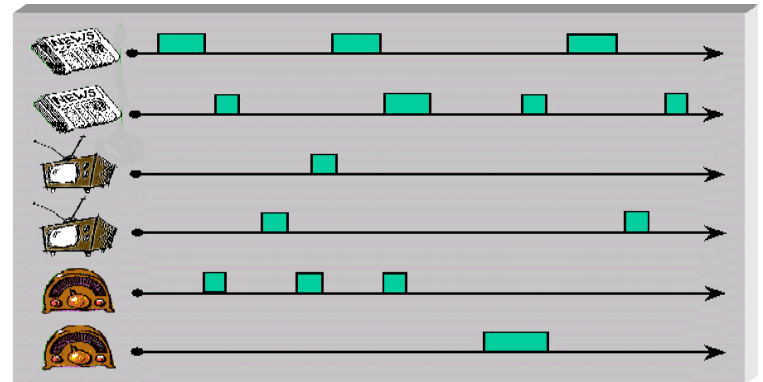


Information Retrieval and Extraction

Berlin Chen 2003



Textbook and References

- Textbook

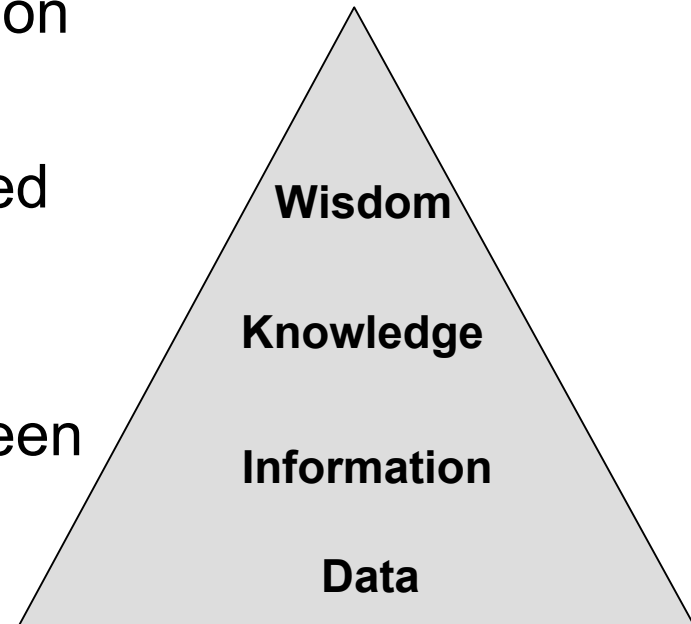
- R. Baeza-Yates and B. Ribeiro-Neto, Modern Information Retrieval, Addison Wesley Longman, 1999.

- References

- W. B. Frakes and R. Baeza-Yates, Information Retrieval: Data Structures & Algorithms, Prentice-Hall, 1992.
- A. D. Bimbo, "Visual Information Retrieval", Morgan Kaufmann, 1999.
- I. H. Witten, A. Moffat, and T. C. Bell, Managing Gigabytes: Compressing and Indexing Documents and Images, Morgan Kaufmann Publishing, 1999.
- C. Manning and H. Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.
- D. Jurafsky and J. H. Martin, Speech and Language Processing, Prentice-Hall, 2000.

Motivation

- Information Hierarchy
 - Data
 - The raw material of information
 - Information
 - Data organized and presented by someone
 - Knowledge
 - Information read, heard or seen and understood
 - Wisdom
 - Distilled and integrated knowledge and understanding



Motivation

- User information need
 - Find all docs containing information on college tennis teams which:
 - (1) are maintained by a USA university and
 - (2) participate in the NCAA tournament
 - (3) National ranking in last three years and contact information



Query



Search engine/IR system

Emphasis is on the retrieval of information (not data)

Information Retrieval

- Deal with the representation, storage, organization of, and access to information items
- Focus is on the user information need
 - Information about a subject or topic
 - Semantics is frequently loose
 - Small errors are tolerated
- Handle natural language text which is not always well structured and could be semantically ambiguous

Data Retrieval

- Determine which document of a collection contain the *keywords* in the user query
- Retrieve all objects (attributes) which satisfy clearly defined conditions in a regular expression or a relational algebra expression
 - Which documents contain a set of keywords?
 - Well defined semantics
 - A single erroneous object implies failure!

Motivation

- IR system
 - Interpret contents of information items (docs)
 - Generate a ranking which reflects relevance
 - Notion of *relevance* is most important

IR at the Center of the Stage

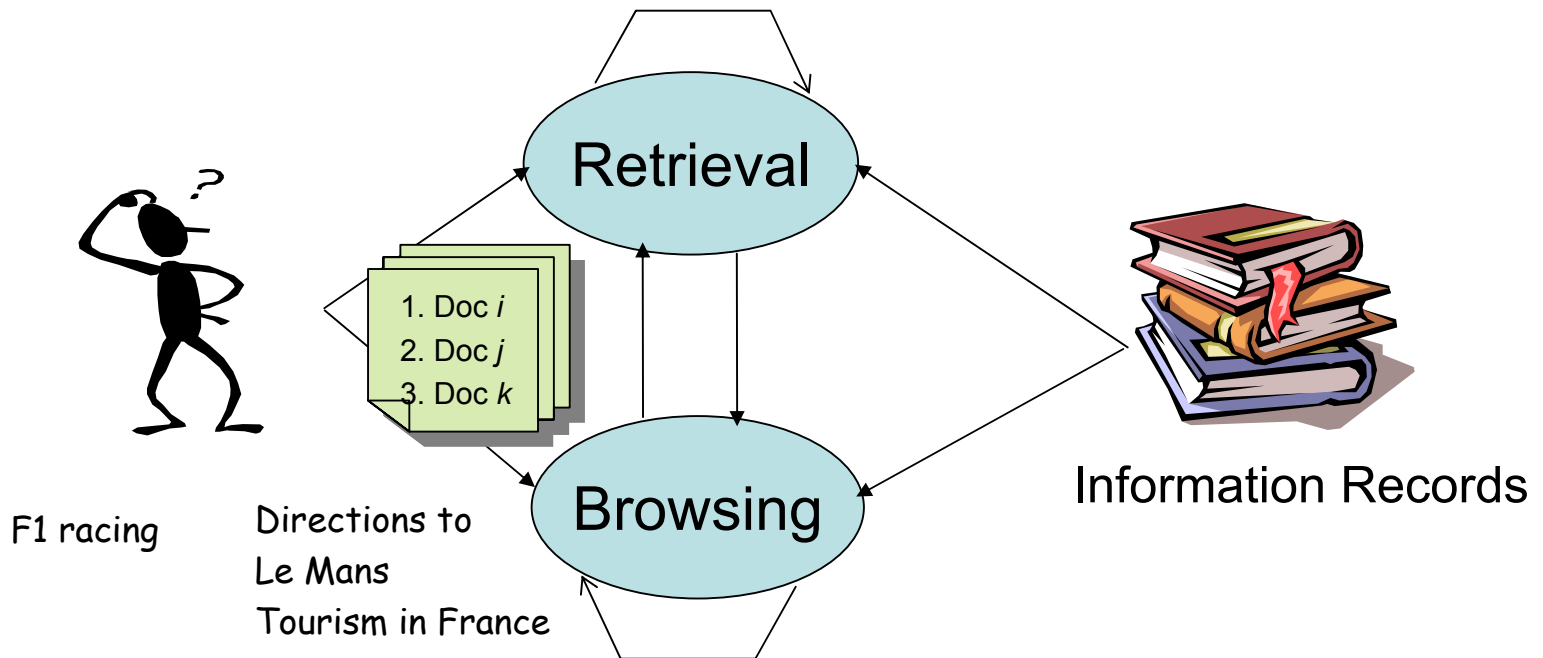
- IR in the last 20 years:
 - Modeling, classification, clustering, filtering
 - User interfaces and visualization
 - Systems and languages
- WWW environment (90~)
 - Universal repository of knowledge and culture
 - Without frontiers: free universal access
 - Lack of well-defined data model

