

User Interface for Search

Berlin Chen

Department of Computer Science & Information Engineering
National Taiwan Normal University

Reference:

Modern Information Retrieval, Chapter 2 & Teaching material

Introduction

- This lecture focuses on
 - The **human users** of search systems
 - The **search user interface**, i.e., the window through which search systems are seen
- The role of **search user interface** is to aid in the searchers' understanding and expression of their **information need**
- Further, the interface should help users
 - Formulate their queries
 - Select among available information sources
 - Understand search results
 - Keep track of the progress of their search

How People Search (1/2)

- User interaction with search interfaces differs depending on
 - The type of task
 - The domain expertise of the information seeker
 - The amount of time and effort available to invest in the process
- *Marchionini* makes a distinction between **information lookup** and **exploratory search**
- **Information lookup** tasks
 - Are akin to **fact retrieval** or **question answering**
 - Can be satisfied by discrete pieces of information: numbers, dates, names, or Web sites
 - Can work well for standard Web search interactions

How People Search (2/2)

- **Exploratory search** is divided into **learning** and **investigating** tasks
- **Learning search**
 - Requires more than single query-response pairs
 - Requires the searcher to spend time
 - Scanning and reading multiple information items
 - Synthesizing content to form new understanding
- **Investigating** refers to a longer-term process which
 - Involves multiple iterations that take place over perhaps very long periods of time
 - May return results that are critically assessed before being integrated into personal and professional knowledge bases
 - May be concerned with finding a large proportion of the relevant information available

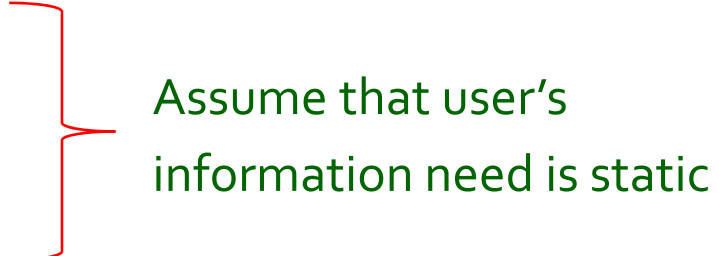
How People Search (cont.)

- More broadly, **information seeking** can be seen as being part of a larger process referred to as **sensemaking**
 - **Sensemaking** is an iterative process of formulating a conceptual representation from a large collection
- *Russell et al.* observe that most of the effort in sensemaking **goes towards the synthesis of a good representation**
- Some sensemaking activities interweave search throughout, while others consist of doing a batch of search followed by a batch of analysis and synthesis

How People Search (cont.)

- Examples of deep analysis tasks that require sensemaking (in addition to search)
 - The legal discovery process
 - Epidemiology (disease tracking)
 - Studying customer complaints to improve service
 - Obtaining business intelligence

Classic vs. Dynamic Models of Information Seeking

- Classic notion of the information seeking process:
 1. problem identification
 2. articulation of information need(s)
 3. query formulation
 4. results evaluation

Assume that user's information need is static
- More recent models emphasize the **dynamic nature** of the search process
 - The users learn as they search
 - Their information needs adjust as they see retrieval results and other document surrogates
- This dynamic process is sometimes referred to as the **berry picking** model of search

Classic vs. Dynamic Models of Information Seeking (cont.)

- The rapid response times of today's Web search engines allow searchers:
 - To look at the results that come back
 - To reformulate their query based on these results
- This kind of behavior is a commonly-observed strategy within the berry-picking approach
- Sometimes it is referred to as **orienteering**
- *Jansen et al.* made a analysis of search logs and found that the proportion of users who modified queries is 52%

Classic vs. Dynamic Models of Information Seeking (cont.)

- Some seeking models cast the process in terms of **strategies** and how choices for next steps are made
 - In some cases, these models are meant to reflect **conscious planning behavior** by expert searchers
 - In others, the models are meant to capture the **less planned, potentially more reactive behavior** of a typical information seeker

Navigation vs. Search

- **Navigation**: the searcher looks at an information structure and browses among the available information
- This browsing strategy is preferred when the information structure is well-matched to the user's information need
 - It is mentally less taxing to recognize a piece of information than it is to recall it
 - It works well only so long as appropriate links are available
- If the links are not available, then the browsing experience might be frustrating

Navigation vs. Search (cont.)

- Spool discusses an example of a user looking for a software driver for a particular laser printer
- Say the user first clicks on *printers*, then *laser printers*, then the following sequence of links:
 - HP laser printers*
 - HP laser printers model 9750*
 - software for HP laser printers model 9750*
 - software drivers for HP laser printers model 9750*
 - software drivers for HP laser printers model 9750 for the Win98 operating system*
- This kind of interaction is acceptable when each refinement makes sense for the task at hand

Search Process

- Numerous studies have been made of people engaged in the search process
- The results of these studies can help guide the design of search interfaces
- One common observation is that users often reformulate their queries with slight modifications
- Another is that searchers often search for information that they have previously accessed
 - The users' search strategies differ when searching over previously seen materials
- Researchers have developed search interfaces support both **query history** and **re-visitation**

Search Process (cont.)

