show that MLLE outperforms state-of-the-art dimension reduction methods.

Ranking Documents

- **HITS** (Kleinberg, 1997)
- **PageRank** (Page et al., 1999)
- **Hw-rank** (Bar-Ilan & Levene, 2015)
- **Bradfordizing & author centrality** (Mutschke & Mayr, 2015)
- **Article-level Eigenfactor** (Wesley-Smith, Bergstrom, & West, 2016)

Bibliometrics

**Information
Retrieval**



Reciprocal Contributions

- With growing datasets, new ways to store, process and display data are needed
- IR frameworks provide tools & approaches for -metrics researchers
 - Database design for bibliographic datasets
 - Relational & graph-based DBMSs, IR software & toolkits
 - Application of vector space & probabilistic IR models to compare data

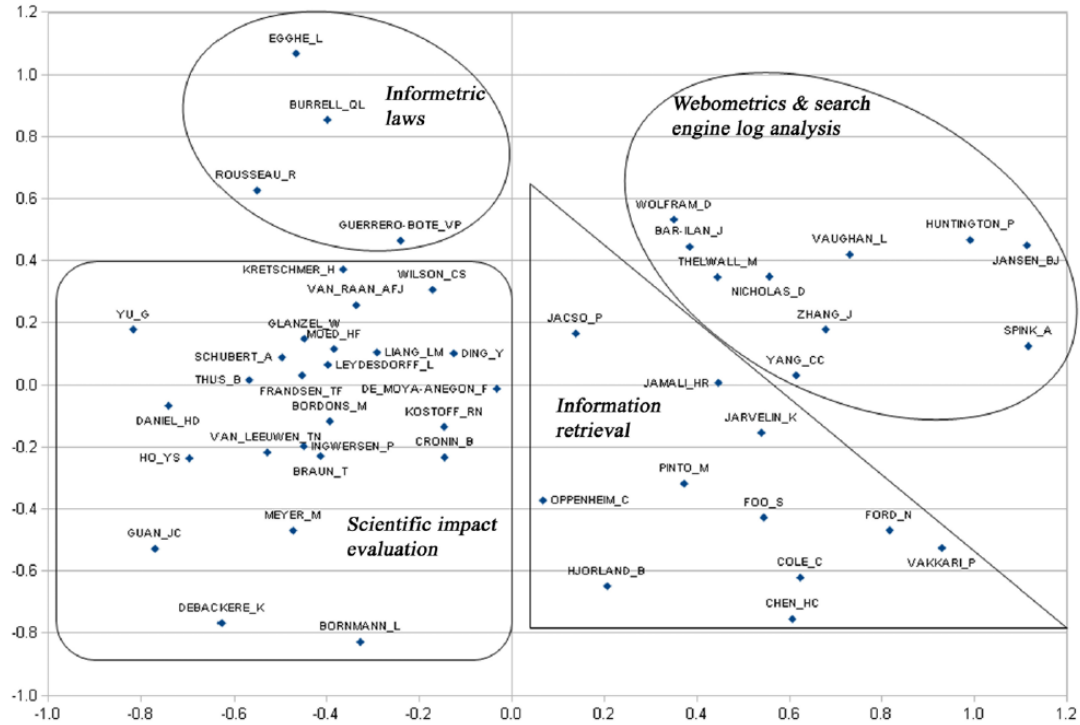
PageRank Comes Full Circle



Language-based Methods & -metrics Research

- Citations & collaborations form the foundation of traditional comparative analysis
- Downside: No link \Rightarrow No relationship
- Language can expand relationship possibilities
 - Term co-occurrence
 - Topic modeling
 - Identifying hidden patterns with text mining

Author-Topic Modeling for Author Research Relatedness



An A-T model produced more coherent groupings of prolific authors in information science than co-citation analysis

Lu, K., & Wolfram, D. (2012). Measuring author research relatedness: A comparison of word-based, topic-based and author co-citation approaches. *Journal of the American Society for Information Science and Technology*, 63(10), 1973-1986.

Text Mining

- Can be combined with bibliometric methods
 - Citation mining for user research profiling (Kostoff et al., 2001)
 - Clustering of scientific fields (Janssens, 2007)
 - Knowledge structure of bioinformatics (Song & Kim, 2013)
- Text mining techniques are integrated into some bibliometric mapping software, including
 - VOSviewer - <http://www.vosviewer.com/>
 - CiteSpace - <http://cluster.cis.drexel.edu/~cchen/citespace/>

Future Directions

- Complexities of bibliometric datasets lend themselves to IR techniques
 - Resulting “big data” require data and text processing or mining techniques to identify overt & hidden patterns
- Topic modeling and other text-based methods show great promise in providing complementary approaches to citation & co-authorship data
 - Computational overhead to train models is still high
- Need for better evaluation methods for visualization outcomes

Thank you