IR Main Issues

- The effective retrieval of relevant information affected by
 - The user task
 - Logical view of the documents

The User Task

- Translate the information need into a query in the language provided by the system
 - A set of words conveying the semantics of the information need
- Browse the retrieved documents

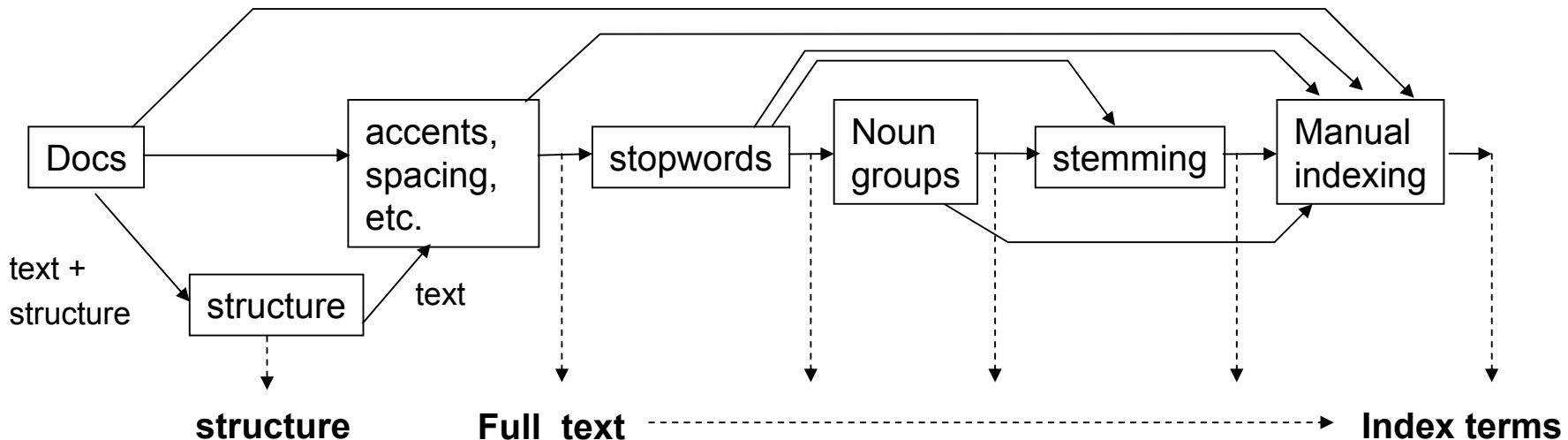


Logical View of the Documents

- A full text view (representation)
 - Represent document by its whole set of words
 - Complete but higher computational cost
- A set of index terms by a human subject
 - Derived automatically or generated by a specialist
 - Concise but may poor
- An intermediate representation with feasible *text operations*

Logical View of the Documents

- Text operations
 - Elimination of stop-words (e.g. articles, connectives, ...)
 - The use of stemming (e.g. tense, ...)
 - The identification of noun groups
 - Compression
- Text structure (chapters, sections, ...)



Different Views of the IR Problem

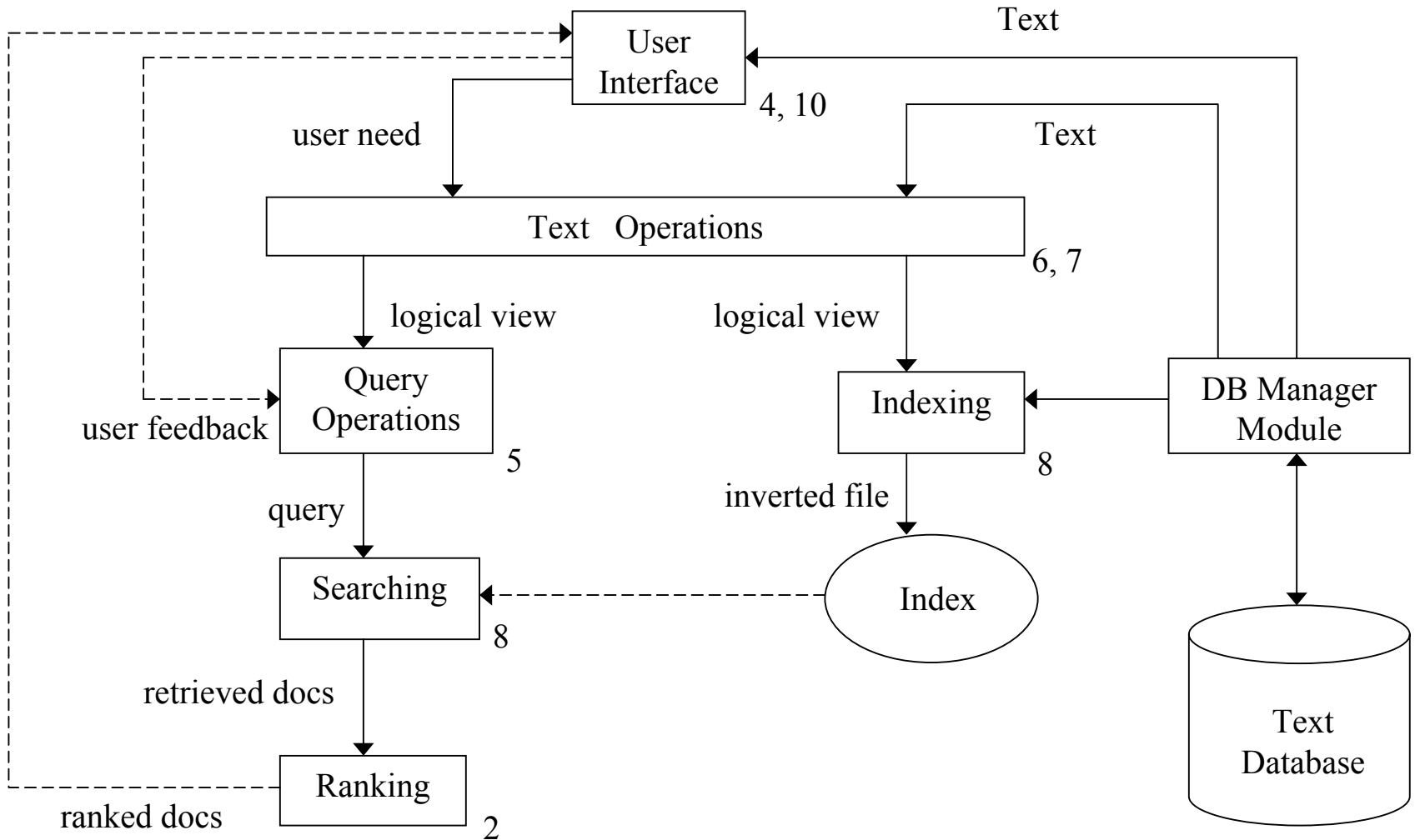
- Computer-centered (commercial perspective)
 - Efficient indexing approaches
 - High performance matching ranking algorithms
- Human-centered (academic perceptive)
 - Studies of user behaviors
 - Understanding of user needs

} Library science
psychology
....