- Studies also show that it is difficult for people to determine whether or not a document is relevant to a topic
 - The less users know about a topic, the poorer judges they are about if a search result is relevant to that topic
- Other studies found that searchers tend to look at only the top-ranked retrieved results
- Further, they are biased towards thinking the top one or two results are better than those beneath them simply by virtue of their position in the rank ordering

Search Process (cont.)

- Studies also show that **people are poor at estimating how much of the relevant material they have found**
- Other studies have assessed the effects of knowledge of the search process itself
- These studies have observed that **experts** use different strategies than **novices** searchers
- For instance, Tabatabai *et al.* found that
 - **Expert searchers** were more patient than **novices**
 - This positive attitude led to better search outcomes

Search Interfaces Today: Getting Started

- How does an information seeking session begin in online information systems?
 - The most common way is to use a **Web search engine**
 - Another method is to select a **Web site from a personal collection of already-visited sites**
 - which are typically stored in a **browser's bookmark**
 - Online bookmark systems are popular among a smaller segment of users
 - Ex: Delicious.com
 - **Web directories** are also used as a common starting point, but have been largely replaced by search engines

Query Specification

- The primary methods for a searcher to express their information need are
 - Either entering words into a **search entry** form
 - Selecting links from a **directory** or other information organization display
- For Web search engines, the query is specified in textual form
 - But in future, query specification via **spoken commands** will most likely become increasingly common, using mobile devices as the input medium
- Typically, Web queries today are very short consisting of **one to three words**

Query Specification (cont.)

- Short queries reflect the standard usage scenario in which the user *tests the waters*:
 - If the results do not look relevant, then the user **reformulates** their query
 - If the results are promising, then the user **navigates** to the most relevant-looking Web site
- This search behavior is a demonstration of the **orienteering strategy** of Web search

Query Specification (cont.)

- Before the Web, search systems regularly supported **Boolean operators** and **command-based syntax**
 - However, these are often difficult for most users to understand
- *Jansen et al.* conducted a study over a Web log with 1.5M queries, and found that
 - 2.1% of the queries contained Boolean operators
 - 7.6% contained other query syntax, primarily **double-quotation marks for phrases**
- *White et al.* examined interaction logs of nearly 600,000 users, and found that
 - **1.1% of the queries** contained one or more operators
 - **8.7% of the users** used an operator at any time

Query Specification (cont.)

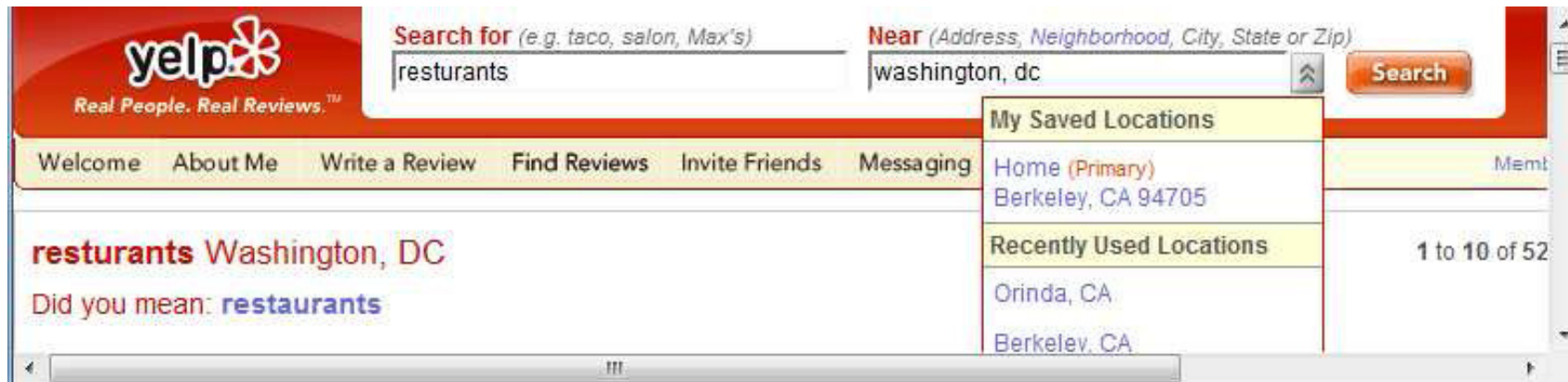
- Web ranking has gone through three major phases
- In the first phase, from approximately 1994–2000:
 - Since the Web was much smaller then, complex queries were less likely to yield relevant information
 - Further, pages retrieved not necessarily contained all query words
 - Information about query term proximity within the page was not used, nor was the information about relative importance of Web pages
- Around 1997, Google moved to conjunctive queries only
 - The other Web search engines followed, and conjunctive ranking became the norm
 - Google also added term proximity information and page importance scoring (PageRank)
 - As the Web grew, longer queries posed as phrases started to produce highly relevant results

Query Specification Interfaces

- The standard interface for a textual query is a **search box entry form**
- Studies suggest a relationship between query length and the width of the entry form
 - Results found that either small forms discourage long queries or wide forms encourage longer queries

Query Specification Interfaces (cont.)