IR for Web and Digital Libraries

- Questions should be addressed
 - Still difficult to retrieve information relevant to user needs
 - Quick response is becoming more and more a pressing factor (*Precision vs. Recall*)
 - The user interaction with the system (HCI, Human Computer Interaction)
- Other concerns
 - Security and privacy
 - Copyright and patent

The Retrieval Process



The Retrieval Process

- In current retrieval systems
 - Users almost never declare his information need
 - Only a short queries composed few words (typically fewer than 4 words)
 - Users have no knowledge of the text or query operations

Poor formulated queries lead to poor retrieval !

Major Topics

- Four Main Topics

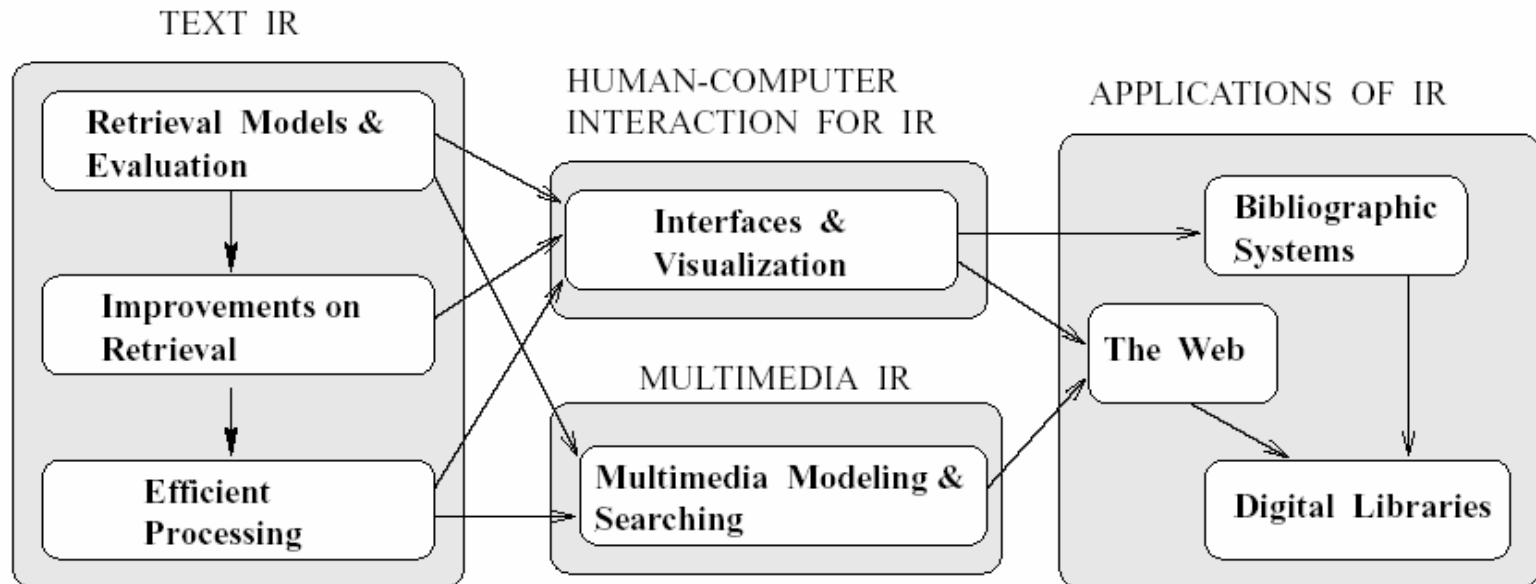
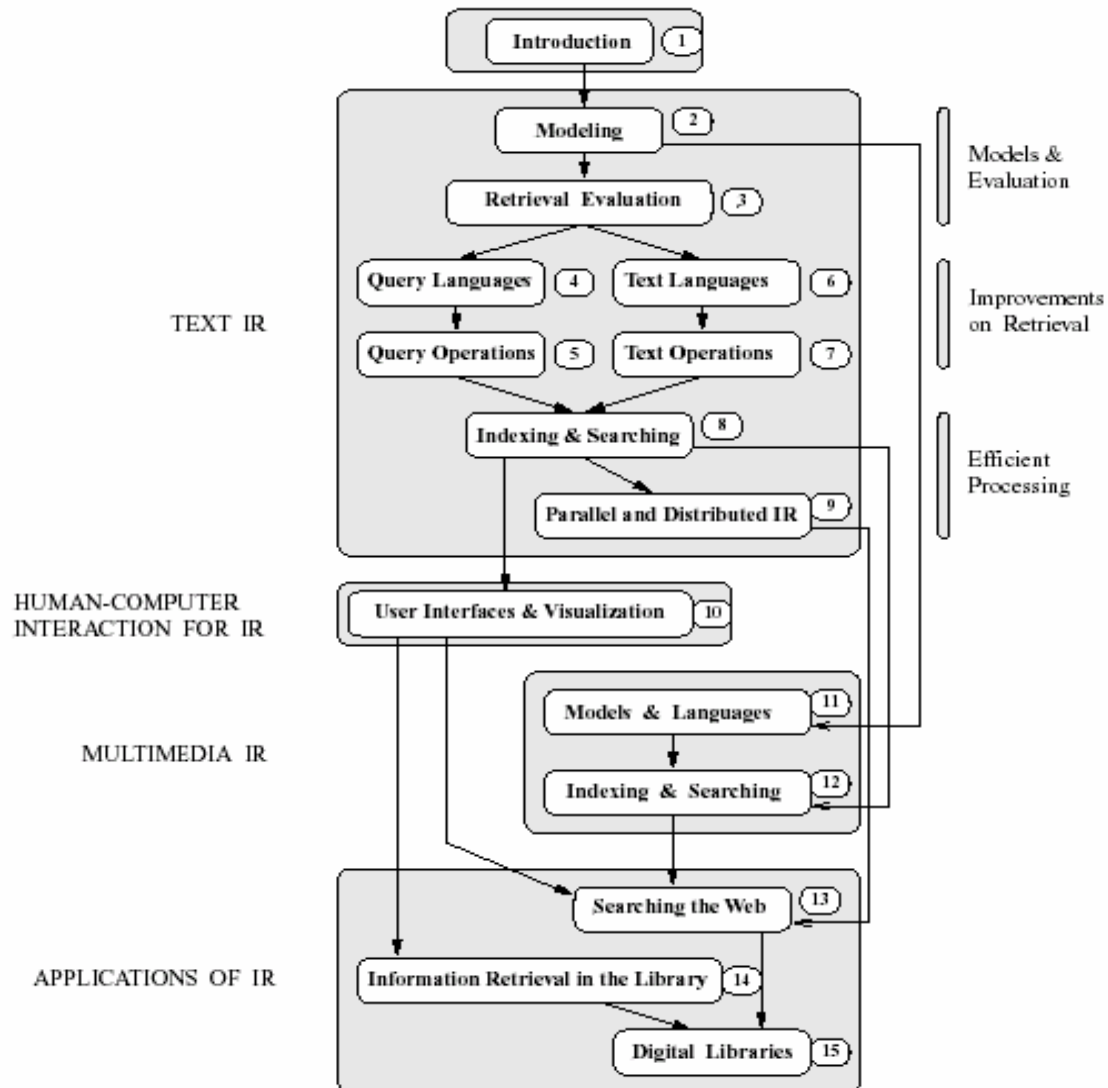


Figure 1.4 Topics which compose the book and their relationships.

Major Topics

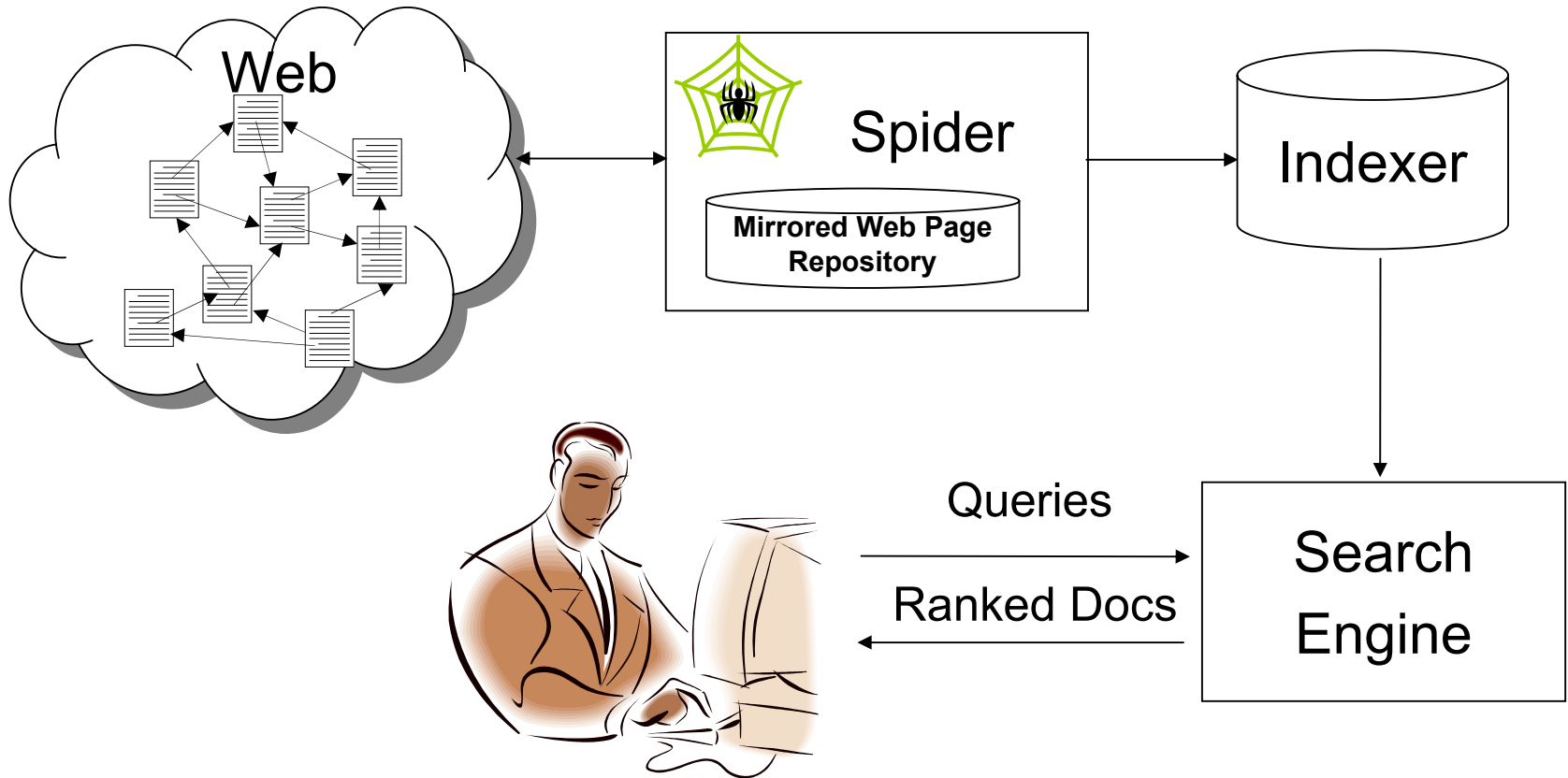
- Text IR
 - Retrieval models, evaluation methods, indexing
- Human-Computer Interaction (HCI)
 - Improved user interfaces and better data visualization tools
- Multimedia IR
 - Text, speech, audio and video contents
 - Multidisciplinary approaches
- Applications
 - Web, bibliographic systems, digital libraries

Textbook Topics



Text Information Retrieval

- Internet searching engine



Text Information Retrieval

Google 搜尋: 觀霧 - Microsoft Internet Explorer

網址 (D) TF-8&newwindow=1&q=%E8%A7%80%E9%9C%A7&sa=N&ab=iv

Google 搜尋

觀霧

搜尋所有網站 搜尋所有中文網頁 搜尋中文(繁體)網頁

已向所有網站搜尋觀霧。 共有 5,660 頁查詢結果, 這是第 1-10 頁。 搜尋共費 0.11 秒。

EbioTW-觀霧
觀霧位於新竹五峰鄉與苗栗泰安鄉交界, 雪霸國家公園範圍內, 為攀登大霸尖山必經之路, 終年雲霧繚繞, 是台灣觀賞雲霧風景的最佳景點之一。年平均溫度約 14-15 度, 冬季偶而飄雪, 夏季涼爽, 空氣清新無污染, 景色優美 ...
www.ebio2.com/ebiotw/leisure/shinjux-KuanWu.htm - 31k - 頁庫存檔 - 類似網頁

觀霧農莊
tree.2u.com.tw/ - 17k - 頁庫存檔 - 類似網頁

搜主義網檢複合式書店
· 觀霧 · 觀霧森林遊樂區 觀霧森林遊樂區位於新竹和苗栗交界處, 海拔約 2000 公尺, 區內林木茂密, 視野遼闊, 可遠眺雪山山脈的縱谷, 同時也是攀登大霸尖山的必經之地, 為近年來國內熱門的森林浴場所之一 ...
www.soidea.com.tw/soidea_model_index.cfm?CONSULTATENO=45-41k - 頁庫存檔 - 類似網頁

雪霸國家公園-觀霧遊憩區
地形特色: 在觀霧山莊、橫山步道、樂山林道等處可眺望蜿蜒曲折、岩巒高聳的聖稜線景觀。植物景觀: 橫山步道的四、五月可見高山杜鵑的綻放, 如霧社杜鵑、台灣杜鵑等, 檜山步道沿線陰濕林下或林緣可見黃花鳳凰花 ...
www.spnp.gov.tw/chinese/information/kuanwuc.htm - 7k - 頁庫存檔 - 類似網頁