- Some entry forms are followed by a form that filters the query in some way
- For instance, at yelp.com, the user can refine the search by location using a second form



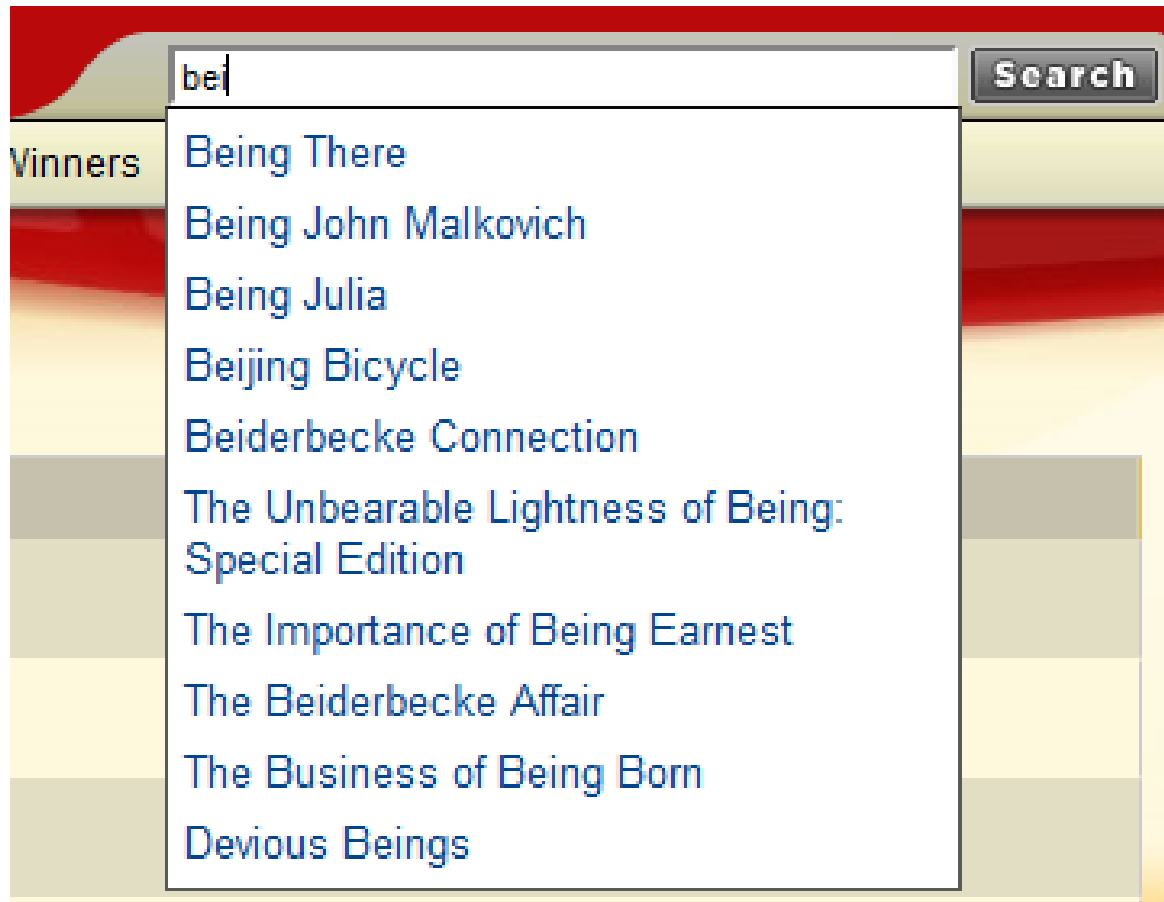
- Notice that the yelp.com form also shows the user's home location, if it has been specified previously

Query Specification Interfaces (cont.)

- Some interfaces show a list of query suggestions as the user types the query
 - This is referred to as **auto-complete**, **auto-suggest**, or **dynamic query suggestions**
 - *Anick et al.* found that users clicked on dynamic Yahoo suggestions one third of the time
- Often the suggestions shown are those whose prefix matches the characters typed so far
 - However, in some cases, suggestions are shown that only have interior letters matching
- Further, suggestions may be shown that are **synonyms** of the words typed so far

Query Specification Interfaces (cont.)

- Dynamic query suggestions, from [Netflix.com](https://www.netflix.com)



Query Specification Interfaces (cont.)

- The dynamic query suggestions can be derived from several sources, including:
 - The user's own query history
 - A set of metadata that a Web site's designer considers important
 - All of the text contained within a Web site

Retrieval Results Display

- When displaying search results, either
 - The documents must be shown in full, or else
 - The searcher must be presented with some kind of representation of the content of those documents
- The **document surrogate** refers to the information that summarizes the document
 - This information is a key part of the success of the search interface
 - **The design of document surrogates is an active area of research and experimentation**
 - The quality of the surrogate can greatly effect the perceived relevance of the search results listing

Retrieval Results Display (cont.)