Openfind Taiwan Webpage Search: 觀霧 - Microsoft Internet Explorer

網址 (D) image&Query=&QUERY=query=%C6%5B%C3%FA&ServiceID=0

Openfind 免費撥接服務 電話號碼: 40508888 使用名稱: openfind 密碼: openfind

網頁	BBS文章	新聞	分類	圖片	音樂	軟體	文件
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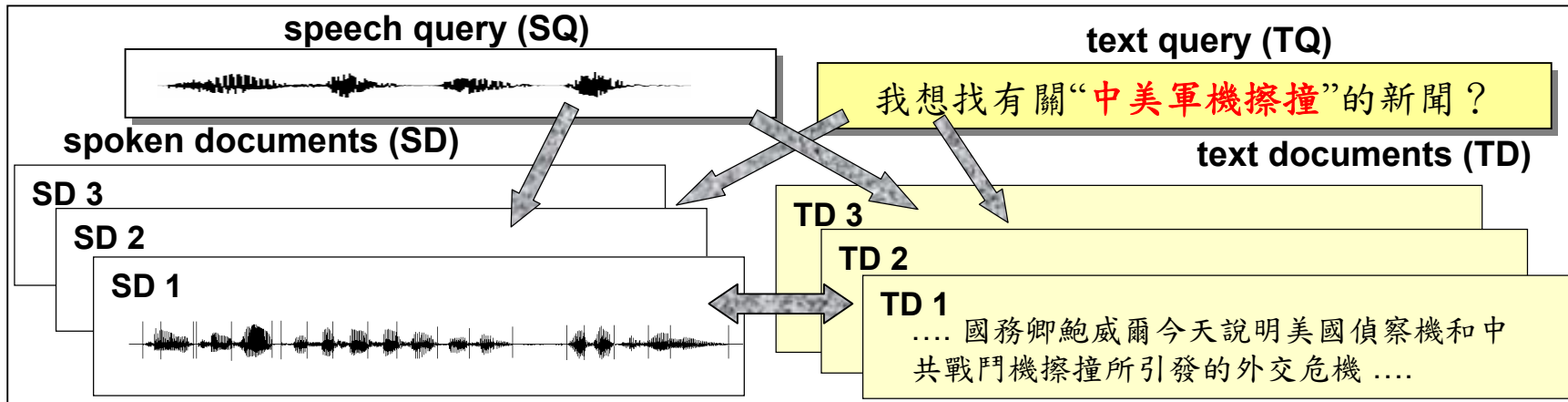
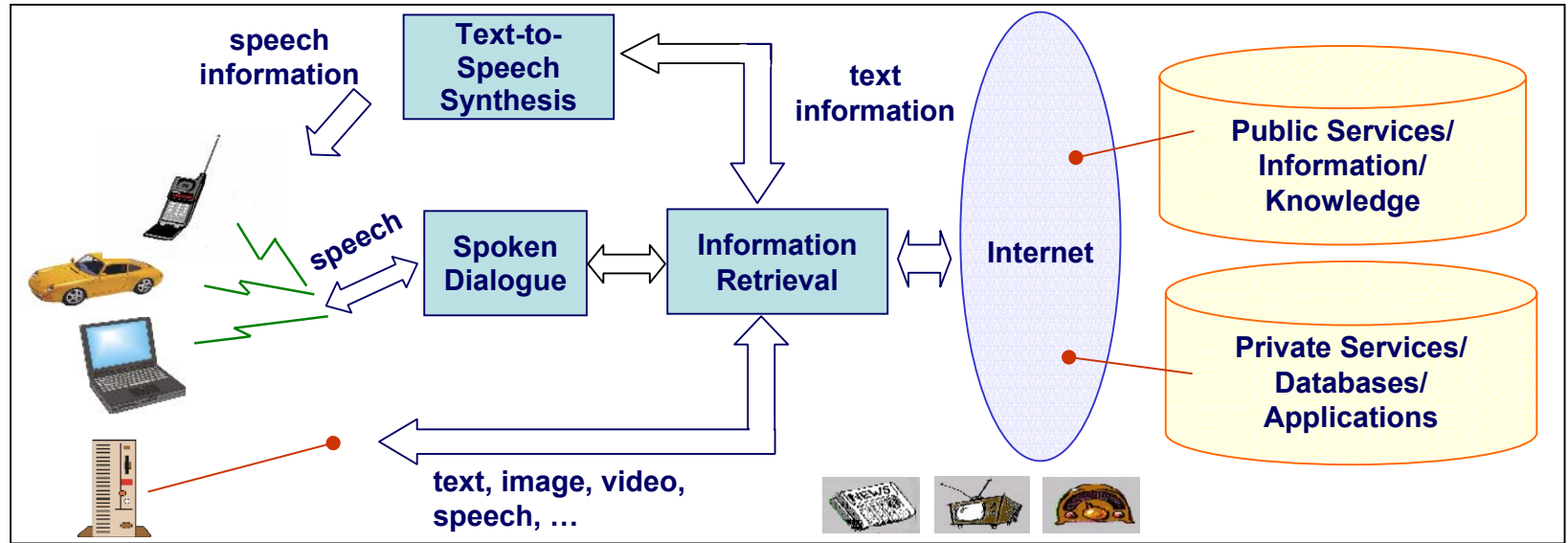
觀霧 不限日期 查詢 進階-喜好-說明

相關查詢 8 筆 · 雲霧 · 雪霸國家公園 · 大霸尖山 · 林道 · 竹東 · 觀霧山莊 · 觀霧之旅 · 觀霧農場

Openfind 找到 5,594 篇相關網頁 有效增加網站曝光

- 觀霧農莊**
介紹農莊風景及其服務項目、交通指南、住宿方式等。公司名稱: ...
<http://tree.2u.com.tw/> - 2002/12/11, 16k - [關鍵字] [更多結果]
- 瀑布谷農場**
自然休閒-擁抱山水-到雲海的舞台觀霧 | 瀑布谷農場介紹 | | 交通路線圖 | | 旅遊注意事項 | 觀霧是雲的故鄉, 景色千變萬化, 體驗大自然、賞... 農場也準備卡拉OK讓您高歌一曲。注意事項※觀霧地區日夜溫差大請多加保暖衣物, 請攜帶證件... 簡介-介紹位在雪霸國家公園觀霧的瀑布谷農場, 經營民宿、餐飲、水密...
<http://ppg2u.com.tw/> - 2002/06/04, 2k - [庫存頁面] [關鍵字]
- 觀霧雲山農場**
觀霧雲山農場位在雪霸國家公園內, 提供遊客餐飲及住宿服務。公司名稱: 觀霧雲山農場
公司地址: 新竹縣五峰鄉橫山村尾362號之1 公司電話:

Speech Information Retrieval



Speech Information Retrieval

- Compaq Research Group – Speechbot System
 - Broadcast news speech recognition, Information retrieval, and topic segmentation (SIGIR2001)
 - Currently indexes **15,588 hours of content** (2003/02/21, <http://speechbot.research.compaq.com/>)

hp.com - SpeechBot - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

← 上一頁 → 搜尋 ★ 我的最愛 媒體

網址(D) <http://speechbot.research.compaq.com/> 移至 連結 Customize Links Free Hotmail

Norton AntiVirus

hp **SpeechBot™**
audio search using speech recognition

invent

Simple Search **Power Search** **Help** > [FAQ](#) > [About SpeechBot](#) > [Feedback](#)

Search for:

Topics: Dates:

Tip: An asterisk "*" at the end of a partial word will match all words starting with the partial word (e.g. "surf*" matches "surfers", "surfs" etc.)

SpeechBot is a search engine for audio & video content that is hosted and played from other websites (listed below). **Note:** Transcripts of the content based on speech recognition are not exact.

SpeechBot currently indexes **15588 hours of content** from the following websites:

Advice Dr. Toni Grant	Government and Military AFRTS Radio News The White House U.S. Department of Defense Briefings	Science & Technology The Rapidly Changing Face of Computing
Arts & Entertainment Fresh Air	Internet Geeks in Space InternetNews Radio Streaming Media Talk	Sport Only A Game Resort Sports Network Scuba Radio The Golf Power Show
Current Events American RadioWorks Here and Now On Point PBS Online NewsHour	Paranormal Sightings on the Radio with Jeff Rense	Talk Car Talk Radio Show One Union Station Public Interest The Charlie Rose Show The Connection The Diane Rehm Show
Gardening On the Garden Line	Personal Investment Informed Investors, Inc. Radio Forum Marketplace Radio Business News Motley Fool Radio Show	

Speech Information Retrieval

- 輸入聲音問句：“請幫我查總統府升旗典禮”

中文電視暨廣播新聞檢索系統 2002v1-Berlin Chen & Lin-shan Lee

辨識 I 等待輸入指令...

測靜音 3.70秒

放音

離開

載入新聞

DIALOG KWSPT WDRecog

SYL-based CHR-based WD-based

QueryByExemplars 檢索結果之排名

	File ID	Score
<input checked="" type="checkbox"/>	[1] FTV2002_004	3.09164e-001
<input type="checkbox"/>	[2] N200201211200-01	2.11802e-001
<input type="checkbox"/>	[3] N200201091200-12	1.91467e-001
<input type="checkbox"/>	[4] N200109061200-07	1.66562e-001
<input type="checkbox"/>	[5] T200201211200-04	1.57109e-001
<input type="checkbox"/>	[6] T200201211200-04	1.53650e-001
<input type="checkbox"/>	[7] T200201211200-04	1.51319e-001
<input type="checkbox"/>	[8] N200110031200-03	1.47177e-001
<input type="checkbox"/>	[9] N200201171200-11	1.44006e-001
<input type="checkbox"/>	[10] N200105071400-02	1.41382e-001
<input type="checkbox"/>	[11] T200106191000-02	1.39268e-001
<input type="checkbox"/>	[12] N200110291200-01	1.38799e-001
<input type="checkbox"/>	[13] N200104301230-05	1.36488e-001
<input type="checkbox"/>	[14] N200109051200-05	1.33595e-001
<input type="checkbox"/>	[15] N200109141200-18	1.33158e-001
<input type="checkbox"/>	[16] N200105142000-05	1.32321e-001
<input type="checkbox"/>	[17] FTV2002-064	1.32147e-001
<input type="checkbox"/>	[18] N200201181200-11	1.31223e-001

語音辨識結果

總統府升旗典禮

Viterbi=>End_Time= 100
TotalFrame=362 1. (接受) 幫我找 8340.57 (時間) 28 100

文字檢索

語音辨識結果

FILE (Erroneous Transcription): FTV2002-004.txt

中華民國就是明年元旦總統府升旗典禮即將在下而星期二登場
而今年首度社教有民間工商團體來舉辦
新科立委金素梅將帶著實為原住民亦同高唱國歌
展現多元文化的特性有以今年的元旦升旗典禮將打破傳統方式長
經紀人龍門一千人到新竹美勞他擔任市為原住民

檢索到新聞的語音辨識結果

檢索到新聞的影音

Speech Information Retrieval

NTNU Broadcast News Retrieval System - Microsoft Internet Explorer

網址: rjda.csie.ntnu.edu.tw/SpeechIR.php?query=%BB%AB%A9%D4%B5n

NTNU Brocast News Retrieval System

搜尋詞彙: 賓拉登
共找到 90 頁相關網頁。

- ① /Word/N200109141200-25.txt audio
包庇 賓拉登 的阿富汗塔利班因為美國九一一恐怖攻擊案而再度成為全球關注焦點根據阿富汗消息塔利班表示如果美國知名 賓拉登 的罪行將考慮把 賓拉登 已從審判目前阿富汗首都喀布爾籠罩在可能遭報復的緊張氣氛下並重已經陸續拋出可獲
- ② /Word/N200110081000-05.txt audio
而 賓拉登 今天也發表的公開談話阿富汗當地電視台實況提供一卷事先錄製好的 賓拉登 談話被西方媒體 賓拉登 表示阿富汗將奮戰到底並強調美國是罪魁禍首 賓拉登 讚揚就已對美國發動的恐怖攻擊並且審慎那次攻擊是一群回教徒所謂 賓拉登 在這項錄影談話當中說美國在最軟弱的地方遭到真主的打擊墜毀的她最有名的建築物感謝真主他要求回教國家青年加入這場選戰
- ③ /Word/N200110081200-04.txt audio
錄製好的 賓拉登 談話被西方 國發動的恐怖攻擊並且審慎 到真主的打擊摧毀了他最有
- ④ /Word/N200109191200-25.txt audio
佈分子 賓拉登 台灣目前金 觸表示 賓拉登 願意回應結 的問題包括了 賓拉登 在九一 器及計畫如何使用的不過還 確定 賓拉登 目前是生十四 礙國家安全為前提擷取片段



Visual Information Retrieval

- Content-based approach

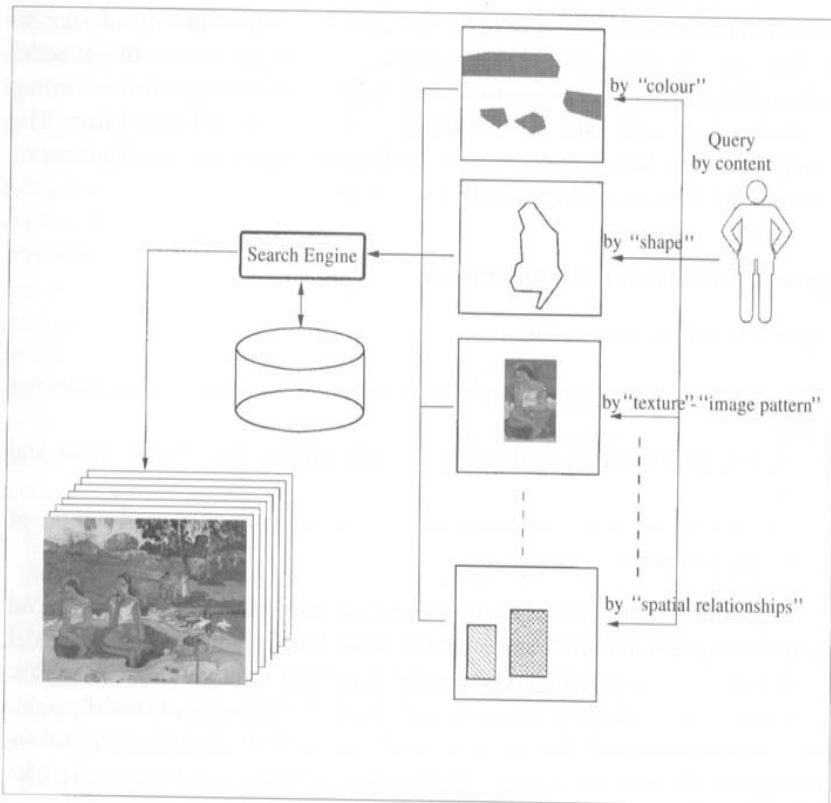


Figure 1.2 Different types of query by example.

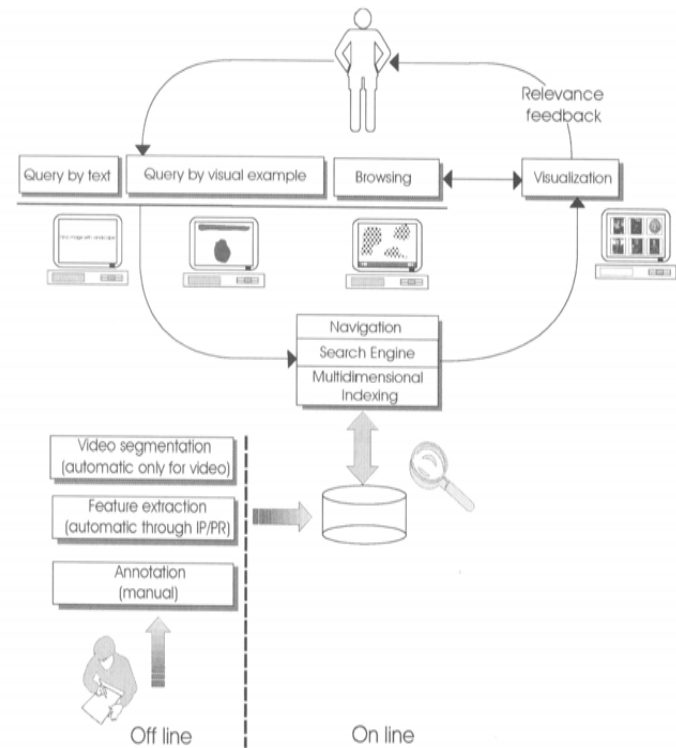


Figure 1.5 Sketch of a new-generation visual information retrieval system for video.