The screenshot shows a Windows Internet Explorer browser window displaying Google search results for the query '限水'. The address bar shows the search URL. The search results page includes the Google logo, a search bar with the query '限水', and a search button. Below the search bar, it indicates approximately 10,300,000 results. The main content area is titled '「限水」的新聞搜尋結果' and lists several news articles with titles, dates, and snippets. On the left side, there are navigation links for '全部', '圖片', '影片', '新聞', '即時', and '更多'. Below these are search filters for '搜尋所有網站', '不限時間', and '最新內容'. On the right side, there is an advertisement for 'UB-FINE免手觸節水系統'.

限水 - Google 搜尋 - Windows Internet Explorer

http://www.google.com/search?hl=zh-tw&q=%E9%99%90%E6%B0%B4

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

限水 - Google 搜尋

所有網頁 圖片 影片 地圖 新聞 翻譯 Gmail 更多

Google 限水 搜尋

約有 10,300,000 項結果 (搜尋時間：0.74 秒) 進階搜尋

「限水」的新聞搜尋結果

二階段限水是否延後經濟部今敲定

2 小時前
經濟部今天(16日)中午舉行抗旱會議，將敲定是否延後桃竹等地的第二階段限水。如果延後原訂18、23日實施的二階段限水措施，全台工業用戶減供5%的用水壓力也可暫時解除。 ...
中央廣播電台 - 45 則相關文章

六月底不第三階段限水 桃園農灌可能多用

中時電子報 - 7 則相關文章

《經濟》老天幫忙，第二段階限水延後

中網理財 - 422 則相關文章

中部稍解渴第2階段限水延後-Yahoo!奇摩新聞

2011年5月16日 ... 中央社記者管瑞平苗栗縣15日電) 行政院長吳敦義今天到苗栗縣鯉魚潭水庫視察中部地區水情，由於連日來明顯降雨，全台水庫皆有進帳，原訂23日啟動苗栗及 ...
tw.news.yahoo.com > 生活, 氣象, 中央社

水庫稍稍解渴限水延至6月-Yahoo!奇摩新聞

2011年5月14日 ... 這幾天鋒面報到，讓全台水庫進帳3000萬噸，等於多了6天的用水 ...
tw.news.yahoo.com > 財經, 經貿財稅, 華視

水庫暫時"解渴" 限水將延到6月-Yahoo!奇摩新聞

2011年5月14日 ... 大家都希望，下雨能下在對的地方，而這波鋒面目前已經讓全台 ...
tw.news.yahoo.com > 生活, 氣象, 華視 - 頁庫存檔

顯示更多來自 yahoo.com 的結果

廣告

UB-FINE免手觸節水系統

省水節能深入您生活 腳踏式水龍頭
有效省水達65.5% 環保規格高標準
桃園縣蘆竹鄉吉林路137號
www.ub-fine.com

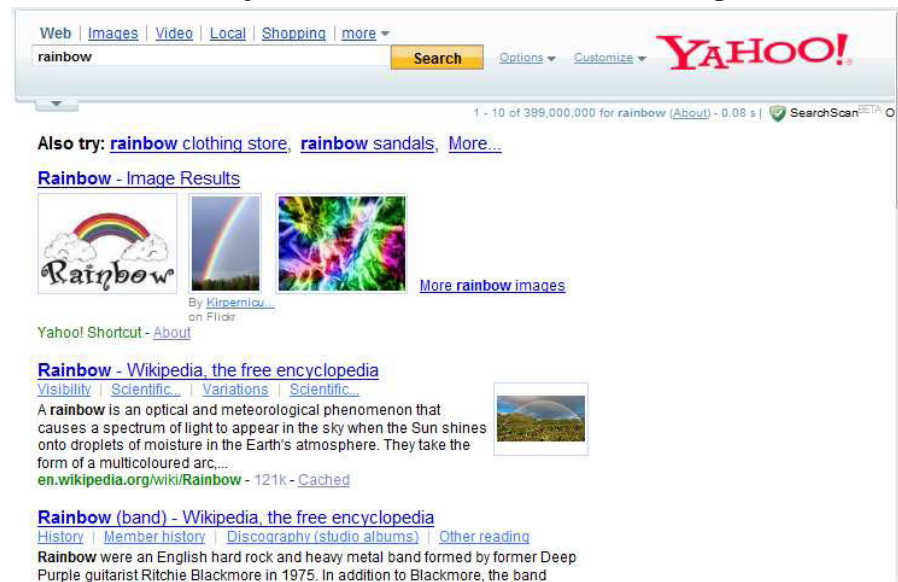
您可以在這裡登廣告 >

Retrieval Results Display (cont.)

- In Web search, the **page title** is usually shown prominently, along with the URL and other metadata
- In search over information collections, metadata such as **date published** and **author** are often displayed
- Text **summary** (or **snippet**) containing text extracted from the document is also critical
- Currently, the standard results display is a vertical list of textual summaries
- This list is sometimes referred to as the **SERP** (Search Engine Results Page)

Retrieval Results Display (cont.)