Visual Information Retrieval

- Images with Texts

Google 搜尋: 觀霧 - Microsoft Internet Explorer

檔案(E) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

← 上一頁 → 搜索 我的最愛 媒體

網址(1) <http://www.google.com/search?q=%E8%A7%80%E9%9C%A7> 移至 連結 Customize Links Free Hotmail

Norton AntiVirus

Google 進階圖形搜尋 使用偏好 圖形搜尋說明

Google 搜尋

Google 圖片搜尋

所有網頁 圖片 新聞群組 網頁目錄

查詢有關 觀霧 的圖片。 共有 171 項查詢結果, 這是第 1-20 項。 搜尋共費 0.26 秒。

 E2-18.jpg 149 x 203 pixels - 11k www2.hchg.gov.tw/hc_intro/ E/E2.html	 E2-25.jpg 198 x 256 pixels - 15k www2.hchg.gov.tw/hc_intro/ E/E2.html [www2.hchg.gov.tw 站內的其它相關資訊]	 雪霸 012-1.jpg 224 x 150 pixels - 8k cclab6.mcu.edu.tw/ htm/sheipa.php	 雪霸 011-1.jpg 224 x 150 pixels - 7k cclab6.mcu.edu.tw/ htm/sheipa.php [cclab6.mcu.edu.tw 站內的其它相關資訊]
	 KwangWu01.jpg 372 x 268 pixels - 25k		 family3.jpg

網際網路

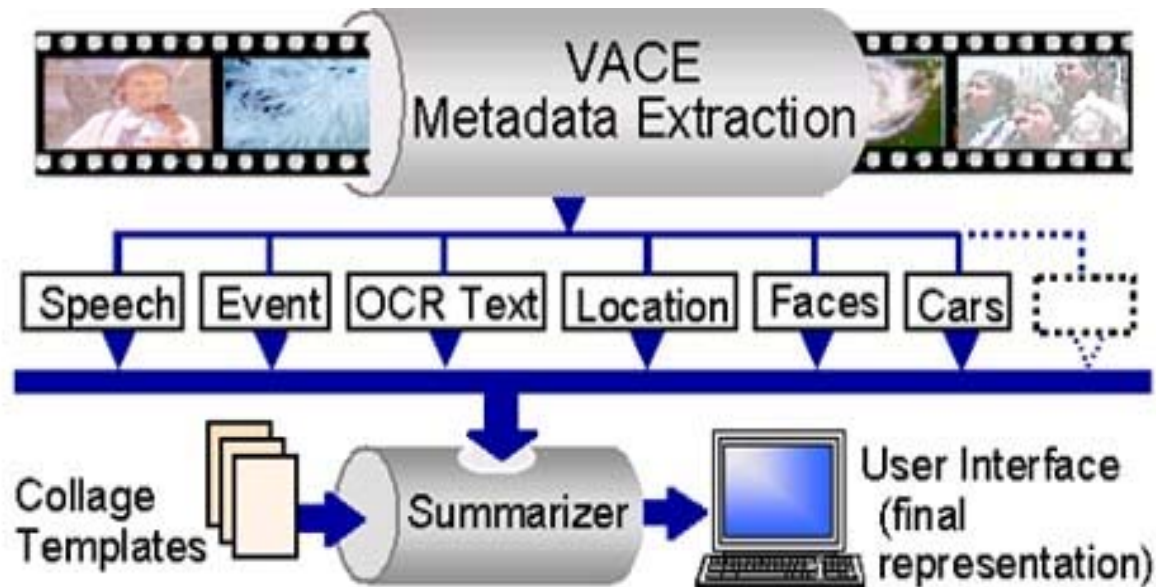
Visual Information Retrieval

- Content-based Image Retrieval

The screenshot shows a web browser window displaying a search interface for a Content-Based Image Retrieval (CBIR) system. The title bar of the browser shows standard navigation icons. The main content area features a header with the title "相似圖片互動搜尋系統" (Similar Image Interactive Search System) and "CBIR (Content-Based Image Retrieval)". Below the header, there is a "隨機產生" (Randomly Generate) button. The main display is a 3x6 grid of 18 images of various vases and pots. Each image has a "相似" (Similar) radio button selected and a "不相似" (Not Similar) radio button unselected. Below the grid, there is a pagination bar showing "共找到 100 圖片 (1-18) 頁: [1] [2] [3] [4] [5] [6]". To the right of the pagination bar, there is a prompt: "請至少選擇一個相似圖片, 按 GO 開始查詢" (Please select at least one similar image, click GO to start search). At the bottom, there is a "相似程度" (Similarity Level) dropdown menu set to "普通相似" (Medium Similarity) and a "傳回圖數" (Number of Images Returned) dropdown menu set to "100". The footer contains the copyright notice: "© 2003 新視科技 Visionnext. All Rights Reserved."

Visual Information Retrieval

Video Analysis and Content Extraction

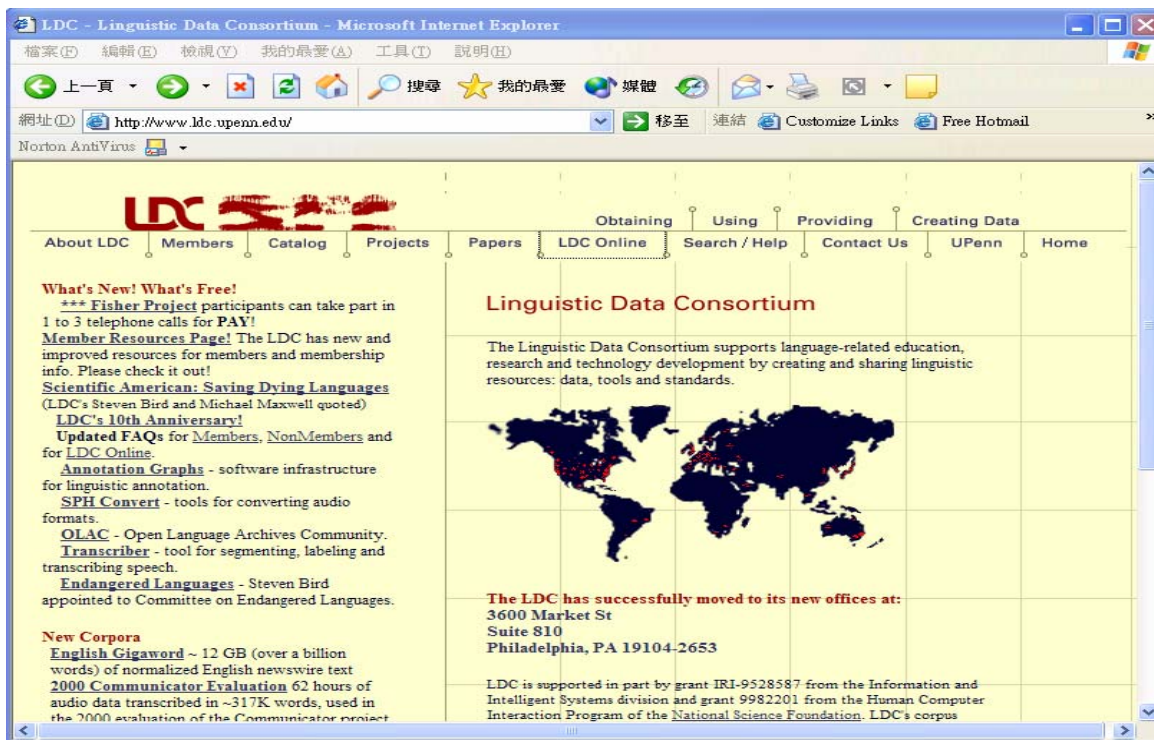


Other IR-Related Tasks

- Information filtering and routing
- Document categorization
- Document clustering
- Document summarization
- Information extraction
- Question answering
- Crosslingual information retrieval
-