- In some cases the summaries are excerpts drawn from the full text that contain the query terms
- In other cases, specialized kinds of metadata are shown in addition to standard textual results
 - This technique is known as **blended results** or **universal search**
 - For example, a query on a term like “rainbow” may return sample **images** as one entry in the results listing



Retrieval Results Display (cont.)

- A query on the name of a sports team (e.g., “rockets”) might retrieve the latest game scores and a link to buy tickets

Web [Images](#) [Maps](#) [News](#) [Video](#) [Gmail](#) [more](#) ▼

Google rockets [Advanced Search](#)
[Preferences](#)

Web [Video](#) [News](#) [Blogs](#) [Images](#) Results 1 - 10 of about 22,800,000 for rockets [\[definition\]](#)

[NBA.com - Houston Rockets](#)
Official site containing news, scores, audio and video files, player statistics, and schedules.
[www.nba.com/rockets/](#) - 7k - [Cached](#) - [Similar pages](#)



Scores and Schedule	Rockets Power Dancers
Tickets	Stats
E-Brochure	Giveaway Nights
Players	Video Gallery

[More results from nba.com »](#)

[ROCKETS: 2008-09 ROCKETS SCHEDULE](#)
[Rocket Power Dancers](#) · [Clutch the Bear](#) · [Red Rowdies](#) · [Fan Photos](#) · [Launch Crew](#) · [Little Dippers](#) · [Recycle Item of the Month ...](#) [ROCKETS SCHEDULES & RESULTS ...](#)
[www.nba.com/rockets/schedule/](#) - 73k - [Cached](#) - [Similar pages](#)

[Rocket](#) - Wikipedia, the free encyclopedia
A **rocket** or **rocket vehicle** is a missile, aircraft or other vehicle which obtains thrust by the reaction of the **rocket** to the ejection of fast moving fluid ...
[en.wikipedia.org/wiki/Rocket](#) - 205k - [Cached](#) - [Similar pages](#)

Video results for rockets

	lakers vs rockets 11/9/2008 kobe Bryant huge ... 7 min www.youtube.com		How To Make a Mentos Coke Rocket one.rewer.com
---	---	---	---

Retrieval Results Display (cont.)

- Nielsen notes that in some cases the information need is satisfied directly in the search results listing
 - This makes the search engine an “**answer engine**”
- Displaying the query terms in the context in which they appear in the document:
 - Improves the user’s ability to gauge the relevance of the results
 - It is sometimes referred to as **KWIC** - keywords in context
 - It is also known as **query-biased summaries**, **query-oriented summaries**, or **user-directed summaries**

Retrieval Results Display (cont.)

- The visual effect of query **term highlighting** can also improve usability of search results listings
 - Highlighting can be shown both in document surrogates in the retrieval results and in the retrieved documents
- Determining which text to place in the summary, and how much text to show, is a challenging problem
- Often the summaries contain all the query terms in close proximity to one another
- However, there is a **trade-off** between
 - Showing contiguous sentences, to aid in coherence in the result
 - Showing sentences that contain the query terms

Retrieval Results Display (cont.)

- Some results suggest that it is better to show full sentences rather than cut them off
 - On the other hand, very long sentences are usually not desirable in the results listing
- Further, the kind of information to display should vary according to the intent of the query
 - Longer results are deemed better than shorter ones for certain types of information need
 - On the other hand, abbreviated listing is preferable for navigational queries
 - Similarly, requests for factual information can be satisfied with a concise results display

Retrieval Results Display (cont.)

- Other kinds of document information can be usefully shown in the search results page
 - E.g., the page results below show figures extracted from journal articles alongside the search results

The screenshot shows the BioText search engine interface. The search query is 'CXCR4 HIV-1'. The search results are displayed in a list format. The first result is titled 'Down-regulation of cell surface CXCR4 by HIV-1' by Choi, B., Gatti, P., Fermin, C., Vigh, S., Haislip, A., Garry, R. (2008) *Virology Journal*. The abstract text is visible, and there are full-text excerpts. To the right of the abstract, there are several small thumbnail images representing figures from the article. The second result is titled 'Differential control of CXCR4 and CD4 downregulation by HIV-1 Gag' by Valiathan, R., Resh, M. (2008) *Virology Journal*. The abstract text is visible, and there are also thumbnail images representing figures from the article. The interface includes a search bar, a search button, and various filters and options for displaying the results.

Query Reformulation

- There are tools to help users reformulate their query
 - One technique consists of showing terms related to the query or to the documents retrieved in response to the query
- A special case of this is spelling corrections or suggestions
 - Usually only one suggested alternative is shown: clicking on that alternative re-executes the query
 - Some years ago, the search results were shown using the purportedly incorrect spelling

Query Reformulation (cont.)

- Microsoft Live's search results page for the query "IMF"

The screenshot shows the Microsoft Live Search interface for the query "IMF". The search bar at the top contains "IMF" and the results are categorized under "Web" with 1-10 of 9,500,000 results. The primary result is the "IMF -- International Monetary Fund Home Page" with a brief description and a link to the website. Below this, there are several sub-links related to the IMF, such as "IMF Country Page", "Publications", "Data And Statistics", "What The IMF Does", "About The IMF", "How To Contact Us", "IMF Recruitment", and "For Students". A secondary result for "Western Asset Inflation Management Fund Inc. (IMF)" is shown, featuring a line chart of its price over time, a current price of 15.34 (up 0.07 or 0.46%), and financial metrics like Volume (12,567), P/E Ratio (NA), and Market Cap (NA). To the right, there are "Related searches" including "International Monetary Fund", "The World Bank", "International Music Feed", "IMF Download", "History IMF", "International Ministerial Fellowship", "Indian Mountaineering Foundation", and "IMF Archive Manager". At the bottom right, there are "Sponsored sites" like "Sirana SpamCenter".

Live Search | MSN | Windows Live United States | Options | cashback | Sign in

Live Search

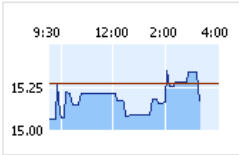
Web 1-10 of 9,500,000 results · [Advanced](#)
See also: [Images](#), [Video](#), [News](#), [Maps](#), [More](#) ▾

IMF -- International Monetary Fund Home Page
IMF Home page with links to News, About the IMF, Fund Rates, IMF Publications, What's New, Standards and Codes, Country Information and featured topics
www.imf.org/external/index.htm · [Cached page](#)

[IMF Country Page](#) [Publications](#)
[Data And Statistics](#) [What The IMF Does](#)
[About The IMF](#) [How To Contact Us](#)
[IMF Recruitment](#) [For Students](#)

[Show more results from www.imf.org](#)

Western Asset Inflation Management Fund Inc. (IMF)

 ▲ **15.34**
+0.07 (0.46%)

Volume	12,567
P/E Ratio	NA
Market Cap.	NA

[Company Report](#) · [Financial Results](#) · [Earning Estimates](#) · [Quotes by Comstock, 20 min delay](#) - Data in US Dollars

* [Western Asset Inflation Management Fund Inc. Announces...](#) BusinessWire 6 days ago
* [Western Asset Inflation Management Fund Inc. Announces...](#) BusinessWire 3/4/2009

Helpful? [Yes](#) | [No](#)

International Monetary Fund - Wikipedia, the free encyclopedia
The **International Monetary Fund (IMF)** is an international organization that oversees the global financial system by following the macroeconomic policies of its member countries, in particular those with an impact on exchange rates and the balance of payments. It is an organization formed to stabilize international exchange rates and facilitate development. [2]
[Organization and purpose](#) · [Data Dissemination ...](#) · [Membership qualifications](#)
en.wikipedia.org/wiki/IMF · [Cached page](#)

Related searches
[International Monetary Fund](#)
[The World Bank](#)
[International Music Feed](#)
[IMF Download](#)
[History IMF](#)
[International Ministerial Fellowship](#)
[Indian Mountaineering Foundation](#)
[IMF Archive Manager](#)

Sponsored sites
[Sirana SpamCenter](#)
Web-based application that enables administration of MS Exchange **IMF**.
www.sirana.com
[See your message here...](#)

Query Reformulation (cont.)

- **Term expansion**: search interfaces are increasingly employing related term suggestions
- Log studies suggest that **term suggestions** are a somewhat heavily-used feature in Web search
- *Jansen et al.* made a log study and found that **8% of queries were generated from term suggestions**
- *Anick et al.* found that **6% of users who were exposed to term suggestions chose to click on them**

Query Reformulation (cont.)

- Some **query term suggestions** are based on the entire search session of **the particular user**
- Others are based on behavior of **other users** who have issued the same or similar queries in the past
 - One strategy is to show similar queries by other users
 - Another is to extract terms from documents that have been clicked on in the past by searchers who issued the same query

Query Reformulation (cont.)

- **Relevance feedback** is another method whose goal is to aid in query reformulation
- The main idea is to have the user indicate which documents are relevant to their query
 - In some variations, users also indicate which terms extracted from those documents are relevant
- The system then computes a new query from this information and shows a new retrieval set

Query Reformulation (cont.)

- Nonetheless, this method (i.e., relevance feedback) has not been found to be successful from a usability perspective
 - Because that, it does not appear in standard interfaces today
- This stems from several factors:
 - People are not particularly good at judging document relevance, especially for topics with which they are unfamiliar
 - The beneficial behavior of relevance feedback is inconsistent

Organizing Search Results

- Organizing results into meaningful groups can help users understand the results and decide what to do next
- Popular methods for grouping search results: **category systems** and **clustering**
- **Category system**: meaningful labels organized in such a way as to reflect the concepts relevant to a domain
 - Good category systems have the characteristics of being coherent and relatively complete
 - Their structure is predictable and consistent across search results for an information collection

Organizing Search Results (cont.)