Resources

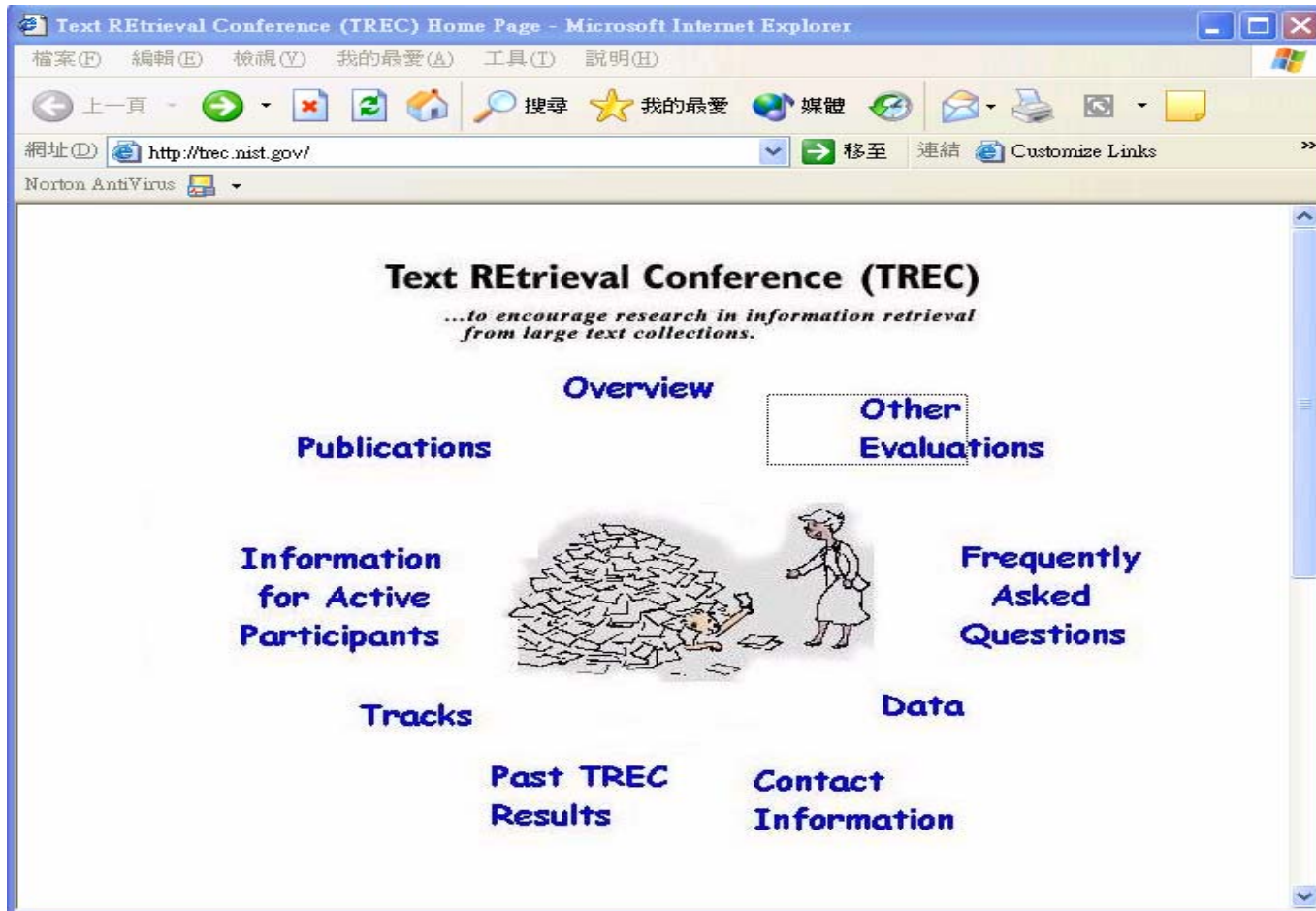
- Corpora (Speech/Language resources)
 - Refer speech waveforms, machine-readable text, dictionaries, thesauri as well as tools for processing them
- [LDC - Linguistic Data Consortium](http://www ldc.upenn.edu/)



The screenshot shows a Microsoft Internet Explorer browser window displaying the LDC website. The address bar shows the URL <http://www ldc.upenn.edu/>. The website has a yellow background and a navigation menu with links for About LDC, Members, Catalog, Projects, Papers, LDC Online, Search / Help, Contact Us, UPenn, and Home. The main content area is divided into two columns. The left column contains several news items under the heading "What's New! What's Free!", including announcements about the Fisher Project, member resources, a Scientific American article on saving dying languages, the LDC's 10th anniversary, updated FAQs, annotation graphs, SPH Convert tools, OLAC, a transcriber tool, and the appointment of Steven Bird to a committee. The right column features the LDC logo, a mission statement, a world map with red dots indicating office locations, and a notice that the LDC has moved to its new offices at 3600 Market St, Suite 810, Philadelphia, PA 19104-2653. At the bottom, it mentions support from the Information and Intelligent Systems division and the Human Computer Interaction Program of the National Science Foundation.

Contests

- [Text REtrieval Conference \(TREC\)](http://trec.nist.gov/)



Contests

- US National Institute of Standards and Technology

Benchmark Tests - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

地址(D) <http://www.nist.gov/speech/tests/index.htm>

IAD Website

NIST
National Institute of
Standards and Technology

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Information Extraction - Entity Recognition:

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Spoken Document Retrieval

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1998 Speaker Recognition Evaluation

1997 Speaker Recognition Evaluation

1996 Speaker Recognition Evaluation

Conferences/Journals

- Conferences

- ACM Annual International Conference on Research and Development in Information Retrieval (SIGIR)
- ACM Conference on Information Knowledge Management (CIKM)
- ...

- Journals

- Information Processing and Management
- Journal of the American Society for Information Science
- ACM Transactions on Asian Language Information Processing
- ...

2003 IR Workshop

- Date: 18 September, 2003
- Place: National Tsing Hua Univ., Hsinchu
- Webpage: <http://140.114.75.26/rocling/>



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資訊檢索研討會(18日一天)[\[top ↑\]](#)

會議簡介

一. 會議日期及地點

日期：中華民國九十二年九月十八日

地點：國立清華大學資電館(地下一樓)

會議議程

論文選集

報名方式

二. 主辦單位

國立台灣師範大學

中華民國計算語言學學會

食宿資訊

日期	時間	會議內容
9/18	10:30~11:20	陳信希 教授 (台大 資工系) 題目：自動摘要技術和評估 Session Chair 蘇豐文 教授 清華大學資工系
	11:20~12:10	梁焯 教授 (交大 資料系) 題目： "Information Extraction from Biomedical Literature"
	12:10~14:00	午餐與計算語言學會會員大會
	14:00~14:50	張嘉惠 教授 (中央 資工系) 題目： "Semi-supervised Information Extraction for Semi-structured Documents" Session Chair 簡立峰 博士 中研院資訊所研究員
	14:50~15:40	劉昭麟 教授 (政大 資料系) 題目： 法學資訊服務：審判輔助，教學輔助與判例檢索
	15:40~16:10	中場休息
	16:10~17:00	蔡偉和 博士 (中研院 資訊所) 題目： 流行歌曲之歌手識別與分類 Session Chair 陳柏琳 教授 台灣師範大學資工所