- The most commonly used category structures are **flat**, **hierarchical**, and **faceted** categories
- **Flat categories** are simply lists of topics or subjects
 - They can be used for grouping, filtering (narrowing), and sorting sets of documents in search interfaces
- Most Web sites organize their information into general categories
 - Selecting that category narrows the set of information shown accordingly

Organizing Search Results (cont.)

- Some experimental Web search engines automatically organize results into flat categories
 - Studies using this kind of design have received positive user responses (*Dumais et al.*, *Kules et al.*)
- However, it can be difficult to find the right subset of categories to use for the vast content of the Web
- Rather, category systems seem to work better for more focused information collections

Organizing Search Results (cont.)

- In the early days of the Web, **hierarchical directory systems** such as Yahoo's were popular
 - **Hierarchy** can also be effective in the presentation of search results over a book or other small collection
- An alternative representation is the **faceted metadata**
 - Unlike flat categories, faceted metadata allow the assignment of multiple categories to a single item
 - Each category corresponds to a different facet (dimension or feature type) of the collection of items

Organizing Search Results (cont.)

- Figure below shows an example of faceted navigation

The screenshot displays the 'Flamenco Fine Arts Search' interface. At the top, it includes a search bar, a 'search' button, and navigation links: 'Save Search', 'History and Settings', 'Return to Search', 'New Search', and 'Logout'. Below the search bar, there are radio buttons for 'all items' (selected) and 'in current results'. The main search area shows the current search terms: 'keyword "castle"', 'LOCATION: Europe', and 'MEDIA: Print'. A message states: 'These terms define your current search. Click the [x] to remove a term.' Below this, it indicates '197 items, grouped by MEDIA (view ungrouped items)'. The results are organized into faceted navigation panels on the left and a grid of image thumbnails on the right.

Flamenco Fine Arts Search
Images from the Collections of the Fine Arts Museums of San Francisco; Legion of Honor and de Young Museums, <http://www.thinker.org>

Powered by Flamenco

Save Search History and Settings Return to Search New Search Logout

search
 all items in current results

These terms define your current search. Click the [x] to remove a term.

keyword "castle" [x]
LOCATION: Europe [x]
MEDIA: Print [x]

197 items, grouped by MEDIA (view ungrouped items)

MEDIA: all > Print

aquatint (4)	lithograph (21)
drypoint (10)	mezzotint (14)
engraving (50)	woodcut (12)
etching (77)	

LOCATION: all > Europe (group results)

Austria (1)	Italy (14)
Belgium / Flanders (5)	Scotland (5)
Bohemia (8)	Spain (1)
France (27)	Switzerland (2)
Germany (19)	more...
Holland (24)	

OBJECTS (group results)

Clothing (89)	Musical Instruments (4)
Containers (21)	Vehicles (56)
Food and Meals (45)	Weapons (27)
Fuel (2)	Writing Tools (13)
Lighting (2)	

BUILT_PLACES (group results)

Bridge (18)	Dwelling (197)
Building (56)	Part of Building (44)
Built Open Space (14)	Road (21)

ANIMALS AND PLANTS (group results)

Birds (19)	Mammals, Hoofed (43)
Creatures and Beasts (1)	Mammals, Other (39)
Fish and Molluscs (5)	Parts of Plants (4)
Flowers (5)	Trees (33)

aquatint (4)

Caernarvon Castle, ... 18th - 19th century	Dunstanborough Castle 1808	Edinburgh Castle N... 1801	Untitled (landscap... circa 1780

drypoint (10)

Lindesfarne Castle 19th - 20th century	Stirling Castle, N... 19th - 20th century	Castle Moyle 19th - 20th century	Landscape with a ... 19th - 20th century

Organizing Search Results (cont.)

- **Clustering** refers to the grouping of items according to some measure of similarity
- It groups together documents that are similar to one another but different from the rest of the collection
 - Such as all the document written in Japanese that appear in a collection of primarily English articles
- The greatest advantage of clustering is that it is fully automatable
- The disadvantages of clustering include
 - An unpredictability in the form and quality of results
 - The difficulty of labeling the groups
 - The counter-intuitiveness of cluster sub-hierarchies

Organizing Search Results (cont.)

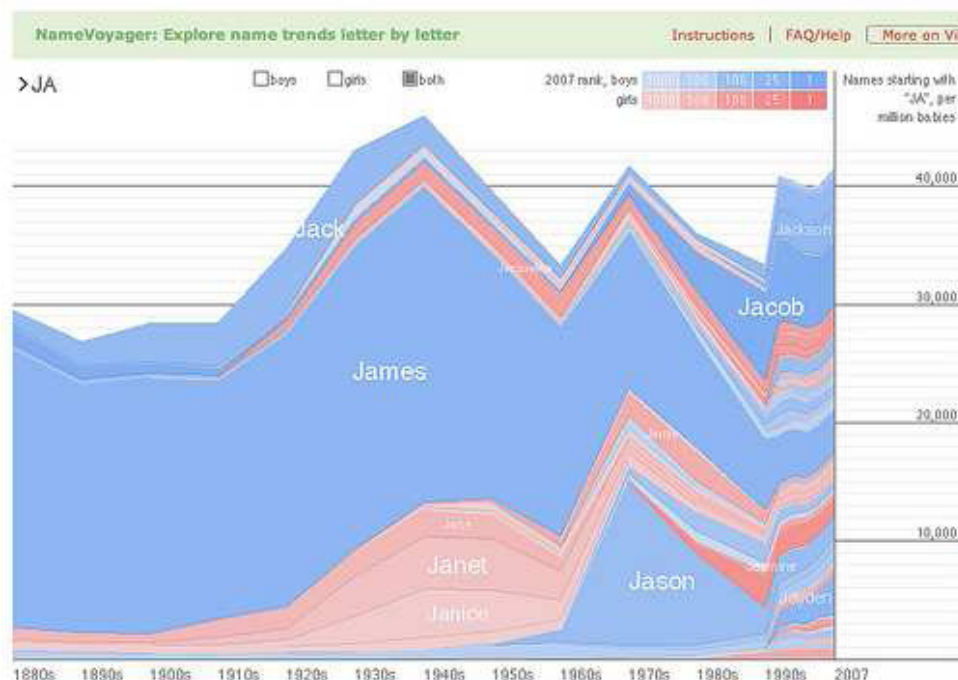
- Output produced using Findex clustering

The screenshot shows a Microsoft Internet Explorer browser window displaying search results for the term "jaguar" on the Findex website. The browser's title bar reads "Findex search: jaguar - Microsoft Internet Explorer". The address bar shows "http://". The Findex logo is visible on the left side of the page. A search bar at the top right of the page contains the text "jaguar" and a "Search" button. Below the search bar, the text "Found about 3 140 000 results for the query." is displayed. The search results are organized into a list of categories on the left and a list of search results on the right. The categories include "All results", "jaguar cars 11", "august 9", "club 9", "jaguar panthera onca 9", "mac jaguar 9", "atari jaguar 9", "apple 8", "largest 7", "cats 6", "information 6", "released 6", "reviews 6", "powerful 5", "virtual 5", and "endangered 5". The search results include:

- Atari Jaguar FAQ**: Atari Jaguar FAQ. Atari Archives. ... Q. What was the Atari Jaguar/Jaguar64? ... (41) <http://www.digiserve.com/eescape/showpage.phtml?page=a2>
- Jaguar Interactive II -- The Premier 24-Hour Atari Jaguar ...**: ... 09:45 26/Jun/04, Jaguar Collector, ... 18:07 25/Jun/04, Jaguar Collector, ... (59) <http://www.atarihq.com/interactive/>
- Atari Jaguar VLM**: Atari Jaguar VLM. Mucho thanks to Joe Britt for the pix and modification details. Atari's Virtual Light Machine (VLM), was developed ... (66) http://www.audiovisualizers.com/toolshak/vidsynth/jag_vlm/jag_vlm.htm
- AtariAge - Atari Jaguar History**: ... However, after the Summer CES that year, Atari announced that the Panther was cancelled so that they could concentrate on a new machine, the 64-bit Jaguar. ... (95) <http://www.atariage.com/Jaguar/?SystemID=JAGUAR>
- Slashdot | New Atari Jaguar Game Running \$1,225 on eBay**: ... New Atari Jaguar Game Running \$1,225 on eBay. Games: ... Bill Kendrick writes, "The long-awaited Atari Jaguar game Battle Sphere has finally been released. ... (100) <http://slashdot.org/articles/00/03/02/1430232.shtml>
- Slashdot | New Atari Jaguar Game Running \$1,225 on eBay**: ... New Atari Jaguar Game Running \$1,225 on eBay. Games: ... Bill Kendrick writes, "The long-awaited Atari Jaguar game Battle Sphere has finally been released. ... (101) <http://slashdot.org/articles/00/03/02/1430232.shtml>

Visualization in Search Interfaces

- Experimentation with visualization for search has been primarily applied in the following ways:
 - Visualizing Boolean syntax
 - Visualizing query terms within retrieval results
 - Visualizing relationships among words and documents
 - Visualization for text mining



Design and Evaluation

- User interface design: a field of **Human-Computer Interaction (HCI)**
- This field studies how people think about, respond to, and use technology
- User-centered design: a set of practices developed to facilitate the design of interfaces
- The design process begins by determining what the intended users' goals are
- Then, the interface is devised to help people achieve those goals by completing a series of tasks

Design and Evaluation (cont.)

- Goals in the domain of information access can range quite widely
- The design of interfaces is an iterative process, in which the goals and tasks are elucidated via **user research**
- Evaluating a user interface is often different from evaluating a ranking algorithm or a crawling technique
 - The quality of a user interface is determined by how people respond to it
 - If a person has a choice between two systems, they will use the one they prefer
 - The reasons for preference may be determined by a host of factors: speed, familiarity, aesthetics, preferred features, or perceived ranking accuracy